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Plenary Lectures

Plenary Lecture 1: PL/01

Translational Research using Yoga Nidra: Model for Chronic Insomnia

Karuna Datta¹, Manjari Tripathi², Hrudananda Mallick²

¹ Present affiliation: Department of Sports Medicine, AFMC Pune, work was done at AIIMS New Delhi as PhD scholar, ² AIIMS New Delhi.

Introduction: Various complementary and alternative medicine have been tried for insomnia. Yoga nidra is an ancient technique by which sages used to sleep. Yoga nidra has been used as a therapeutic option with no documented side effects. There was a felt need to assess yoga nidra as a therapeutic option and develop a model for its use in chronic insomnia patients.

Material and methods: The principal author visited Bihar school of Yoga, Munger, India and attended sessions of yoga nidra. Permission to use yoga nidra for chronic insomnia patients was taken. She had discussions with the teachers and doctor in the school. She also did sessions herself under supervision while in to help planning for the patients subsequently. Planning of the session was done keeping these discussions in mind. Yoga nidra intervention was done using pre-recorded audio CD on yoga nidra© from the school which are available on sale. Planning of the model included assessment of participants for readiness and voluntary participation and conducting supervised sessions. Outcome measures were sleep diary, Pittsburgh sleep quality index, insomnia severity index, depression anxiety stress scales and pre sleep arousal scale. Baseline polysomnography (PSG) was done for all patients. Repeat PSG was done in patients who consented for it.

Results: 10 patients completed the intervention. After yoga nidra intervention, we found significant improvement in total sleep time, sleep onset latency, WASO, sleep quality, insomnia severity, and pre sleep arousal scale after yoga nidra. There was a significant increase in N3 sleep on PSG.

Conclusions: Yoga nidra can be used as an important adjunct in management of chronic insomnia patients.

Acknowledgements: The authors acknowledge the support of Bihar School of Yoga Munger, Bihar, India and sleep technicians in the sleep lab in completing this study.
Plenary Lecture 2 : PL/02

Integrated Curricula in Medical Education: Benefits and Challenges

Dr. Latika Mohan

Professor and Head, Dept of Physiology, AIIMS, Rishikesh.

While designing a curriculum, goals which will describe the behaviors a student will exhibit upon graduation and later on in life have to be defined. The role model for most Indian medical students is a tertiary care subspecialist who is practicing in an urban well equipped referral hospital, whereas the need of the country is to have more primary care physicians who are confident practicing in a resource poor rural location. In addition, there is an information explosion and with the wide availability of internet and technology and the manner in which young students learn is very different from as it was in previous years. Medical curriculum in India is in dire need of reform, along with the way it is implemented. Integrated teaching has been adopted by most medical schools worldwide. Some of the methods utilized and lessons learnt from the west are discussed. Vertical integration between basic sciences and clinical medicine has been shown to achieve deeper learning, stimulate reflection on biomedical principles, stimulate clinical research and improve motivation. In India most medical colleges follow traditional curricula and there is very little interdisciplinary interaction. An attempt is made here to discuss integrated teaching and its feasibility in the Indian medical education. A model is proposed where in first year of basic sciences teaching provides buffer period and early hospital and clinical services exposures sensitize students to the basics of their future role. In second year, integration can be started after 6 months of a foundation period where the basics of general pathology, general microbiology and general pharmacology are taught with horizontal integration, cutting redundancies. In addition, the students are introduced to the hospital and to basics of history taking and clinical examination. Next three and a half years, a modular competency based curriculum is introduced with vertical integration between pre, para, and clinical disciplines. Certain skill based competencies reserved for internship should also be included in the MBBS course before the final prof examination, as most of internship time is utilized for PG entrance preparation. For integration of all elements in these modules if adequate faculty is not available, e-learning technology and simulation can be utilized and factored into the modules. A blueprint curriculum, defined with adequate amount of flexibility and robustness, with nodal trained personnel to implement and monitor is the need of the hour.
Keynote Address

Keynote Address 1:

MicroRNAs in Diabetic Heart: from Biomarker to Target for Therapy

Dr. Rajesh Katare

Associate Professor, Department of Physiology, University of Otago, New Zealand.

Diabetic heart disease (DHD) is often unrecognized in the subclinical stage due to absence of pathognomonic signs, thereby restricting timely diagnosis and management of disease. Identifying early modulators of disease will not only help in early detection of disease, but also allow sufficient time for optimization of treatment. Recently, microRNAs (miRs) are gaining popularity as diagnostics and key regulators in the pathophysiology of several diseases including cardiovascular diseases. However, the diagnostic potential and pathophysiological role of miRs in DHD is still unrecognized. In this seminar I will provide an overview of our pre-clinical and clinical studies aiming to establish the pathophysiological role of cardiovascular enriched microRNAs (miR-15a/b, miR-133a, miR-208a, miR-499, miR-126 and miR-132) in accelerating the heart disease in diabetics. Promising results suggest the clinical translation is no more a dream!
Symposium Abstracts

SYMPOSIUM 1: Physiological Response of Low Landers in high altitude condition

Speakers:

1. Effect of Intermittent Normobaric Hypoxia Exposure (IHE) on Physiologic Adjustment and Acute Mountain Sickness (AMS) during Rapid Ascent to High Altitude

Dr. G. Bhaumik, Defence Institute of Physiology and Allied Sciences, Lucknow Road, Timarpur, Delhi-110054, India.

2. Predicting Susceptibility to High Altitude Pulmonary Edema (HAPE)

Dr. R. K. Gupta, Defence Institute of Physiology and Allied Sciences, Lucknow Road, Timarpur, Delhi-110054, India.

3. Sleep Architecture in Indian and Kyrgyz Low Landers at High Altitude

Dr. Koushik Ray, Defence Institute of Physiology and Allied Sciences, Lucknow Road, Timarpur, Delhi-110054, India.

4. Time-Dependant Effects of High Altitude Hypoxia on Brain Functions in Unacclimatized Lowlanders

Dr. Usha Panjwani, Additional Director, Divisional Head, Applied Physiology Division, Defence Institute of Physiology and Allied Sciences, Lucknow Road, Timarpur, Delhi-110054, India.

SHA/01

Effect of Intermittent Normobaric Hypoxia Exposure (IHE) on Physiologic Adjustment and Acute Mountain Sickness (AMS) during Rapid Ascent to High Altitude

G. Bhaumik, D. Das, D. Ghosh, H. Kumar

Defence Institute of Physiology and Allied Sciences, Lucknow Road, Timarpur, Delhi-110054, India.

High altitude (H A) is defined as an elevation of 9000 ft and above. At this height most of the people develop acute mountain sickness (AMS) and if it is untreated this may lead to high altitude pulmonary edema (HAPE) or high altitude cerebral edema (HACE), both are potentially life threatening. AMS occurs on rapid ascent to high altitude and is characterized by headache, anorexia, nausea, fatigue, dizziness, insomnia etc. Acclimatization by staging or temporarily residing at moderate altitude prior to ascending to higher altitude reduces the incidence and severity of AMS and found to be effective. Different pharmacological interventions are also in use to reduce AMS but they have their own side effects. An alternative non-pharmacological approach to induce acclimatization (pre-conditioning) and reduce the incidence of AMS is use Intermittent hypoxic exposure (IHE). In this laboratory, the IHE study was conducted on human subjects and IHE was given at sea level at 12% FiO2 (altitude air equivalent 4350m) for 4 hrs per day for 4 consecutive days. On the fifth day, subjects were airlifted to Leh (altitude 3500m), Western Himalayas by pressurized aircrafts. Different physiological parameters like AMS score...
(Lake Louise Score), pulse arterial oxygen saturation (SaO2), ventilator parameters like ventilation, oxygen consumption, and ventilator drive were recorded on daily basis for six consecutive days. On day one at HA, 60% of control group suffered from AMS whereas IHE group treated group showed only 10%. IHE treated group also showed the significant increase in SaO2, ventilation and ventilatory drive. These results suggest that modest physiological adjustments by IHE for 4 hrs per day for 4 days significantly reduces the incidence of AMS during rapid ascent to high altitude at 3500m.

SHA/02

Predicting Susceptibility to High Altitude Pulmonary Edema (HAPE)

Poonam Soree1, Rajinder K. Gupta1, Krishan Singh1, Koundinya Desiraju2, Anurag Agrawal2, Praveen Vats3, Abhishek Bharadwaj3, T. P. Babura1, Pooja Chaudhary1, Vijay Singh1, Saroj K Verma1, Amir Chand Bajaj1, Usha Panjwani1, ShashiBala Singh1.

1Defence Institute of Physiology and Allied Sciences, Timarpur, Delhi-110054, India, 2CSIR Institute of Genomics and Integrated Biology, Mall Road, Delhi 110007, India.

Exaggerated pulmonary pressor response to hypoxia is a pathognomic feature observed in high altitude pulmonary edema (HAPE) susceptible individuals. It was investigated whether chronic hypoxia mediated vascular remodeling can cause baseline elevated pulmonary artery pressure and exaggerated pulmonary vascular response to hypoxia and could improve identification of HAPE susceptible subjects. We studied baseline HIF 1 alpha levels, baseline hemodynamics and the response to hypoxia (Flo2 = 0.12 for 30 min duration at sea level) in HAPE resistant (no past history of HAPE, Control) and HAPE susceptible (past history of HAPE, HAPE-S) subjects. Baseline Ppa and plasma HIF 1 alpha levels were high in HAPE-S subjects compared to control. Acute hypoxia produced an exaggerated increase in heart rate (p<0.05), mean arterial pressure (p<0.05) and Ppa (p<0.05) and fall in peripheral oxygen saturation (p<0.05) in HAPE-S compared to control. Receiver operating characteristic (ROC) curves showed that Ppa response to acute hypoxia was the best variable to identify HAPE susceptibility (AUC 0.92) but HIF 1 alpha levels provided comparable information (AUC 0.87). HIF 1 alpha levels are easy to determine and may represent an important marker for the determination of HAPE susceptibility

SHA/03

Sleep architecture in Indian and Kyrgyz low landers at high altitude

Koushik Ray, Praveen Vats1, Krishna Kishore1, Supriya Saini1, Debojyoti Bhattacharyya1, Bhuvensh Kumar1, Akpay Sarybaev2, ShashiBala Singh1.

1Defence Institute of Physiology and Allied Sciences, Defence Research and Development Organization, Ministry of Defence, Lucknow Road, Timarpur, Delhi-110054, Kyrgyz Indian Mountain Biomedical Research Centre Togolok Moldo Str 3, Bishkek-720040, Kyrgyz Republic.

Background: High-altitude (HA) environments have adverse effects on the normal body functioning of people accustomed to living at low altitudes because of the change in partial pressure of oxygen. Sustained exposure to hypoxia has adverse effects on body weight, muscle structure and exercise capacity, mental functioning, and sleep quality. The changes in sleep pattern at high altitude are probably related to oxygenation of the sleep related centres on the brain.
**Objective:** In the present study quality and quantity of different component of sleep was evaluated at an altitude of 3200m in two different ethnic populations.

**Material and methods:** 20 Indian and 20 Kyrgyz soldiers participated in the study. Overnight sleep recording was carried out on sea level, 1st, 3rd, 7th and 14th nights at HA and after de-induction.

**Results:** Sleep latency and REM latency were increasing from day 1 of exposure but significantly higher (p<0.001) on 7th day in both the groups. In Kyrgyz it comes to near baseline value after 14th day and after de-induction but in Indian sleep latency and REM latency were still significantly higher (p<0.001) after 14 days than baseline. Deep sleep (N3) and REM sleep were significantly reduced from day 1 in both the groups and further reduced significantly (p<0.001) till 14th day but maximum reduction (p<0.001) were observed on 7th day than baseline.

**Conclusion:** From the results it may be concluded that the overall sleep architecture was disturbed in both the ethnic groups but Kyrgyz soldiers were faster in sleep acclimatization than Indians.

**Keywords:** Sleep, High Altitude, REM, NREM

**SHA/04**

**Time-Dependant Effects of High Altitude Hypoxia on Brain Functions in Unacclimatized Lowlanders**

**Usha Panjwani, K Ray, K Kishore, J Prasad, S Kumar**

Defence Institute of Physiology and Allied Sciences, Defence Research and Development Organization, Ministry of Defence, Lucknow Road, Timarpur, Delhi-110054.

**Background:** Brain functions are compromised at high altitude (HA). There is scanty information about the time-dependent effects of residence at HA in unacclimatized lowlanders

**Objective** The present study aimed to evaluate the effect of residence at high altitude on brain functions

**Methods** The study was conducted in normal healthy unacclimatized lowlanders of the Indian army in the age group 20-30 years. Sleep profile, Event related potentials, P300 and Contingent negative variation (CNV), Cerebral blood volume, Spatial working memory (SWM), Choice reaction time (CRT) and Paired Associate learning (PAL) were evaluated at sea level (Pathankot), within 7 days of induction to 14500 ft (Loma), after 1 month and after 6 months of residence at 14500 ft (Fukche) in the Western Himalayas.

**Results** There was an increase in sleep latency, % Wake and number of awakenings and decrease in sleep efficiency at 7 days and after 1 month but values recovered partly at 6 months of residence. A reduction in mean correct responses of CRT and increased number of errors in SWM and PAL was observed at 7 days and 1 month but values partly recovered at 6 months at HA. Event related potential P300 showed an increase in P3 latency and CNV showed an increased M1 peak latency at 7 days but showed the same trend at 6 months. There was an increase in Cerebral blood volume at HA at 7 days as compared to sea level but values recovered partly after 1 month and further recovered after 6 months of residence at HA. **Conclusion** High altitude exposure (14500 ft) altered brain functions at HA in a time dependent manner. Further follow up studies up to 2 years at HA and on de-induction will give leads on appropriate tenure of posting at HA.

**Key words:** High altitude, Sleep, Cognitive functions, ERP, P300, CNV
SYMPOSIUM 2: Nano particle - Role in Current Medical Practice

Speakers:

1. Nanoparticle Clearance in Translational Cancer Theranostics

Dr. Aravind Kumar Rengan, Assistant Professor, Department of Biomedical Engineering, Indian Institute of Technology, Hyderabad.

In the field of cancer theranostics, there are many nanoparticles that are being researched for their potency in imaging (diagnosis) and therapeutics. The current nano-photothermal agents (in clinical research) for cancer treatment are non-biodegradable and can’t be completely cleared from the body, limiting their usage. We have designed a biodegradable analogue that is efficient for photothermal therapy of cancer and also gets cleared from the physiological system at ease. This nano-system holds great promise in translational research towards improvement in patient healthcare.

SNM/02

Disease-responsive Drug Delivery: An Emerging Concept for the Treatment of Inflammatory Diseases

Dr. Praveen Kumar Vemula, Institute of stem cell Biology and Regenerative Medicine (inStem), Bangalore, Karnataka.

A significant leap in drug delivery is an autonomous system that titrates the amount of drug released in response to a disease, for instance, inflammation, ensuring the drug is released only when needed at therapeutically relevant concentration. Diseases have inherently fluctuated in nature such as inflammatory and autoimmune diseases, in particular, pose an enormous challenge to deliver drugs in safe, efficient and compliant manner. In what follows we will take a brief look at current approaches about nanotechnology-based therapeutics and with examples taken from our work to examine how disease-responsive biomaterials have developed to i) improve the lifetime of the transplanted organs and ii) inflammation-targeted drug delivery to alleviate inflammatory bowel diseases.

SNM/01

Nanoparticle Clearance in Translational Cancer Theranostics

Dr. Aravind Kumar Rengan, Assistant Professor, Department of Biomedical Engineering, Indian Institute of Technology, Hyderabad.

In the field of cancer theranostics, there are many nanoparticles that are being researched for their potency in imaging (diagnosis) and therapeutics. The current...
A Trilayer Model for Studying the Interplay between Human Retinal Pigment Epithelial and Endothelial cells

Karthikka Palanisamy, Subbulakshmi Chidambaram, R.S. Metha Jain

Department of Biochemistry and Cell Biology, Vision Research Foundation, Chennai, India, School of Chemical and Biotechnology, SASTRA University, Thanjavur, India, Department of Biochemistry and Molecular biology, Pondicherry University, Puducherry.

Background: The microenvironment of outer retina is largely regulated by Retinal pigment epithelium (RPE) and choroid. Damage to either of these layers lead to the development of age related macular degeneration (AMD). A simplified cell culture model that mimics the RPE/Bruch’s membrane (BM)/Choroidal layers of the posterior segment of the eye will be of great importance in elucidating the molecular mechanism of disease progression. Therefore, in this study, we characterized an in vitro primary culture model of RPE/BM/Choroid based on human retinal pigment epithelial (hRPE) and choroidal endothelial cells (hCEC).

Methods: Three cadaver eyes aged 32, 35 and 42 years were used for the isolation of primary cells. We have optimized RPE explant culture for maximum yield of human retinal pigment epithelial cells. Human microvascular choroidal endothelial cells were isolated using collagenase and anti-CD31 beads. The duo of hRPE/hCEC and HUVEC/ARPE19 cells were grown on either side of amniotic membrane (AM) or 0.4μm polycarbonate transwell inserts. Permeability assay was done using 4 kDa and 20 kDa FITC Dextran.

Results: The isolated primary cells expressed the endothelial and epithelial specific markers. EGM2 medium enhanced the yield of hRPE cells from RPE explants. Intriguingly, hRPE/AM/hCEC trilayer culture lost the characteristic morphological features while ARPE19/AM/HUVEC culture was intact. Secretion of VEGF in the insert grown bilayer of hCEC/hRPE was significantly higher (22 pg/ml) than the hCEC monolayer (3 pg/ml). DMSO treatment followed by FITC dextran permeability studies showed that hRPE/hCEC system could be modulated to mimic the disease conditions. Further, the model was treated with 100 ng/ml of VEGF, which increased the permeability of bilayer for 20 kDa FITC dextran while addition of bevacizumab reversed the effect.

Conclusion: The transwell insert based primary hRPE/hCEC bilayer model would be an ideal system for studying the disease mechanisms and the crosstalk between RPE and Choroid. This model will also be useful in screening small molecules and performing drug permeability kinetics.

SYMPOSIUM 3: Role of Physiologist in Sleep Medicine

Speakers:

1. New technology to study Sleep, Sleep Medicine and Role of Physiologist

   Tripat Deep Singh, International Sleep Specialist (World Sleep Federation Program) Singapore

2. Sleep Medicine and Role of Physiologist - Pondicherry Institute of Medical Science Model

   Dr. Subhasis Das, Professor and Head, Pondicherry Institute of Medical Science, Puducherry.
3. Opportunities in India- “Role of Indian Society for Sleep Research”

Dr. H. N. Mallick, Professor of Physiology, AIIMS, New Delhi, President Indian Society for sleep Research.

Sleep is a universal phenomenon and it occurs in humans as well as animals. Investigators study different aspects of Sleep with help of different technologies, like-

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In India, Sleep is taught in Undergraduate Medical curriculum for 1 hr only and Sleep disorders are not taught at all. The awareness of Sleep disorders among the general public is low as well.

For this symposium, I have chosen to discuss how the technology required to evaluate Sleep and Sleep problems evolved from ultra-specialization to managing sleep disorders at home to our phones becoming the sleep testers.

**Historical Perspective**

Interest in Sleep increased with discovery of EEG by Hans Berger in 1924. In 1936, Loomis classified Sleep into Five stages- A-E. In 1950, Aserinsky and Kleitman discovered REM Sleep. In 1957, Dement and Kleitman Classified Sleep into NREM and REM. In 1968, Rechtschaffen and Kales developed the first manual giving rules for Sleep Staging based on EEG, EOG and Chin EMG. But this manual covered only sleep staging and did not cover abnormal events during sleep. In 2007, American Academy of Sleep Medicine (AASM) published a manual for scoring sleep and associated events including Respiratory events, movement events, arousals and Cardiac events.

This manual has been revised several times and the latest revised manual was released on 1st April 2017.

International Classification of Sleep Disorders (ICSD) was published in 1990 and revised again in 1997. It was totally revised in 2005 with publishing of 2nd edition of ICSD. In 2014, AASM released ICSD 3rd edition which is built on the foundation laid by the ICSD 2nd edition released in 2005. ICSD is a result of over 100 American Task force members and international members’ hard work. ICSD second edition had removed the axial system of the previous ICSD 1st edition and limited its scope to the diagnostic criteria.

It also listed only one set of criteria to apply universally. The ICSD 3rd edition has
maintained the seven major sections to initially classify the sleep disorders. These include Insomnia, Sleep-related breathing disorders, Central disorders of hypersonmolence, Circadian rhythm sleep-wake disorders, Parasomnias, Sleep-related movement disorders and other sleep disorders. Since much scientific evidence is still lacking, the ICSD 3rd edition recommends allowing some clinical judgment while establishing diagnosis by meeting all of the defining criteria. ICSD-3 specifically distinguishes the pediatric obstructive sleep apnea.

Technology and Sleep Disorders

For this section I will limit the discussion to use of technology to study Obstructive Sleep Apnea. In 1956, Burwell and colleagues described the first OSA patient clinically. In 1965, French scientist Gestaut added measurements of airflow and chest wall motion to other PSG measures to document obstruction of the upper airway (UA) at night. The interest in management of OSA increased after the discovery of CPAP as treatment for OSA by Colin Sullivan in 1981.

Polysomnography (PSG) is the gold standard for diagnosis of OSA. It measures EEG, EOG, EMG, ECG, Oxygen Saturation, Airflow, Respiratory effort, Snoring and Body Position. The diagnostic criteria for OSA based on PSG are-

1. $\text{RDI} \geq 15/\text{hr}$, or
2. $\text{RDI} \geq 5/\text{hr}$ with symptoms like snoring, daytime sleepiness, impaired memory, witnessed apneas and chocking, Insomnia, nocturia.

RDI is total no. of apneas plus hypopneas plus RERA’s divided by Total Sleep Time. It does not take into account the duration of apneas or hypopneas, no. of Oxygen desaturations and proportion of apneas versus hypopneas. Despite these limitations of RDI/AHI, it is still the best indicator that we have to study OSA.

It is known now that OSA can be caused by several factors like abnormal arousal threshold, altered loop gain, abnormal activity of upper airway muscles besides anatomical reasons. An attempt is being made to study each of these factors in individual patients and personalize the therapy based on that. But the current technology to measure above parameters is not routinely available and is present in research settings only.

Several observational studies have shown association between OSA and Cardiovascular morbidity. Marin et al (2005) have shown that if you treat moderate to severe OSA with CPAP, occurrence of both fatal and non-fatal cardiovascular events is decreased. But the recently conducted SAVE trial reported that therapy with CPAP plus usual care, as compared with usual care alone, did not prevent cardiovascular events in patients with moderate-to-severe obstructive sleep apnea and established cardiovascular disease though CPAP significantly reduced snoring and daytime sleepiness and improved health-related quality of life and mood. One of the limitation of the study only 3.7hrs of use of CPAP per night. New Phone app based technologies like Dream mapper (Philips Respironics) and Air View (Resmed) have been developed to improve compliance of patients.

The PSG is time consuming, costly and technically demanding technology. The field is moving towards managing OSA patients using simple technologies at home which is less costly, less time consuming and less technically challenging. The technology is called Home Sleep Testing (HST). It measures Airflow, respiratory effort and Oxygen Saturation or some devices are based on technology assessing Peripheral Arterial Tonometry. Till 2007 studies were comparing HST
devices with PSG but from 2007 the focus is changed. Now the clinical outcomes of starting CPAP treatment for OSA after HST are being compared with clinical outcomes of treatment initiated on the basis of PSG. There have been 7 studies published till 2012 on this topic but all the studies excluded patients with co-morbidities.

Recently there are attempts to simplify the technology to diagnose OSA and new devices based on different technologies are being validated. One device which is worn around neck differentiates benign snoring from OSA. Another device is measuring suprasternal pressure to differentiate between OSA and CSA.

**Consumer Sleep Technologies**

With advent of Smart Phones, Watches and wearables several parameters, including Sleep, that reflect health state can be assessed on a day to day basis. These are popularly called Consumer Sleep Technologies. Below is the table with broad classification and some examples for each-

<table>
<thead>
<tr>
<th>Mobile Device Platforms</th>
<th>Wearable Platforms</th>
<th>Embedded Platforms</th>
<th>Desktop or Website Platforms</th>
<th>Accessory Appliance Platforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep Cycle</td>
<td>FitBit</td>
<td>Tanita Sleep Scan</td>
<td>MedHelp Sleep Tracker</td>
<td>Clocky</td>
</tr>
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</tr>
<tr>
<td>Sleep as Android</td>
<td>Smart Watches</td>
<td>Sleep NumberX12</td>
<td>SHUTi</td>
<td>emWave</td>
</tr>
<tr>
<td>Sunriser</td>
<td>Basis Peak</td>
<td>Early Sense</td>
<td>SleepyHead</td>
<td>Resmed S+</td>
</tr>
<tr>
<td>ENTRAIN</td>
<td>Sleep Image</td>
<td></td>
<td>Sense with Sleep Pill</td>
<td>Withings AURA</td>
</tr>
<tr>
<td>Go! To Sleep</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is hardly any research supporting the claims of these technologies. Also the manufacturers of these technologies update them at much rapid pace then the medical community can catch up with it. By the time any study is published validating the technology, new version of the technology already has been released.

These technologies are becoming an important part of human lives. Whether we like it or not, patients will come to the clinic asking to interpret the data of these devices.

My suggestion is that instead of throwing the data away in light of no evidence, we should take a look at the data to see whether it is making any sense clinically. These technologies are at least engaging the consumers in their own health and they become self-aware and interested in their health.

**Computer Assisted Sleep Scoring**

Manual scoring of sleep studies is time consuming process and lead to inter scorer variability in scoring them. To reduce scoring time and reduce inter scorer variability, new softwares have been developed to do Computer assisted Sleep scoring, like Somnolyzer and Michelle.

<table>
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delta wave duration) during scoring may greatly reduce scoring variability and that better training or fine-tuning of the scoring guidelines are not likely to be effective in improving Inter-scorer variability during sleep staging.

These Computer assisted scoring systems should not be seen as a threat to jobs of Sleep technologists. Rather they will free up the Sleep technologists time from scoring to be spent on more patient interaction activities like explaining PAP therapy, proper fitting of the mask, follow up of the patient and troubleshooting their issues with PAP therapy.

**Future Directions**

We need to learn these technologies well and at a fast speed as they are evolving very fast. We need to teach more about Sleep and Sleep disorders at the undergraduate and PG Medical Curriculum. Basic sciences and Clinical departments should work hand in hand to handle the patient burden. There are a lot of educational opportunities available in India and the information can be obtained from the websites of following Sleep societies in India-

1. Indian Society for Sleep Research (ISSR)- [www.issr.in](http://www.issr.in)
2. Indian Sleep Disorder Association (ISDA)- [www.isda.co.in](http://www.isda.co.in)
3. Indian Association of Surgeons for Sleep Apnea (IASSA)- [www.iassa.in](http://www.iassa.in)

ISSR publishes newsletter “Sleep Watching India” two times in a year. It contains educational information and also training opportunities in different countries in the field of Sleep Medicine and Technology. It is available on ISSR website under the newsletter tab. To keep the readers updated about the latest in the field of Sleep Medicine and Technology, ISSR publishes “Sleep Medicine Literature Updates” two times in a year and it is available on ISSR website under the Literature update tab. I am sure the readers will benefit from these resources.

Sleep Well. Sleep on Time.

**SYMPOSIUM 4: Personalized Medicine – Need, Current status and Challenges**

**Speakers:**

1. **Need for Personalization of Medicine**
   Dr. Prasanth Ganesan, Associate Professor, Department of Medical Oncology, Cancer Institute (WIA), Adyar, Chennai.

2. **Personalization of Medicine - Current Status**
   Dr. C. Adithan, Director of the Central InterDisciplinary Research Facility (CIDRF) and Professor of Pharmacology at the Mahatma Gandhi Medical College & Research Institute, Pondicherry.

3. **Challenges in Implementation of Personalized Medicine - Clinicians Perspective**
   Dr. T. Kadhiravan, Additional Professor of Medicine, JIPMER, Pondicherry.

**SPM/01**

**Personalization of Medicine - Current Status**

Dr. C. Adithan, Director of the Central InterDisciplinary Research Facility (CIDRF) and Professor of Pharmacology at the Mahatma Gandhi Medical College & Research Institute, Pondicherry.

Personalized Medicine (PM) is aimed at tailoring the preventive or medical
treatments to the individual characteristics of each patient. An important component of precision medicine is pharmacogenomic research. Precision Medicine Initiative (PMI) announced by the former U.S. President in 2015, promises to usher in a new, individualized approach to patient care. The PMI includes genetic information, defining loss of function mutations, biomarker research, health risk models, new disease classifications, empowering patients with their individual health data, and creating a platform for targeted therapy trials. At present, there is a lot of interest in PM. Many companies including in India, started offering pharmacogenetic testing services. There are some positive evidences for benefits of genetic testing of anticancer and cardiovascular drugs. However, its acceptance by practising clinicians and regulatory approval is lagging. This is mainly due to lack of high level evidence (e.g, RCT) for their wider acceptance. It appears that there are missing links between genomic information and the real benefit to the suffering patients. The details will be presented in the conference and ii) Lack of reimbursement by insurance plans. This raises the pertinent question, should personalised medicine interventions be viewed and evaluated, as any other conventional healthcare intervention such as a new drug, using the same paradigm. Or else, should we have different benchmarks for adopting personalised medicine interventions into clinical practice? In the words of Dr David Hunter, “Arriving at the era of precision medicine does not mean that we can be so certain of molecular mechanisms that therapeutic decisions should not be subject to adequately powered trials.” These challenges, however, are not insurmountable. Genomic-based personalised medicine interventions throw up other challenges as well — how to communicate effectively with patients about the meaning and implications of genetic tests. Finally, there could be some theoretical limit to the personalisation of treatment that can be achieved. For example, personalisation might not be possible if the within-person variability for a particular trait exceeds the between-person variation.

**SPM/02**

**Challenges in Implementation of Personalized Medicine - Clinicians Perspective.**

Dr. T. Kadhiravan, Additional Professor of Medicine, JIPMER, Pondicherry.

While personalised medicine has the potential to revolutionise health care, many of the well-researched discoveries have not found acceptance into clinical practice yet. Genotype-guided dosing of warfarin could serve as a case-study to understand the challenges in implementing personalised medicine. Two of the main reasons why genotype-guided dosing of warfarin has not found wide acceptance are — i) Data showing a beneficial effect of genotype-guided dosing on hard clinical outcomes is limited;
3. The Recent Advances in the Management of Sports Related Injuries - The Orthopedic Perspective

Dr. Deep Sharma, Dept of Exercise Physiology, Sports Physiology of India, Bangalore, Karnataka.

SSP/01

Evaluation of Sports persons and Biomechanics

Dr. Raksha Jaipurkar, Trainee Exercise Physiology, Dept of Exercise Physiology, Sports Physiology of India Bangalore, Karnataka.

Biomechanics is a multidisciplinary science involving application of mechanical principles in study of structure and function of human body. The term biomechanics combines the prefix ‘bio’ means life and ‘mechanics’ means the study of action of forces. Biomechanics describes the science involving study of mechanical aspects of living organism. The forces include both internal forces produced by muscles and external forces that act on the body. Statics and dynamics are two major sub-branches of biomechanics. Statics involve study of systems that are in constant motion i.e. either at rest or moving at constant velocity. Dynamics is study of systems in which acceleration is present. Kinematics and kinetics are further subdivisions of biomechanics. Kinematics is what we are able to observe while watching the body in motion. It involves size, sequencing and timing of motion. Kinematics of sports skill is basically form or technique of game. Whereas kinematics describes appearance of motion, kinetics is the study of forces associated with the motion.

Although biomechanics is relatively young field of science, biomechanical considerations are of interest in several scientific disciplines and professional fields. Biomechanists can have a scientific background from orthopedics, sports medicine, zoology, biomechanical engineering, physiotherapy and kinesiology. Biomechanics of human movement is the sub-discipline of kinesiology i.e. the study of human movement.

Problems studied by biomechanists

In aeronautics and space research: study of effect of microgravity on human body. Bone loss is limiting factor for long term stay in space. Biomechanists have developed instruments such as treadmill for optimal use for new bone formation, also voluntary muscle contraction with electrical stimulation of muscles to maintain muscle mass and tone. Biomechanists are also in study of elderly people. Age is associated with mobility impairment, maintaining balance, and frequent fall related fractures. Biomechanists worked for developing intervention strategies such as limiting trunk movement along with whole body exercise to prevent falls. Occupational biomechanists are involved in studies to prevent work related injuries. They are also involved in designing innovative equipments, apparels in sports by conducting experiments in wind tunnels that involve controlled situation encountered during specific sport eg. aerodynamic helmets, clothing cycle designs used in competitive cycling. Sports biomechanists have directed their efforts towards improving technique component of athletic performance. Eg. Al Oerter four times Olympic discus champion bettered his performance at age of 43 by 8.2 m. in addition to motivation and training, some part of performance was also attributed to enhanced technique following biomechanical analysis. Biomechanists contribute to knowledge base for full gamut of human movement from physically disabled child to elite athletes. Basic knowledge of biomechanics is essential for professionals such as
coaches, trainers, Physical education teachers, physiotherapist, etc.

Kinematics concept of human motion

Most human movement is general motion, complex combination of linear and angular motion. Linear motion involves uniform motion along a line that may be straight or curved, with all parts of body moving in same direction of speed. Motion is straight line is known as rectilinear motion. When uniform motion is along curved line, it is known as curvilinear motion. Angular motion involves rotation around central line or point. Movements of human body are referenced to sagittal, frontal and transverse plane associated with mediolateral, AP and longitudinal axes respectively.

Experience in performing motor skill does not necessarily translate to proficiency in analyzing the skill. Qualitative analysis requires knowledge of specific biomechanical purpose of movement. Repeated observation of motor skills is useful in helping to distinguish consistent performance errors from random error. Use of video camera is useful for movement analysis. Reflective joint markers tracked by camera for automatic digitizing of movement. Motion analysis software tracks joint markers in 3D space. Digital camera with infrared light ring is used for tracking reflective markers of subject. Accelerometer is also used for measuring acceleration during non-linear movements.

Kinetic concepts of human motion

Kinetic concepts are mass, force, weight, pressure, volume, density, specific weight, torque, impulse, etc. Several types of mechanical loads act on body such as compression, tension, shear, bending and torsion. Force of gravity and friction enable walking and manipulation of objects in specific way when internal forces are produced by muscles. Inertia is tendency to resist change in state of motion. e.g A skater has tendency to continue gliding with constant speed and direction due to inertia. Force can be push or pull acting on the body it is product of mass and acceleration. Weight is amount of gravitational force exerted by earth on a body. Centre of gravity is point around which body’s weight is equally balanced no matter how the body is positioned. Torque or moment of force is rotatory effect created by eccentric force. It is product of force and the perpendicular distance from the force’s line of action to the axis of rotation. Centric force produces translation while eccentric force produces translation and rotation. Impulse is product of force and time over which it acts. Tension is pulling or stretching force directed axially through the body. Shear is directed parallel to the surface while stress is distribution of force within the body. Lumbar vertebra bear more weight of body during standing position so it should be logically under more stress but stress is not proportional to weight borne by vertebra, as load bearing areas of lumbar vertebra are larger than upper vertebrae. Torsion is load bearing twisting of body. Repeated loading is repeated application of subacute load that is relatively of low magnitude. Acute loading is application of a single force of sufficient magnitude to cause injury to biological tissue. Tools for measuring kinetic quantities are electromyography for neuromuscular functions and dynamography i.e. force platforms and pressure platforms for gait research, starts, take off, landing etc.

Biomechanics of human skeletal muscle articulation

The anatomical configuration of joint of human body governs directional movement capability. The ends of freely movable joints are covered with particular cartilage to reduce the contact stress and
for lubrication. The menisci present in some joint also contribute to these functions. Tendons and ligaments are collagenous tissues and are elastic and extensible. Joint stability is ability of joint to resist displacement of articular bones. Major factor in determining stability of joint is shapes of articulating bone and arrangement and strength of muscles, tendons and ligaments. Joint flexibility is function of relative tightness of muscle and tendons. If they are not stretched they tend to shorten. The joint flexibility can be increased by active versus passive stretching. Proprioceptive neuromuscular facilitation (PNF) is effective procedure for stretching muscles and ligaments.

**Biomechanics of skeletal muscle**

Muscles are elastic and extensible and respond to stimulus. Most importantly muscles are only biological tissue capable of developing tension. Functional unit of muscle is motor unit. Muscle responds to stimulation by developing tension. The resultant action may be concentric, eccentric and isometric i.e. shortening, lengthening or remaining unchanged. There is well defined relationship between force output and velocity of shortening, length of muscle at the time of stimulation and time since onset of stimulus. The force production is enhanced if muscle is prestretched. Muscle performance is described in terms of strength, power and endurance. Strength is ability of muscle group to generate torque at a joint. Power is rate of torque production and endurance is resistance to fatigue.

**Linear kinematics of human movement.**

Kinematics is form or technique of movement. Careful kinematic analysis of sequencing and timing of body segments which translate into skill may help coaches, PE teachers for improving sports performance. E.g Kinematic of soccer kick involves hip flexion, knee extension and plantar flexion at ankle. Elite sprinters develop both greater horizontal and vertical velocity coming of starting blocks as compared well trained nonelite sprinters. The volleyball spike jump in subtleties in approach kinematics certainly influence the height of spike jump. For human gait, speed is product of stride length and stride frequency. Overly long stride length should be avoided while running to prevent hamstring strain. Most runners tend to choose combination of stride length and frequency that minimizes physiological cost of running. Running downhill increases speed which is function of increased stride length. Exactly opposite happens in uphill running. Fatigue is expected near the end of marathon running is result of increased stride frequency and decreased stride length. Elite 1500m runners are differentiated from other performers in the event by more efficient use of hip during running. In racing events, comparisons are done based on pace. Pace is inverse of speed. It is the time taken to cover given distance. Unit of pace is min/km. Acceleration and deceleration have implication for injury on human body. ACL tear is common when athlete decelerates rapidly and changes direction quickly.

**Kinematic of projectile motion**

Bodies projected into air are projectile. Basketball, discus, high jumper and sky diver are all projectile as long as they are moving in air unassisted. The horizontal and vertical components of projectile motion are independent. The ball hit horizontally has same vertical component as ball dropped with no horizontal velocity.

Force of gravity affects the vertical component of projectile motion. Neglecting the air resistance, the horizontal speed of a projectile remains constant throughout the motion. Trajectory is flight path. Trajectory of
Projectile depends on angle of projection, speed, and relative height of projection. Projectile flight time is increased by increasing vertical component of projection velocity or increasing relative projection height. This phenomenon is very useful for diving sports, discus throwers, etc.

Factors influencing projectile motion

<table>
<thead>
<tr>
<th>Variable</th>
<th>Factors of influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight time</td>
<td>Initial vertical velocity, relative projection height</td>
</tr>
<tr>
<td>Horizontal displacement</td>
<td>Horizontal velocity, relative projection height</td>
</tr>
<tr>
<td>Vertical Displacement</td>
<td>Initial vertical velocity, relative projection height</td>
</tr>
<tr>
<td>Trajectory</td>
<td>Initial speed, projection angle, relative projection height</td>
</tr>
</tbody>
</table>

Projection angle has direct implication on basketball game. Nearly vertical angle of entry into basket allows a somewhat larger margin of error than horizontal angle of entry.

Angular kinematics of human movement

Why is driver longer than 9-iron?

This question is related to angular motion. Relative angle is the angle formed between longitudinal axes of adjacent body angles. Absolute angle is angular orientation of body segments with reference to fixed line of reference. Goniometers are used for measuring relative body angles. Greater the angular velocity of cricket bat, farther the struck ball will travel.

Linear kinetics of human movement

Linear kinetics is study of linear forces associated with linear motion. The interrelationships among many kinetic quantities are identified in Newton’s laws of motion. The skater has tendency to continue gliding with constant speed and direction because of inertia. In accordance with Newton’s third law of motion, ground reaction forces are sustained with every footfall during running. The ground reaction forces are external forces acting on the body. Use of longer stride during running increases retarding horizontal component of ground reaction forces. During high jump take off, the horizontal component of ground reaction forces decreases horizontal velocity while vertical component of ground reaction forces contribute to vertical velocity. Friction force is generated when two surfaces are in contact. Magnitude of static and kinetic friction is determined by coefficient of friction. Direction of friction force is opposite to direction of motion. The coefficient of friction and dancers shoes and floor must be small enough to allow freedom of motion but large enough to prevent slippage. Other factors that determine the behavior of two bodies in contact are momentum and elasticity. Linear momentum is product of objects mass and velocity. Mechanical work is product of force and distance. Mechanical
power is the work done over a time. Mechanical energy is of two forms; kinetic and potential. During pole vault, the bent pole stores strain energy for subsequent release as kinetic energy and heat.

**Equilibrium and human movement**

Levers are rigid, bar like bodies which can be made to rotate about an axis. Fulcrum is point of support or axis about which lever may be made to rotate. There are three types of levers, First, Second and Third. Muscles and bones function as levers. Most joints function as third class lever, well structured for maximizing range of motion, movement of speed, but requiring muscle force of greater magnitude than the resistance to overcome. The angle which muscle pulls the bone also affects its mechanical effectiveness. The rotatory effect created by applied force is torque. Torque is a rotatory force. Rotatory motion is caused by torque, a vector quantity with magnitude and direction. Torque is a product of force and force’s moment of arm which is a perpendicular distance of force’s line of action to the axis of rotation. When muscle develops tension, it produces torque at the joint. Rotation of joint occurs in the direction of resultant joint torque. As joint moves through the range of motion, there are changes in moment arm. For any given muscle, the moment arm is maximum when angle of pull on the bone is closest to 90°. As moment of arm decreases, muscle must produce more force to generate a constant joint torque. In cricket, fielder increases the moment of arm between ball hand and total body axis of rotation during throwing of ball. In rowing sport, traditionally adjacent crew members row on opposite side of hull, the moment of arm between ort and stern of the boat is factor affecting performance. With this arrangement, rowers from one side were placed farther away from the stern as compared to their counterparts from other side, thus causing net torque resulting lateral oscillation about the stern during rowing. The Italian and German rowers developed alternative positioning to eliminate net torque and assuming force produced by all the rowers is same. The torques required at the hip, knee and ankle during cycling are influenced by bodies position and cycle dimension. The mechanical behavior of body is subject to various forces which are greatly influenced by centre of gravity. CoG is the point around which mass of the body are balanced no matter how body is positioned. Speed and projection angle of an athlete’s total body centre of mass largely determine performance outcome of high jump. Base of support is area bound by outermost regions of contact between body and support surface. Body’s mechanical stability is its resistance to linear and angular acceleration. Body’s stability is influenced by mass, friction, centre of gravity and base of support. Kabaddi requires extremely strong muscle hence mesomorphic endomorph physique will suit sports like kabaddi. In contrast gymnasts are at disadvantage with greater body mass because most gymnastic skills require disruption of stability. About base of support, the martial artist typically assumes wide stance during defensive situation to increase stability, but sprinters in starting block maintain relatively small base of support so that they can quickly disrupt stability at the start of race. The height of centre of gravity to the base of support also affects the stability. The strategy of lowering the CoG prior to takeoff enables the athlete to lengthen the vertical path over which the body is accelerated, thus facilitating high vertical velocity at take off. Higher the CoG, greater the potentially disruptive torque created if body undergoes angular displacement. Horizontal location of CoG to base of support also affects stability. Closer the horizontal location of CoG to edge of base of support, smaller force is required to push it outside base of support. The swimmer on the blocks...
positions her CoG close to the front boundary of her base of support to prepare for forward acceleration. So increasing mass, friction and base of support, vertically positioning CoG as low as possible will increase stability.

**Angular kinetics of human motion**

Resistance to angular acceleration is known as moment of inertia. The linear force that acts on rotating body is centripetal (centre seeking) directed towards centre of rotation. Its magnitude depends on mass, speed, and radius of rotation. Cyclists, runners, and motorists lean into the curve to offset the torque created by centripetal force acting on base of support. The arm swing during take-off contributes significantly to diver’s angular momentum. During air-born execution of spike in volleyball, compensatory rotation of lower limb offsets forceful swinging of arm so that total body angular momentum is conserved.

**SSP/02**

**Physiological Monitoring of Sports Personnel**

Dr. Raksha Jaipurkar, Dr. Karuna Datta, Dr. Deep Sharma P

Dept of Exercise Physiology, Sports Physiology of India Bangalore, Karnataka.

Physical activity is the body movement produced muscle action that increases energy expenditure e.g. daily routine activities. Exercise is planned, structured, repetitive, purposeful physical activity. Eg. walking, jogging, running, swimming, tennis games, gymnastics, boxing, wrestling, hockey, cricket, etc. in 2016 Olympics 28 sports were contested.

Exercise Physiology is evolved from its parent discipline Physiology and sports physiology applies concepts of exercise physiology to training the athlete and enhancing athletes performance.


Exercise Physiology is the study of how body responds in function and structure to 1. Acute exercise stress and 2. Chronic physical activity.

The role of exercise physiologist in sports is 1. Searching the facts and developing theories, disseminating knowledge and preparing sports personnel.

**History of Exercise Physiology:**

First published book in Exercise Physiology in 1889 “Physiology of Bodily Exercise” by Ferdinand LaGrange. Prof Archibald Hill (AV Hill) received Nobel Prize in 1922 for production of heat and mechanical work in muscle. His work resulted in wide ranging applications in sports physiology. Professor David Bruce Dill (DB) was a pioneering exercise Physiologist who initially worked on crocodile later redirected his efforts on human performance when he became director of Harvard Fatigue Laboratory in 1927.

**Physiological Adaptations to training**

Principle of individuality

Principle of specificity

Principle of progressive load

Principle of hard and easy

Principle of periodization

Skeletal muscle and exercise:

Endurance and speed during exercise depends largely on your muscle ability to produce energy and force.
**Slow twitch (ST)** | **Fast Twitcha (FTa)** | **Fast Twitchb (FTb)**
---|---|---
**Oxidative capacity** | High | Moderate | Low
**Glycolytic capacity** | Low | High | highest
**Contractile speed** | Slow | Fast | Fast
**Fatigue resistance** | High | Moderate | Low
**Motor unit strength** | Low | High | High

World champions in marathon runners possess 93-99% ST fibres in their gastrocnemius and world class sprinters have only 25% of ST fibres in this muscle.

**Muscle strength:**
Maximal force a muscle or group of muscles generate is termed as strength.
1 repetition maximum (1RM) is maximal weight individual can lift just ones.
Power is functional application of both strength and speed. It is a key component of most athletic performance. Strength is determined by maximum weight individual can lift
Power is determined by performing 1RM as explosively as possible.
Power =Force* Distance from chest to full arm extension/Time to lift the weight
Muscular endurance is greatest number of repetitions that could be completed using 75% of 1RM
Speed is innate quality that changes little with training
Power is increased exclusively through gain in strength and through changes in metabolic and circulatory changes.

<table>
<thead>
<tr>
<th>Athlete</th>
<th>Athlete</th>
<th>Athlete</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td><strong>Strength</strong></td>
<td>100 Kg</td>
<td>200 Kg</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>100 kg lifted 0.6 m in 0.5 sec =120kg m/s</td>
<td>200 kg lifted 0.6 m in 2 sec =60 kg m/s</td>
</tr>
<tr>
<td><strong>Muscle endurance</strong></td>
<td>10 repetitions with 75 kg</td>
<td>10 repetitions with 150 kg</td>
</tr>
</tbody>
</table>

Athlete B has more strength and muscle endurance.

**Resistance training principles**
1. Identify group of muscles to be trained
2. Identify type of training
3. Number of repetitions per set
4. Number of sets per workout
As intensity of training increases, set must decrease. Emphasize on exercising higher resistances (High intensity i.e % of 1RM) and lower repetitions for strength gain.
To develop muscle endurance emphasize on lower resistance and more repetitions.

**Energy systems:**
1. **Phosphagen system**
   Pcr + ADP ------Cr + ATP (8sec –100 m sprint)
2. **Glycolysis—Anaerobic source of energy (30-60 sec) (In Cytoplasm)**
   Glucose ---- Pyruvic acid+2 ATP+2 Lactate (middle and long distance runners to provide kick in the sprint finish)
   Pyruvic acid --- Aerobic (Kreb’s cycle)
   Pyruvic acid --- Anaerobic (Lactate+ H⁺)
3. Aerobic
   Pyruvic acid----Aerobic (Kreb’s cycle)
   Pyruvate will build up lactate until
   exercise goes past 60 sec to 40 min.
   Ones past 60 secs pyruvate will enter
   Krebs’s cycle as Acetyl CoA with 10
   conversions yielding 1 ATP. Complete
   glucose breakdown yield 36 ATPs.

4. When exercise exceeds 40 min,
   Lipolysis will begin and yield 129 ATP

Cross over concept:
Exercise intensity at which lipid and
   carbohydrate utilization is equal. In
   trained individuals, crossover occurs at
   around 60-70 % of VO2 Max because of
   decrease in glycogen and increase in
   noradrenaline and adrenaline. These
   hormones increase lipolysis. Longer the
   duration of exercises are more reliant on
   lipids. Crossover occurs after 3-5 hours of
   sub-maximal work.

Metabolic Mill:
   Relationship between O2 independent
   and O2 dependent systems.
   Phosphagen: 8-10 sec
   Glycolysis: 30-60 sec
   Aerobic : 60 sec – Hours
   Systems are not mutually exclusive. These
   systems can be trained and become more
   efficient. These above times will change
   depending upon training.
   Aerobic training
   Long term adaptation:
   1. Decrease in basal HR
   2. Increase in capillarization
   3. Increase in muscle mitochondria
   4. Increase in VO2 max
   5. Increase in plasma volume

Strength training adaptation:
   1. Neuromuscular system will account for
      improvement
   2. Emphasis on fast twitch muscle fibres
   3. Short term response to flexibility
      training: Stretch reflex prevents rapid
      overstretching of muscles.

Periodization of resistance training
   Phase I: Muscle hypertrophy
   Phase II: Strength
   Phase III: Power
   Phase IV: Peak strength
   Phase V: Active recovery

Resistance training should be sports
   specific
   Intensity is amount of weight you are
   lifting i.e. %1RM
   Volume is number of reps and sets.
   Volume = 5*5*80= 2000kg ( 5 sets of 5
   reps with 80 kg bench press where 80 kg is
   intensity)
   High intensity = 5*5*100= 2500 kg volume
   High volume=5*10*75= 3750 kg volume
   High volume low intensity is preferred for
   weightlifters.

Excess post exercise oxygen consumption
   (EPOC): EPOC is defined as excess O2
   uptake above resting level during
   recovery.

Two phases of oxygen debt.
1. Alactic O2 debt: Is a rapid phase of
   recovery from strenuous exercise to
   restore ATP and PCr depleted during
   last phase of exercise.
2. Lactoid oxygen Debt: This phase
   represents reconversion of lactate to
   liver glycogen.

Intermittent exercise and recovery:
   Interval training approach, utilization of
   energy and rest intervals forms basis of
   interval training program. Player uses
   submaximal efforts to overload specific
   energy system
   e.g all out exercise for 8 secs,
   intramuscular phosphagen provide energy
   with little demand from glycolytic
   pathway. Submaximal graded exercise is
   any physical activity where intensity or
   workload of exercise is increased at steady
   rate but upto 85% of max HR. Rapid
   recovery ensues and exercise begin again.
For optimal recovery from steady state exercise, player can perform exercise at 55-60% of VO2 max with little or no lactate accumulation with faster recovery.

VO2 max: Expressed in ml/kg/min- more accurate comparison in different sized individuals in weight bearing events such as running. In non weight bearing events such as swimming, cycling, etc endurance performance is more closely related to VO2 max expressed in Lit/min.

Interaction between aerobic and anaerobic efforts:
It is measure by two methods:
1. EPOC, 2. Lactate threshold (LT)

Lactate threshold is the point at which lactate begins to accumulate in blood.

LT is interaction between aerobic and anaerobic systems. It is the point during exercise of increasing intensity when rate of lactate production exceeds rate of lactate clearance. LT is expressed in terms of % VO2 max. The major determinants of successful endurance performance are VO2 max and % VO2 max at which athlete can be maintained for prolonged period. Person with highest lactate threshold exhibits best endurance performance.

LT of non athletes is 50-60% of VO2 max
Endurance athletes is 70-80% of VO2 max

Economy of efforts:
When athlete becomes more skillful at performing exercise, energy demands reduce.
Marathon runners are more energy efficient than middle distance runners.

For successful endurance athletes requirements:
1. High VO2 max
2. High LT expressed in % VO2 max
3. High energy economy efforts expressed as low VO2 for same rate of work
4. High % of ST muscle fibres.

Muscle soreness:
Acute Muscle soreness occurs immediately following exercise due to H+, lactic acid and tissue edema.
Delayed onset muscle soreness (DOMS): It results primarily from eccentric action such as downhill run associated with acute muscle damage.
Reducing negative effects of DOMS is important for maximizing training gains.

Fatigue and its causes:
1. Exhaustion of energy systems
2. Accumulation of metabolic end products
3. Nervous system fatigue
4. Failure of muscle fibre contractile system

Exercise associated muscle cramps (EAMC): EAMCs are associated with electrolyte and fluid imbalance, high sweating rate, sustained alpha motor neuron activity.

To prevent EAMCs:
1. Athlete should be well conditioned to reduce muscle fatigue, 2. Regularly stretch those muscles which are prone for cramps, 3. Maintain fluid and electrolyte balance and carbohydrate store.

Physiological monitoring of sports personnel:
While performing physiological monitoring the athletes participating in specific game, exercise physiologist must know the requirements of game such as:
1. Total duration of game.
2. Energy systems involved in game
Events in game such as short and moderate duration of high intensity bouts, any recovery period between them.
Laboratory test Vs Field test:
Laboratory testing has greater degree of control hence can produce more reliable results. However it is more expensive and lacks ecological validity. Field assessments are inexpensive, easy to administer and usually performed under natural conditions. Reliability and validity of field tests are subjected for errors of measurements, and specificity of test selection for specific game.

Reasons for testing metabolic domains:
Evaluation of genetic factors, training status, strength and weakness, training outcome, monitoring.

Various Tests:
Anthropometry: Measuring height, weight, girth, skin fold thickness, DEXA scans for muscle mass allows us comparisons between teams

Determining aerobic power (VO2 max)
Ability to sustain low to moderate intensity exercise for long duration.

Common field tests for VO2 max:
Cooper 12 m run test
20 m Beep test
YoYo test

Determining anaerobic capacity is maximal amount of high intensity work that can be performed less than 60 sec.
10*20 m RAST test
30 s wingate cycle test
100-400 m sprint test
These last 10-60 sec and tend to deplete anaerobic energy reserves

RAST test assesses ability of athlete to maintain high intensity efforts with short rest intervals

It depicts two performance parameters 1. Overall test performance (Total sprint time in sec) 2. Percent decrement in score (Mean sprint time/ Best sprint time)*100-100

Recommendations before testing your athletes:
1. Familiarization with tests
2. Time devoted to test
3. Equipment needed
4. Ecological validity (temperature, humidity)
5. Running surface (rubber tracking, grass)

SYMPOSIUM 6: Slow Deep Breathing: Physiological Effects and Therapeutic Potential

Speakers:

1. Pranayama: A classical way of respiratory modulate rate and depth of respiration
   Dr. Ishwar V. Basavaraddi, Director ,Morarji Desai National Institute of Yoga Ministry of AYUSH, New Delhi.

2. The Physiological Mechanism of Slow Deep Breathing
   Dr. K. K. Deepak, Professor & HOD, Department of Physiology, All India Institute of Medical Sciences, New Delhi.
   Dr. Om Lata Bhagat, Associate Professor, Department of Physiology, All India Institute of Medical Sciences, Jodhpur, Associate Editor (Physiology), IJPP.

Respiration is a powerful modulator of cardiovascular oscillations. The respiration is an ‘automatic act’ and it is modifiable by volition. Cardiovascular and respiratory systems are coupled reciprocally and Breathing exerts profound influences on autonomic neural outflow. As the respiration is modifiable under volition and can be influenced by various
respiratory practices, this envisages the possibility to integrate involuntary (autonomic) nervous mechanisms with higher cortical mechanisms that are under voluntary control. Controlled breathing with low rate and high tidal volume, the so-called “slow deep breathing”, reported to reduce sympathetic activity by enhancing central inhibitory rhythms. It is associated with greater respiratory sinus arrhythmia and blood pressure (BP) oscillations. It has also been shown to improve the efficiency of ventilation by increasing alveolar and reducing dead space ventilation. In Slow Deep Breathing as therapy, relaxation would complement it in decreasing heart rate, blood pressure, oxygen consumption and levels of stress hormones. There is an emerging body of literature suggesting that with minimal prerequisite training, slow breathing around 0.10 Hz can acutely enhance the baroreflex sensitivity. These reports have led to the speculation that behavioral interventions designed to reduce breathing frequency (e.g., pranayama) may serve a therapeutic role in ameliorating depressed baroreflex function in conditions such as chronic heart failure, essential hypertension, and obstructive airway disease. In this symposium, we will discuss these advances in scientific studies about slow deep breathing, describe its physiological effects in health and diseases, and highlight the therapeutic potential of slow deep breathing.

**TOPICS:**
1. What is wrong with the physiology?
2. Understanding infertility/subfertility
3. Where is the bug?
4. Assessment methods to diagnose the physiology at fault
5. Manipulating the physiology- boon or curse?
6. Challenges in prolonging reproductive life and fertility preservation
7. Team work- makes it a dreamwork
8. Requirement of multidisciplinary expertise in subfertility treatment
9. What’s new?
10. Latest developments in Practice of Reproductive Medicine

**2. Dr. Usha Subramani, MBBS, MD(OG), JIPMER**
Consultant Reproductive Medicine, Srishti Hospital, Pondicherry

**TOPICS:**
1. Setting the physiology right- pharmacological interventions
2. Optimizing subfertility treatment
3. Newer pharmacological agents for managing subfertility

**3. Dr. Sebanti Dash, Mbbs, Md (Physiology)**
Senior Clinical Embryologist, Srishti Hospital, Pondicherry

**TOPICS:**
1. Creating life-in vitro: A physiological journey from ovaries to the uterus
2. Quality control in IVF LAB
3. Cryo preservation of gametes and embryos

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**SYMPOSIUM 7: Reproductive Physiology Beyond Classrooms**

**Speakers:**

1. **Dr. Soumyaroop Dash, MBBS., MD (OG), JIPMER**
   Consultant Reproductive Medicine,
   Scientific Director, Srishti Hospital,
   Pondicherry
SYMPOSIUM 8: Newer frontiers of Exploration in Physiology

Speakers:

1. Application of Virtual Reality in Medical Sciences

Dr. Nilima Shankar, Department of Physiology, University College of Medical Sciences & GTB Hospital, New Delhi.

Vineet Gopal, Gentech Marketing & Distribution Pvt. Ltd

2. Assessment of the Electrophysiological Effects of various Ragas of Indian Classical Music

Dr. Kirthana Kunikullaya U, Assistant Professor, Department of Physiology, M. S. Ramaiah Medical College and Hospitals, Bangalore, Karnataka, India.

SNF/01

Application of Virtual Reality in Medical Sciences

Dr. Nilima Shankar¹, Vineet Gopal²

¹Department of Physiology, University College of Medical Sciences & GTB Hospital, Delhi, ²Gentech Marketing & Distribution Pvt. Ltd.

Virtual Reality (VR) is the term used to describe a novel human-computer interface. VR enables users to interact with a computer – generated, multi – dimensional environment and with the help of interface tools allows users to immerse themselves in the environment, navigate within it and interact with objects and other inhabitants. So, what can we expect from VR systems in the medical sciences?

We know that learning health – related subjects in medical training involves the study of extensive materials and the acquisition of a variety of new skills. Over the years, teachers have tried to incorporate new technologies as tools into the curriculum, to make the material more interesting and easier to learn.

As VR education tools become increasingly sophisticated, medical schools are making them part of the curriculum. Thus, health care is becoming one of the biggest users of VR, be it in medical education, therapeutics, medical skills development, medical research and patient education, to name a few.

In Physiology, VR programs have the potential to meet teaching criteria as long as they are considered in light of the complexity of “real” living systems.

While access to VR methods cannot replace years of specialised training, these innovative tools can significantly expand medical learners’ exposure to scenarios pertinent to medical sciences.

In this contribution VR is elaborated, as introduced and used in computer science, both, at the conceptual and at technology levels, drawing examples from medical sciences.

SNF/02

Assessment of the Electrophysiological Effects of various Ragas of Indian Classical Music

Dr. Kirthana Kunikullaya U.

Assistant Professor, Department of Physiology, M. S. Ramaiah Medical College and Hospitals, Bangalore, Karnataka, India.
**Introduction**

Of the various therapies used to relax the body & mind, music is an integral part. Be it during chanting of “Aum” during yoga or meditation sessions or the massage therapy sessions in a spa or simple as listening to enjoyable music as we are driving music now is an essential part of our lives. Though choice of music is a subjective topic, & though abstract in its nature, music arouses feelings of euphoria, happiness, satisfaction & a variety of other moods.

**Music & health - studies in general**

Music & its effect on health has now picked up pace & being studied across the world with special enthusiasm from cardiologists & neuroscientists. To quote a few neuroscience works on music, listening to rhythms is not solely auditory, but is fundamentally shaped by the brain’s motor regions, which predict incoming beats (John Iversen, Computational Neuroscience, University of California). Music was more effective than prescription drugs in reducing anxiety prior to surgery (Trends in neuroscience, Neurochemistry, Daniel J. Levitin, Mc Gill University). Intense pleasure in response to music can lead to dopamine release in the striatal system (Salimpoor et al, Nature Neuroscience). BP was shown to be proportional to the crescendo present in music. Music as a non-pharmacological therapy for hypertension has been tried by many investigators (10 - 25 min for 1-3 months). Neurochemical changes in the brain put forth are increased calcium-calmodulin dependent dopamine synthesis in the neostriatal region & mesolimbic reward system, decreased renal sympathetic nerve activity and BP through the auditory pathway. Whether music causes an increase or decrease in HR & Heart rate variability (HRV) parameters, remains a mystery, with a few finding reduction, increase and a few finding no change. Meditative / slow classical music has been shown to lower neurohumoral markers of stress (I will elaborate on these studies in my talk).

Music can be used in 2 ways: one is creating music actively in a room (Music therapy) or passive listening to music (Music medicine). A number of research studies have looked into the effects of music medicine on a variety of clinical conditions such as in gastrointestinal endoscopy, colonoscopy, cardiac catheterization, cardiac patients.

**Need for study on Indian Music**

Most of these studies I have quoted here are those done abroad & very commonly used music has been Mozart, Beethoven, Bach, Verdi or Vivaldi or just the relaxation or the chant compact discs available. India’s musical history dates back to the prehistoric times and is in fact regarded as one of the oldest in the world, the era when the Vedas were created, particularly, the Samaveda. It is here that raga (colors) was created, which denotes a set of musical notes presented in an orderly manner in order to generate a melody out of the same. The goal of the raga is to create a mood with different ragas having the property of evoking different emotions among humans (example: raga Mishra Mand- refreshing light touch, Neelambari-sleep). As a part of Sama Veda, Gandharva Veda enlists the various ragas & their
health benefits. Unfortunately, scientific evidence regarding these health benefits of Indian music is extremely meagre. In this era of translational research, we started to study the effect of Indian music on health with special reference to electrophysiological parameters.

Our works (funded by ICMR & RGUHS)

Salient points of review of literature

- Stress is a part of our daily lives and as per WHO report about 7.5% of Indians suffer from major or minor mental disorders that require expert intervention.
- Hypertension, a multifactorial chronic disease, with psychosocial stress implicated to contribute significantly in its development.
- The effective management of hypertension includes lifestyle modifications and drug therapy. JNC VII has indicated only lifestyle modifications as the first line of management for prehypertension & pharmacological management along with lifestyle modifications (weight reduction, dietary modifications, salt restriction and physical activity) for the management of hypertension.
- The treatment of hypertension accounts for about 10.6% of the per capita income. The cost of antihypertensive drugs and the adverse effects have emphasized the need for exploring effective non-pharmacological management with or without drug therapy.
- Very few Indian music based studies, have used clinical sphygmomanometric recordings and shown significant reduction in BP. To the best of our knowledge, effect of music on 24 h ambulatory BP (ABP) measurements, with a prehypertension group and simultaneous measurements of biomarkers of hypertension had not been studied. With this view in mind, we started to study the effect of Indian music on BP among prehypertensives and hypertensives.

Our Initial work methodology & results in brief

A prospective, randomized controlled trial was done on 100 prehypertensives/stage I hypertensives, randomly divided into two groups (n = 50 in each). Group 1 received music intervention along with lifestyle modifications while Group 2 received only lifestyle modifications. We used Samavedaand raga chikitsa(Ancient Indian music literature) for selection of ragas. Group1 listened to raga bhimpalas played on flute for 15 min daily for at least 5 days/week for 3 months. The main outcome measures were 24 hour BP, HRV, and stress levels (State Trait anxiety inventory score) & biomarkers of hypertension. Group 1 exhibited significant reduction in stress levels, diastolic BP and systolic BP decreased in Group 2 after intervention. Significant change in BP was seen among those who were prehypertensives prior to intervention. Mean (SD) of diastolic BP (DBP) pre and post intervention were overall = 85.1(6.8) and 83(8.7) [P = 0.004], awake = 87.7(7.6) and 85.9(9.2)[P ¼ 0.021]. Regression analysis showed association between diastolic BP change and post-intervention stress score in the music intervention group. Insignificant rise in parasympathetic parameters of HRV (SDNN, RMSSD, HF) was seen after intervention in both the groups. We found significantly increased parasympathetic and lower sympathetic parameters (LF, LF/HF) in Group 1 and 2 males and females of Group 2. The results suggest that females of Group 1 were less compliant with the given intervention.
The Origin of Chronomedicine: Let the Natural Cycle Rule our Health

Prof. Narsingh Verma
Department of Physiology, King Georges Medical University, Lucknow

The better understanding of basic rhythms can maintain our health in unexpected ways. This new adventure field of chronomedicine explores the interaction between biological rhythms, medicine, nutrition, sleep, physical activity and drugs. Chronobiologies (study of biological rhythms) includes but are not limited to comparative anatomy, physiology, genetics, molecular biology, pharmacology and behavior of organisms within biological rhythm mechanics. Various physiological systems like cardiovascular system and blood pressure of healthy person have characteristic and reproducible circadian pattern i.e. diurnal elevation and nocturnal decline. There are evidences that patients with Essential Hypertension, Coronary artery disease (CAD), Diabetes, Renal failure and metabolic syndrome & Cancer have disturbed or attenuated circadian rhythms. In four different studies (out of many other) conducted by our team in our Chrono lab at department of physiology KGMU on circadian Rhythms of Cardiovascular System (Chronocardiology) in CAD subjects, Postmenopausal and Premenopausal Women, Diabetes and Chemotherapy induced cardiotoxicity in breast cancer subjects, we concluded that CAD subjects (both hypertensive and normotensives) have variations in 7 day circadian pattern of blood pressure and heart rate which can result into disturbed vascular events and thus are at greater risk of cardiovascular morbidity. 7-days /24 hour blood pressure monitoring and assessment of CHAT may decrease potential cardiovascular risk by preventing risk of inappropriate medication and implementing timed administration of anti-hypertensive medication in diabetic subjects. Post-menopausal women and Subjects with Diabetic subjects (both hypertensive and normotensives) have variations in 7 day circadian pattern of blood pressure and heart rate which can result into disturbed vascular events and thus are at greater risk of cardiovascular morbidity. The diagnosis of CHAT, even in normotensive patients, may warrant medical attention by assessing future risk, guiding treatment and managing precautionary measures. Preliminary Data of Breast Cancer subjects suggests that Anthracyclines Chemotherapy treatment in Breast Cancer Subjects produces variations in 7 day circadian pattern of blood pressure and heart rate which can result into disturbed vascular events and thus are at greater risk of cardiovascular morbidity. Chronomedical approach appears to be a novel tool for early prediction of cardiotoxicity than the commonly used diagnosis procedures of cardiotoxicity Like LVEPF, and Cardiotoxicity serum Biomarkers. As predicted from the available data chronobiologic assessment may predict cardiac detoriation before the
damage has become advanced enough or irreversible. Similarly Night shift workers have altered circadian pattern of blood pressure/heart rate and hormones like melatonin and cortisol. Due to this variation, night shift worker suffers from various cardiovascular disorders and hormonal disturbances.

Some more studies have been designed to address the Glycemic variability effectively by smart use of OHA and various Insulin preparations.

Prof. Baldev Singh Oration Award

Prof. Kiranmai S Rai
HOD, Dept. of Physiology, Melaka, Manipal medical college, Manipal university, Manipal - 576104

Gender variation in hippocampal cyto-protection and cognitive reserve of male and post- menopausal ischemic stroke rats supplemented with choline and docosahexaenoic acid

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Stroke is the second leading cause of mortality worldwide with an overall prevalence of 68-80% of ischemic stroke, among stroke-victims in India. Worldwide, stroke is more common among men, but women are more severely ill [24.7%] compared to men [19.7%]. Current therapy for post-ischemic stroke victims does not address vascular cognitive impairment satisfactorily. Studies show that dietary choline and docosahexaenoic acid [DHA] are essential nutrients for neuronal membrane phospholipid synthesis and cognition. The objective of the present study was to compare and analyse hippocampal cyto-protection and cognitive reserve in choline and DHA supplemented male and post-menopausal rats with ischemic stroke. 10 month old male and ovarectomized [OVX] female Wistar rats [n= 12/group] were assigned to 6 subgroups after ethical approval [[IAEC/KMC/66/2010-2011]-Normal control male /female [NC-M/F], Bilateral common carotid artery occlusion [BCCAO-M/F], and BCCAO supplemented with both choline [4.6mmol/kg/bodyweight /day] and DHA [300 mg/kg/day] [BCCAO-Cho+DHA- M/F] post-surgery for 15 days. All rats were then tested for passive avoidance memory and later euthanized to analyse hippocampal neural cell survival and brain lipid peroxidation, antioxidant status [n=6/group]. Both male and OVX-BCCAO female rats showed significant deficits (p< 0.001, 0.01 respectively) in learning and memory retention compared to age-matched NC rats. BCCAO-Cho+DHA supplemented rats showed higher significant attenuation of cognitive deficits (p<0.001) in males as compared with same in OVX- BCCAO rats (p<0.05). Analysis of Nissl stained hippocampal sections showed higher significant deficits (p<0.001) of surviving CA1 and CA3 neural cells in male BCCAO rats and lesser in OVX-BCCAO rats (p<0.05) compared with same in age-matched NC rats. BCCAO-Cho+DHA significantly attenuated (p<0.05) CA1 and CA3 neural cell deficits in males whilst no significant attenuation was observed in OVX-BCCAO rats compared with same in age-matched NC rats. Moreover, BCCAO-Cho+DHA also mildly enhanced (p<0.05)
Brain antioxidant with no significant attenuation of lipid peroxidation levels in males whilst no significant changes of same parameters were observed in OVX-BCCAO rats compared with same in age-matched NC rats. Supplementation of choline and DHA during post-ischemic stroke recovery in rats provides better hippocampal cyto-protection and cognitive reserve in males compared to the same in ovariectomized females.

**Key words:** Ischemic stroke, Choline, Docasahexaenoic acid [DHA], learning and memory, hippocampus, antioxidant, lipid peroxidation

**BK Anand Research Prize**

**Dr. Vidyadhara D J**  
Ph.D. Scholar, Dept. of Neurophysiology, National Institute of Mental Health and Neurosciences, Bangalore 560029.

**Admixing of MPTP-Resistant and Susceptible Mice Strains Augments Nigrostriatal Neuronal Correlates to Resist MPTP-Induced Neurodegeneration**

D. J. Vidyadhara¹, H. Yarreiphang, T. R. Raju, Phalguni Anand Alladi

¹Ph.D. Scholar Dept. of Neurophysiology, National Institute of Mental Health and Neurosciences, Bangalore 560029.

Disease genetics in admixed populations like Hispanic-Americans, African-Americans, etc. are gaining importance due to high disease burden in them. Furthermore, epidemiological studies conclusively prove ethnicity-based differential prevalence of Parkinson’s disease (PD), since the American-Caucasians are more susceptible than Asian-Indians and Africans. Contradictorily, Anglo-Indians, an admixture of Europeans and Asian-Indians are five-times less susceptible than Indians. We evaluated the neural basis of this phenomenon using the cytomorphological features of susceptibility to nigrostriatal neurotoxin 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP). The nigral dopaminergic neuronal numbers, their size and tyrosine hydroxylase (TH), PitX3 and Nur1 expression were compared in MPTP-susceptible C57BL/6J mice, MPTP-resistant CD-1 mice and their crosses using stereology, morphometry and densitometry.

Apoptotic index was evaluated by TUNEL-assay and caspase-3 expression. Striatal volume, TH and glial derived neurotrophic factor (GDNF) expression were studied. The normal CD-1 and crosses had significantly more, although smaller, nigral dopaminergic neurons than C57BL/6J, and a larger striatum. The crosses had higher TH, Nur1 and PitX3 levels. MPTP administration caused loss of ~50–60 % nigral dopaminergic neurons in C57BL/6J, and ~15 % in CD-1, but none in crosses. MPTP-induced cellular shrinkage in C57BL/6J was contrasted by nuclear enlargement without somal alterations in resistant strains. MPTP lowered the striatal TH and GDNF in C57BL/6J. Elevated striatal GDNF in CD-1 and crosses could be of compensatory nature and complemented the reduced nigral caspase-3 expression to attenuate and/or block apoptosis. Similar neural correlates of resilience are envisaged in the Anglo-Indian population.

Thus, we present the core neuroanatomical features of resilience against PD and evidence for ethnicity-based differential prevalence.

**Keywords:** Parkinson’s disease prevalence, First filial generation crosses, Substantia nigra pars compacta, Dorsal striatum. Dopaminergic neurons, MPTP susceptibility
Cardiovascular sequel of neck irradiation in head and neck cancer patients

Manish Goyala
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Purpose: The baroreflex is an important afferent mechanism controlling autonomic functions. As afferent nerves course through the neck, they are susceptible to damage by neck irradiation in head and neck cancer patients. With increased survival of head and neck cancer patients because of improved therapy, the cardiovascular morbidity and mortality in them have become apparent and this is of clinical concern. There are few case reports of baroreflex failure as a chronic sequel to neck irradiation.

Objectives: The present study evaluated the changes in cardio-autonomic tone and postural cardiovascular reflex in neck-irradiated patients.

Methods: Head and neck cancer patients who had received neck irradiation (n=15) and healthy controls (n=15) were evaluated for heart rate variability with time domain analysis of 5 min ECG recording. Postural cardiovascular reflexes were studied with changes in blood pressure and heart rate in the lying to standing test.

Results: Our results suggest that there is a reduction in overall time domain measures of heart rate variability and weakened postural reflexes in neck-irradiated patients.

Conclusion: Decreased heart rate variability in neck-irradiated patients reflects an independent risk of cardiovascular morbidity. The early detection of cardiovascular impairment in such patients may help healthcare professionals in providing better care. Furthermore, the dose delivered to the carotid sinus should be monitored and restricted.

C L Malhotra Research Prize

Dr Pankaj Prabhakar
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α-Amyrin attenuates high-fructose diet-induced metabolic syndrome in rats

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This study investigated the effect of α-amyrin (a pentacyclic triterpene) on high-fructose diet (HFD)-induced metabolic syndrome in rats. Male Wistar rats were randomly distributed into different groups. The control group was fed normal rat chow diet. The HFD group was fed HFD (60%; w/w) for 42 days. Pioglitazone (10 mg/kg, orally, once daily) was used as a standard drug. α-Amyrin was administered in 3 doses (50, 100, and 200 mg/kg, orally, once daily along with HFD). Plasma
glucose, total cholesterol, triglycerides and high-density lipoprotein cholesterol (HDL-C) were estimated. Changes in blood pressure, oral glucose tolerance and insulin tolerance were measured. Hepatic oxidative stress as well as messenger RNA (mRNA) and protein levels of peroxisome proliferator-activated receptor alpha (PPAR-α) were analyzed. A significant increase in systolic blood pressure, plasma glucose, total cholesterol and plasma triglycerides and a significant decrease in HDL-C were observed in HFD rats as compared with control rats. Glucose tolerance and insulin tolerance were also significantly impaired with HFD. α-Amyrin prevented these changes in a dose-dependent manner. Hepatic oxidative stress as well as micro- and macrovesicular fatty changes in hepatocytes caused by HFD were also attenuated by α-amyrin. α-Amyrin preserved the hepatic mRNA and protein levels of PPAR-α, which was reduced in HFD group. This study thus demonstrates that α-amyrin attenuates HFD-induced metabolic syndrome in rats.

**H H Loesheke Research Prize**

Dr. Sabyasachi Sircar  
Prof & Head of Physiology, AIIMS Jodhpur, Basni Insustrial Area Phase – 2, JODHPUR – 342005

**A simple device for measuring static compliance of lung-thorax combine**

Sabyasachi Sircar  
Department of Physiology, All India Institute of Medical Sciences, Jodhpur, India

Explaining the concept of lung compliance remains a challenge to the physiology teacher because it cannot be demonstrated easily in human subjects and all attempts until now have used only simulation models. A simple device is described in the present article to measure the compliance of the “lung-thorax” combine in human subjects with the caveat that what is recorded is not “lung” compliance and the data generated are of little clinical use. The device comprises a spirometer, a manometer, a mouthpiece, and interconnecting tubes guarded with stopcocks.

**Dev Raj Bajaj Research Prize**

Dr. Siju G. Chacko  
Ph.D. Scholar  
Dept. of physiology, AIIMS, Ansari Nagar, New Delhi 110029

Surface Laplacian of spherical spline improves the classification accuracy for mu rhythm based Brain Computer Interface

S. G. Chacko, N. Ahuja, N. Pegwal, P. Tayade, S. Kaur, and R. Sharma  
Department of Physiology, All India Institute of Medical Sciences, New Delhi

The present study aims to find the best spherical surface Laplacian for mu rhythm based Brain Computer Interface (BCI). Further, the study also tried to find out whether the spherical surface Laplacian function has a positive influence on classification accuracy with respect to non-Laplacian transformed data. EEG was recorded using high density sensor-net (128-channel) in 5 subjects for eyes open and grab movement. Laplacian function was applied on data and power value of mu rhythm at each channel was used as feature for Support Vector Machine (SVM). SVM performance was significantly (p < 0.001) better for the data transformed with surface Laplacian with μ values of 2 and 3 compared to the non-Laplacian transformed data. In conclusion, Laplacian function of spline interpolation improves the performance and
classification accuracy for mu rhythm based BCI. Further, these results can also be used for the accurate classification of motor imagery.

**Keyword:** Brain Computer Interface, Spherical Surface Laplacian, Support Vector Machine, Machine Learning, mu rhythm, Motor imagery

**Best Teacher Award**

Dr Gopal Krushna Pal  
Dean, JIPMER, Karaikal, Puducherry

**A V Tilak Parvathi Devi Prize**

Dr Rajashree R.  
Professor  
Dept. of Physiology and coordinator, Medical Education Unit, Gadag Institute of Medical sciences, Gadag, Karnataka state, India

**Effect of SalaciareticulataW.AndClitoriaterinate aL.on the cognitive and behavioral changes in the streptozotocin-induced young diabetic rats**  
R. Rajashree, RajaniPatil, Sanjiva D. Khlokute and Shivaprasad S. Goudar

Professor, Dept. of Physiology and Coordinator, Medical education Unit, Gadag Institute of Medical sciences, Gadag, Karnataka state, India

**Background:** Diabetes mellitus (DM) of juvenile onset affects both the peripheral and central nervous systems (CNS). However, central effects are less documented and studied than peripheral deficits. Currently, the only feasible treatment available for type 1 DM (T1DM) is insulin which has its own limitations. Hence, an alternative therapy, especially a newer herbal formulation is very much the need of the time. The present study aimed to determine the effects of the alcoholic extracts of roots of the SalaciareticulataW. (SR) and ClitoriaterinateaL.(CT) on cognitive and behavioral changes in juvenile diabetic rats.

**Methods:** Diabetes was induced in 25-day-old Wistar rats by streptozotocin (50 mg/kg bw, IP). Animals were divided into seven groups (n = 6). Rats were treated with root extracts of SR and CT (100 mg/kg BW each) for 30 days, from day 1 and day 20 of diabetes confirmation. Then, rats were tested in elevated plus maze (EPM) and Morris water maze (MWM).

**Results:** A statistically significant (p < 0.05) difference was observed between the SRCT group and diabetic groups of rats. Apart from decreasing FBS, the combined therapy also proved beneficial as nootropic agent in rats with early-onset diabetes. However, significant improvement is observed only in the learning and memory among preventive group, but not in the curative group.

**Conclusions:** SRCT, a herbal formula, when used in combination, has a more potent effect in preventing the deleterious effects of juvenile diabetes on cognitive and behavioral changes.

**Keywords:** anxiety; cognition; diabetes mellitus of early onset; learning; memory; streptozotocin.

**Best Branch Award**

Belgaum Branch  
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**Lifetime Achievement Award**

O P Tandon  
Ex-Professor and Head,  
Department of physiology, UCMS and GTB Hospital Dilshad Garden Delhi

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**Evoked Potentials and Their Clinical Applications**

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The term Evoked potentials simply mean brain waves (electrical potentials) generated in response to a specific stimuli. Averaging and computing of these potentials produce well defined wave pattern known as brain evoked responses. Depending upon the type of stimulus used these responses can be Auditory, Visual or Somatosensory. Since these are obligatory neural responses to stimuli this class of evoked responses or potentials are called as Stimulus related or Exogenous potentials. The other class of evoked potentials is the Event related or Endogenous evoked potentials which are the responses in relation to events of cognition, attention, discrimination or reaction to a target stimulus. These evoked responses are picked up from the scalp by placing electrodes at specific points (10-20 system of electrode placement). The potentials evoked by the stimuli are propagated along the sensory nerves and tracts and relay stations in the brainstem to the cortex. The signals are volume conducted through the body tissue and fluids to the surface electrodes. On their way these potentials are modified by activity of generators in the CNS in order to give them final wave form pattern.

Based on the post-stimulus timings (latency 0 of appearance of these waves, these responses can be classified as short latency (within 10 msec 0, mid-latency (with in 50 msec) and long latency (beyond 50 msec). Normally the total duration of stimulus or event related evoked response is 1 second after the application of stimulus. The absolute peak latencies, interpeak latencies and amplitude of each wave denote the functional integrity of the sensory pathway involved in eliciting the response. Hence the normative data of these evoked responses has to be worked out in the evoked potential lab for the healthy, normal individuals before comparing it with the patients. The criteria of abnormality are; Latency or interpeak latency beyond 99% tolerance limit, 50% reduction in amplitude or absence of particular wave or abnormal pattern.

The evoked potentials have wide applications not only in the field of clinical medicine but also in toxicology, occupational and forensic medicine. The auditory responses are being used as tool for screening hearing in new born, diagnosing peripheral and CNS disorders of hearing, neurodegerative disorders, metabolic disorders, inflammations and tumors of the brain. These responses are are also used to monitor the depth of anesthesia and also as intra operative monitoring device. In the occupational medicine these responses are widely used to assess sensory and cognitive functions in the factory workers exposed to pollutants in work place environment. Recently the P3 component of the event related evoked potential has been used as Brain fingerprinting tool in forensic medicine to prove innocence or guilt.
Low Frequency Repetitive Transcranial Magnetic Stimulation as a Therapeutic Intervention in Chronic Tension-Type Headache: a Randomized Control Study

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Introduction: Tension-type headache (TTH) is the most common type of primary headache disorder. Its chronic form is often the most ignored and challenging to treat. The exact pathogenesis of chronic tension-type headache (CTTH) is still unclear and the oscillation between peripheral mechanisms (myofascial nociception) and central mechanisms (sensitization and inadequate endogenous pain control) remains. The aim of our study was to explore the effect of repetitive transcranial magnetic stimulation (rTMS) on pain status in CTTH by subjective and objective pain assessment.

Methods: Patients (n=30) diagnosed with chronic tension-type headache were recruited and randomized into real (n=15) and sham (n=15) rTMS groups. Pre-intervention detailed history of the patient was taken, Numerical pain rating scale as well as questionnaires (Headache impact test, McGill pain questionnaire, Pain Beliefs Questionnaire, Coping Strategies Questionnaire, State-Trait Anxiety Inventory test and WHO-Quality of Life questionnaire (brief version) were filled and objective assessments such as nociceptive flexion reflex and conditioned pain modulation were done. Intervention: 1Hz 1200 pulses in 8 trains consisting of 150 pulses at 110% of the resting motor threshold were given on the right dorsolateral prefrontal cortex for 20days (5days/week) in the real TMS group. Post intervention the assessments and questionnaires were repeated.

Result: We got subjective improvements in the numerical pain rating scale, headache impact test, McGill present pain intensity, trait of anxiety and psychological pain beliefs. The increase in thresholds of nociceptive flexion reflex served as an objective marker for improvement in pain status.

Conclusion: Low frequency rTMS on right dorsolateral prefrontal cortex may be used as a therapeutic intervention in chronic tension-type headache.

Key words: Pain assessment, Nociceptive flexion reflex, Chronic pain, Neuromodulation, Prefrontal cortex, Brain stimulation
Cardiovascular Response and Substrate Utilisation in Cycle Ergometer and Treadmill Aerobic Exercise Matched for Energy Expenditure

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Background: The low physical activity level is a cause of increasing obesity prevalence in India. Aerobic exercise (AE) is one of the best ways to expend calories and lose weight. The bicycle ergometer (CE) and treadmill (TM) exercises are the commonest to perform as indoor AE.

Aim: To compare TM with CE AE for cardiovascular response and fat oxidation at similar energy expenditure

Methods: The present crossover study involved 25 young males who performed an acute bout of TM and CE AE for 30 min for 180 Kcal energy expenditure. Respiratory exchange ratio (RER=CO₂ production÷O₂ uptake), SBP, DBP and HR were accessed after the exercise bout.

Results: RER and HR were significantly (p<.05) less while SBP, DBP, PP and MAP were non-significantly less after TM than CE.

Conclusion: TM might be a preferred mode of AE for individuals requiring more fat oxidation with less exertion on the cardiovascular system.

Keywords: Aerobic exercise, fat oxidation, obesity, physical inactivity, RER.

Normative Frequency of Single Nucleotide Polymorphism of Matrix Metalloproteinase-9 Related to Chronic Obstructive Pulmonary Disease in Healthy South Indian Population and Comparison of Serum Matrix Metalloproteinase-9 Levels Among Genotype Groups

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Background: Chronic Obstructive Pulmonary Disease (COPD) is a disorder of airway obstruction that is not completely reversible. Genetic factors play an important role in the development of the COPD. In our study we aimed at determining the normative frequency of COPD related MMP-9 gene polymorphism (Gln279Arg) in healthy South Indian population and we have also compared serum MMP-9 levels among different genotype groups.

Objective: To determine the frequency of COPD related MMP-9 gene polymorphism (Gln279Arg) among the healthy volunteers of South India aged 18 to 45 years. To compare the serum MMP-9 levels among the different genotype groups.

Materials and Methods: It was a cross sectional study conducted in the Department of Physiology in collaboration with Department of Clinical Pharmacology. 125 healthy South Indian adults of 18 – 45 years were recruited. Pulmonary functions of the subject were tested using computerized spirometer Spirolab III. Subjects with normal spirometry
recordings were recruited for the study. 5 ml of venous blood was collected. DNA extraction, genotyping and serum MMP-9 level estimation were done. Results were analyzed using SPSS version 19.0. P values < 0.05 were considered statistically significant.

**Results:** The frequency of AA genotype was found to be 26 (21%), AG was 53 (42%) and GG was 46 (37%). The frequency of ‘A’ allele was 0.42 and ‘G’ allele was 0.58. MMP-9 levels were significantly increased in AA genotype groups when compared to other groups.

**Conclusion:** Identifying the genotype group amongst the South Indians that is significantly associated with COPD, will enable us to delineate the individuals susceptible to the disease.

**Key words:** COPD related gene polymorphism, Gln279Arg, MMP-9 polymorphism, MMP – 9 levels.

**AW-RS-004**

**Neural Substrates of Emotional Interference: A QEEG Study**

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**Introduction:** Emotional interference disrupts executive functioning. However the dynamic interplay of neural substrates of emotion and executive attentional network is widely unexplored. The present study attempts to elucidate areas implicated in emotional interference condition.

**Materials and methods:** Fifteen right handed individuals (24.64 ± 2.63 yrs) perform two emotional interference task – Face Word Interference and Word Face Interference. The task and eyes open baseline EEG has been preprocessed and inverse source modelling using sLORETA algorithm has been performed. The activity of the cortical sources in the trial segment of both the tasks and baseline has been computed for 66 gyri. The cortical activities were compared between tasks and baseline.

**Results:** Eighteen gyri and Fifty four gyri have shown significantly decreased activity (p<0.05/66) in Face Word Interference vs Baseline and Word Face Interference vs Baseline respectively.

**Conclusion:** The study attempted to elucidate the phenomenon of emotional interference stimuli disengaging frontoparietal networks. It also elucidated areas associated with default mode network which has shown disengagement during task conditions.

**Keywords:** emotional interference, cortical sources, frontoparietal attentional networks, amygdala, inhibition

**AW-RS-005**

**Effect of Non Invasive Vagus Nerve Stimulation on SBP and Qtc in Experimentally Induced Hypertensive Rats**

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**Background:** Hypertension is known for its complex patho-physiology and multiple etiological factors. HTN poses a great...
threat worldwide over the cardiovascular status of an individual. Resistant hypertension cases are emerging even after use 3 or more antihypertensive drugs. Thus, research for non-pharmacological management for hypertension is needed.

**Objectives:** The study aimed to know the effect of non invasive transcutaneous electrical stimulation at the level of tragus (supplied by vagus nerve) on BP and QTc in experimentally induced hypertensive rats.

**Material and methods:** A total of 12 male wistar rats were included in this study. HTN was induced experimentally in Group II (N=6) rats by oral administration of L-NAME (40mg/kg) for 21 days. Vagus nerve at the level of tragus was stimulated after Ketamine(50mg/kg)/Xylazine (5mg/kg) anaesthesia. BP and QTc were recorded by NIBP and Advanced CVS recording instrument (AD Instrument, Australia) respectively.

**Results:** Baseline SBP in control rats was 123.07± 4.51 mmHg while SBP after developing hypertension was 146.88 ± 4.81 mmHg. After stimulation SBP values in hypertensive rats becomes 119.74 ± 3.06 mmHg. QTc changes is to be discussed later.

**Conclusion:** Trans-cutaneous electrical stimulation of tragus is effective non invasive method to lower the SBP.

**Keywords:** non invasive vagus nerve stimulation, BP, QTc, hypertensive rats.

**AW-RS-006**

**Comparison of the Effects of Acute Bout of Exercise on Cognition and Inflammation Between Athletes and Non-Athletes: A Randomized Controlled Trial**

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**Background:** Physical inactivity and resultant obesity are highly prevalent in the contemporary world. Global reviews reveal that even an acute bout of physical exercise can enhance the cognitive functioning and reduce the inflammation in an individual. There is a paucity of studies analysing the effects of exercise on cognition and inflammation in developing countries.

**Methods:** The study is a double-arm parallel design randomised controlled study. Forty males (40 athletes and 40 age and BMI-matched non-athletes) were randomly allocated to moderate and high-intensity treadmill exercises. The two groups were studied for exercise-induced effects on cognitive parameters (p300 latency and reaction time) and inflammatory status. The effects of two varying intensities of exercise are compared in each group.

**Results:** There was a significant post-exercise reduction in p300 latency (p<0.001) and reaction time (p<0.001) in both the groups. The athletes had reduced levels of pro-inflammatory markers at baseline. Sub-analyses revealed no intensity-based differences in exercise-induced changes. Significant inverse correlation was observed between visual reaction time and serum adiponectin levels.

**Conclusion:** Acute bouts of physical exercise can enhance the cognitive functions irrespective of one being athlete or non-athlete. Even milder forms of exercise can bring about significant improvement in cognitive functioning and inflammatory status.

**Keywords:** acute exercise, athletes, cognition, p300 latency, reaction time, inflammation
Neck Circumference as a Tool for Predicting Hyperuricaemia: A Hospital based Cross-sectional Study

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Background: Upper-body fat distribution has long been recognized as a risk factor to increased cardiovascular disease and neck circumference has been used as an index for upper body fat distribution. Serum uric acid levels are also included as a risk factor for cardiovascular disease.

Objectives: This study was aimed to evaluate the relationship of neck circumference as a parameter in predicting hyperuricaemia.

Material and methods: The present study was conducted in the department of Physiology, and Pathology of King George’s Medical University, Lucknow, UP. 160 subjects aged 18-60 years were enrolled excluding those having any anatomical deformity, diabetes and/or hypertension for more than 5 years. Their anthropometric parameters, lipid profile, fasting plasma glucose and uric acid levels were measured.

Results: In this study, 62.5% subjects were males and 37.5% were females. Mean age of the study population was 38.8 ± 13.17 years. The study population was divided into three groups based on their serum uric acid levels. Mean neck circumference of subjects with hyperuricaemia and normal serum uric acid levels were 38.42±2.34 cms and 37.35±3.99 cms respectively and was found significantly higher than subjects with below normal uric acid levels (34.80±4.33 cms). The association of uric acid level with neck circumference was highly significant (p < 0.011).

Conclusion: The significant association of uric acid level with neck circumference suggests neck circumference as an emerging novel marker for metabolic syndrome.

Keywords: hyperuricaemia, neck circumference, metabolic syndrome

A Comparative Study of Parasympathetic Function Tests during Different Phases of Menstrual Cycle in Young Healthy Females

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Background: The hormonal fluctuations that occur during normal menstrual cycle has profound influence on autonomic functions.

Objectives: To study the variation of Parasympathetic function tests during different Phases of menstrual cycle.

Material and methods: The study was carried out on 50 healthy female subjects with normal menstrual cycles between the ages of 18 to 25 years. Various parasympathetic function tests were performed that include heart rate response to standing, deep breathing and Valsalva maneuver. Results were analysed using ANOVA and student-t-test.

Results: During the menstrual cycle, we found varied heart rate response with higher values towards the luteal phase. There was statistically significant difference in the heart rate parameters
like resting heart rate, 30:15 ratio, valsalva ratio and E:I ratio during different phases of menstrual cycle.

**Conclusion**: Study concludes that there was increased sympathetic activity in luteal phase compared to the increased parasympathetic activity in follicular phase.

**Keywords**: Parasympathetic function tests, Menstrual cycle, Heart rate

**AW-RS-009**

**Hypercapnia Mediated Impairment of Dynamic Cerebral Autoregulation during Transient Hypotension**

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**Background and objective** : Hypercapnia leads to increased cerebral blood flow by decreasing the cerebrovascular resistance (CVR). It also leads to decreased efficiency of cerebral autoregulation. Two parameter model using critical closing pressure (CCP) and resistance area product (RAP), effectively describes the role of vascular tone and resistance respectively in altering cerebrovascular resistance and its autoregulation.

**Methods**: 26 healthy subjects underwent bilateral transcranial Doppler and continuous arterial blood pressure recording. Transient hypotension was induced by releasing large thigh cuff after inflation for 3 minutes. Thigh cuff manoeuvre was repeated with normal breathing trial, 3% CO\textsubscript{2} breathing trial and 5% CO\textsubscript{2} breathing trial with CO\textsubscript{2} inhalation given for last 45 secs of thigh cuff manoeuvre and continued for 90 seconds after release. ARI was calculated with Tieck’s model. CCP and RAP were calculated for 10 seconds’ window at (1) baseline, (2) immediately before release (Pre-release) and (3) immediately after release (Release).

**Results**: ARI (Autoregulatory index) values decreased significantly from ARI\textsubscript{B} 5.46 ± 1.47, ARI\textsubscript{P} 5.46 ± 1.14, to ARI\textsubscript{R} 2.0 ± 1.35, ARI\textsubscript{L} 1.65 ± 1.37 (p-value < 0.0001) and ARI\textsubscript{R} 1.64 ± 1.09, ARI\textsubscript{L} 1.41 ± 1.18, (p-value <0.0001) after 3% CO\textsubscript{2} and 5% CO\textsubscript{2} trial respectively. Both CCP (P <.002) and RAP (<.0001) values decreased from baseline (10.3 ±9.8 mmHg, 1.38 ± 0.41 mmHg,Sec/Cm) to pre-release (1.07 ± 9.7 mmHg,1.12 ±0.38 mmHg/sec/cm) after 3% hypercapnia trial and from baseline (9.12 ± 9.74 mmHg,1.45 ± 0.42 mmHg/sec/cm) to pre-release (-0.66 ± 15.4 mmHg,1.13 ± 0.36 mmHg/sec/cm) after 5% hypercapnia trial. No significant changes were observed in CCP value during thigh cuff release with all three trials. RAP significantly dropped from pre-release value after thigh cuff release in all three trials. Drop in RAP attenuated during hypercapnia trial and had significant (P <.0001) difference between ΔRAP release – pre-release for Normal breathing (-0.20 ± 0.12) and CO\textsubscript{2} trials (-0.089 ±0.09).

**Conclusion**: Hypercapnia leads to impairment of ARI during transient hypotension by changing the vascular resistance i.e. RAP without any effect on vascular tone i.e. CCP. These changes in RAP also reflect impaired myogenic component of autoregulation even during metabolic challenge caused by hypercapnia.

**Key Words**: Dynamic cerebral autoregulation, Hypercapnia, Hypotension, Cerebrovascular regulation, Myogenic Autoregulation
AW-RS-010

Assessment of Epicardial Fat Thickness and Cardiovascular Functions in Young Centrally Obese Individuals

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Background: Obesity has been associated with various lifestyle related disorders like cardiovascular diseases, diabetes mellitus, hypertension, metabolic syndrome, etc. Centripetal obesity, which is a better predictor of adverse cardiovascular events when compared to generalised obesity, is measured by Waist Circumference (WC) & Waist-Hip Ratio (WHR). Epicardial fat thickness (EFT) and cardiorespiratory fitness (CRF) have been identified as independent risk factors for the development of various cardiovascular events. Insulin resistance (IR) was also found to be associated with adverse cardiovascular events by various mechanisms.

Objective: To compare EFT, CRF and IR between centrally obese and non-obese young individuals.

Material & Method: This is a Collaborative & Cross-Sectional study between the Department of Physiology & Cardiology, JIPMER. 79 centrally obese and 82 normal young adults (18-30yrs) were recruited for the study. Anthropometric parameters, Basal parameters, IR using fasting blood sample, EFT by echocardiography and CRF by maximal treadmill exercise testing were assessed. Data were analysed and p-value < 0.05 was considered statistically significant.

Results: Statistically significant increase in EFT & IR with decrease in CRF was observed in the study group when compared to control group.

Conclusion: Significantly increased WC with increased IR and decreased CRF in study group indicates that centrally obese individuals are at high risk for the occurrence of adverse cardiovascular events in future.

Keywords: Obesity, Cardiovascular diseases, Epicardial Fat Thickness, Insulin Resistance, Cardiorespiratory fitness.

AW-RS-011

To compare the Impairment in “Lung Age” due to Various Etiologies among B.R.T.S. Traffic Wardens of Indore City

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Increased vehicular pollution is an occupational hazard to people working in traffic like BRTS wardens which impairs the lung functions causing discrepancy between chronological and observed age of lung resulting in early lung ageing.

This study aims in comparing the increase in LUNG AGE due to various etiologies by assessing their lung functions using RMS Helios 401 computerized spirometer on adult males aged 18-50 years working as BRTS traffic wardens in Indore City and controls were matched for the same parameters. They were further categorized into smokers and non-smokers. Lung age was significantly more among non-smoker cases [BRTS Wardens] and particularly the cases more exposed to the pollution. However, smoking among cases and controls overshadowed the effect of air pollution in causing lung ageing. These findings suggest that though air pollution causes lung ageing, smoking still, is the major etiology causing increased lung ageing.
Harish Gupta UG Prize Abstracts

**AW-HG-001**

**Does Warm Water Ingestion Modulate Cardiovascular Autonomic Oscillations?**

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Water ingestion is an essential act for human survival and is known to increase the Heart Rate Variability (HRV). It is reported in the literature that cold water enhances the vagal modulation but the effect of warm water ingestion has not been studied much. The present study was planned to investigate the effect of water ingestion at 25°C, 37°C and 45°C. Ten apparently healthy volunteers (18-21years) were inducted in the study after obtaining consent and thorough physical examination. The subjects were asked to drink 500ml of water at different temperatures on non-consecutive days. Beat to beat BP and ECG was recorded at baseline and for 30mins after water ingestion. The data was analysed for HRV and BPV in 5min epochs. HRV significantly increased after 15mins of water ingestion. Minimal changes were observed in all the cardiovascular parameters on ingestion of water at 45°C. It can be concluded that warm water ingestion does not significantly modulate cardiovascular autonomic oscillations.

**Keywords:** Warm water ingestion, Heart Rate Variability, Blood Pressure Variability, Baroreflex sensitivity

**AW-HG-002**

**Emotional Intelligence and Hypertension.**

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**Background:** Research question: If a person has better knowledge about his own emotions, can he reduce his risk of becoming a hypertensive? Significance: If we can identify this, the incidence of hypertension among young adults can be reduced by trying to intervene with their emotional intelligence.

**Objectives:** To correlate and identify relationship between Blood Pressure and Emotional Intelligence values.

**Materials and Methods:** It is a Questionnaire based cross-sectional study. 45 samples were selected by Consecutive Sampling Method. The subjects were divided into three groups including a control group based on their history and BP. Their EI was evaluated using the...
TEIQue Questionnaire and analysed statistically.

**Results:** The mean of the Emotional Intelligence score were: 29.87 ±15.42 in the control group, 20.33 ±17.69 in the old hypertensives group and 3.07 ±8.25 in the new hypertensives group. Chi square test showed that the difference was highly significant (p<0.001). The correlation coefficient of EI and Blood pressure was found to be -0.55 which showed an inverse relationship.

**Conclusion:** Our study has identified that there is a difference in the EI values of newly diagnosed hypertensives and those already undergoing treatment compared to controls. There is an inverse relationship between EI and BP. This study leads us to a hypothesis that evaluation of Emotional Intelligence can be used to screen normotensive hypertension cases and intervene before the established hypertension sets in. This is just a small step to initiate further longitudinal studies in this arena. Thence, it could serve as a basis for primordial prevention of hypertension.

**Keywords:** Emotional Intelligence, Blood Pressure, Hypertension, Prevention

**AW-HG-003**

**Correlation of Sleep Quality, Perceived Stress and Reaction Time in Medical Students- A Cross sectional Study.**

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Mahatma Gandhi Mission Medical College, Navi Mumbai.

**Background:** Sleep is important for homeostasis. A bidirectional association has been shown between sleep and stress. The effect these entities have on an individual’s reaction time is now being explored in research, as we have done in our study.

**Objectives:** The aim of this study was to correlate sleep quality, perceived stress and reaction time in medical and dental students, and to determine the extent the correlation of sleep quality and perceived stress had on reaction time.

**Material and Methods:** The Pittsburgh Sleep Quality Index was administered for sleep; Cohen’s perceived stress scale-10 for stress and the Digital Display Multiple Choice Apparatus for reaction time. To establish the degree of association between the variables such as sleep quality, stress, auditory and visual reaction Pearson’s Coefficient of Correlation (r) was computed.

**Result:** Along with the high incidence of poor sleepers and highly stressed students, we observed a critical point value in both administered questionnaires, beyond which both auditory and visual reaction times increased exponentially.

**Conclusion:** These findings bring to light a threshold value in both sleep quality and perceived stress, after which an exponential rise in auditory, visual reaction times is seen; in contrast with a linear rise approaching this threshold value.

**Keywords:** Medical students, Dental students, Sleep, Perceived stress, Reaction time
Research Papers : Oral Presentation Abstracts

NEUROPHYSIOLOGY

FP-NP-001

Faces are Difficult to Comprehend and Disrupt Semantics Processing in Emotional Interference Task.


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Background: Emotional Interference is manifested as a decline in executive performance accounted in terms of increased reaction time and decreased accuracy, when exposed to emotional stimuli. However, there is paucity of literature in investigating whether emotional face or emotional word is a potent distractor.

Objectives: To investigate the executive performance of young adults in terms of reaction time and accuracy percentage in emotional interference task, wherein the distractor is emotional word in the first block and emotional face in the second block.

Material & methods: 20 young adults (25.15 ± 2.97 years) performed two blocks of an emotional interference task. Each block comprises of trials designed with emotional words overlaid on emotional faces. Congruent and incongruent trials were designed. In Face Word block, subjects were asked to categorise the emotion of the face. In Word Face block, subjects were asked to categorise the emotion of the word. Reaction time and accuracy percentage data of two blocks and each trial type in a block were sorted and compared.

Results: Face Word block (word as distractor) has a significantly higher reaction time (p<0.0001) and lower accuracy percentage (p<0.0001) as compared to Word Face block (face as a distractor). In incongruent trials of Word Face, higher reaction time (p=0.0129) and lower accuracy percentage (p=0.0029) has been observed in comparison to congruent trials. In incongruent trials of Face Word, significantly lower accuracy percentage (p=0.0039) and no significant difference in reaction time is observed in comparison to congruent trials.

Conclusion: These findings suggest that emotional faces are difficult to comprehend and strongly disrupt emotional word processing in conditions of emotional interference.

Keywords: emotional interference, distractor, reaction time, cognition, accuracy, executive performance.

FP-NP-002

Effect of TSH Suppression Therapy on Nerve Conduction Studies in Hypothyroidism

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Background: Hypothyroidism develops many signs and symptoms and functional alterations in many organs and systems. Especially peripheral neuropathy develops...
early in hypothyroidism even before development of other symptoms. Hence early detection of peripheral neuropathy in hypothyroidism is necessary for giving early diagnosis and treatment.

**Objective:** To assess the electro diagnostic evidence of peripheral nerve dysfunction in newly diagnosed hypothyroid patients and to find out the effect of hormonal treatment after 3 months of duration.

**Methods & Materials:** An observational study was conducted in 25 newly diagnosed hypothyroid patients aged between 20-60 were included for this study. Electro diagnostic workup performed at the initial time of diagnosis and after 3 months for median and ulnar nerves of upper limb. Electrophysiological parameters like distal motor latency, amplitude and conduction velocity were evaluated.

**Results:** Shows that there were reduction of conduction velocity before treatment and statistically significant after 3 months duration of hormonal treatment with appropriate doses

**Conclusion:** With hormonal replacement therapy TT3, TT4, TSH and median and ulnar nerve motor and sensory functions were almost normal with hormonal replacement therapy.

**Keywords:** Hypothyroidism, Motor Nerve Conduction, Sensory Nerve Conduction, Median Nerve, Ulnar Nerve, Thyroid Stimulating Hormone

**FP-NP-003**

**Visual Attention in Glaucoma**

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**Background:** Glaucoma, an optic neuropathy caused due to damage of retinal ganglionic cells and their axons is being considered as a neurodegenerative disease. Attention is one of the primary cognitive processes that is affected in neurodegenerative diseases.

**Objectives:** To study visual attention in glaucoma patients compared to healthy controls.

**Material & Methods:** Twenty-eight newly diagnosed moderate primary glaucoma patients with mean deviation of visual fields (-7.06 dB) and 15 age-matched healthy controls were recruited for the study. Visual attention was assessed by using modified Posner’s task. Subjects were asked to fix their gaze at the center of screen (where fixation appears). On either side of fixation, star mark appeared and subjects were instructed to respond accordingly. Mean reaction time of the total, correct and incorrect trials was analyzed. Unpaired t-test was used and \( p < 0.05 \) was taken as statistically significant.

**Results:** Mean age of glaucoma patients and controls (48.5 and 49.7 years respectively) did not differ significantly. Performance of the glaucoma patients for modified Posner’s task was similar to the controls in terms of the accuracy (controls=20 and glaucoma=18). However, the mean reaction time for total & correct trials was significantly higher in glaucoma patients \( (611.7\pm205.8 \text{ and } 613\pm204.4 \text{ ms}) \) compared to healthy controls respectively \( (471.7\pm94.74 \text{ and } 471.7\pm94.74 \text{ ms}) \) \( (p=0.01 \text{ and } p=0.01) \).

**Conclusion:** The results of the study indicate that glaucoma patients require more time to respond to stimuli irrespective of accuracy. This suggests attentional impairment in patients with moderate primary glaucoma.

**Keywords:** Modified Posner’s task, Glaucoma, Visual attention
Cortical Processing of Music involves Differential Hemispheric Lateralization of Theta and Alpha EEG bands

Vinay Chitturi, Navdeep Ahuja, Simran Kaur Ratna Sharma

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Background: Music has been found to affect multiple cognitive domains—visuospatial processing, verbal performance and linguistic performance. Cortical processing of music exhibits hemispheric lateralization based on the valence elicited.

Objectives: To study the cortical correlates of music processing as assessed through quantitative Electroencephalography (qEEG).

Materials & Methods: High density 128 channel EEG was recorded from 25 adult male subjects during eyes open and exposure to music, Mozart Sonata for 2 pianos –448 for 5 minutes each. Artifact free segments of EEG were preprocessed in Netstation and EEGLAB followed by Time-Frequency analysis through continuous wavelet transform (cwt) in MATLAB to compute wavelet coefficients corresponding to spectral powers in theta, alpha, beta and gamma bands. Statistical analysis was done in MATLAB by Friedman test of repeated measures analysis of variance by ranks. A post-hoc Wilcoxon sign rank test was performed for the comparison between eyes open and music conditions with alpha value of significance adjusted to 0.05/129.

Results: Compared to baseline, theta band spectral power in left centro-parietal and occipital scalp regions decreased significantly and alpha band spectral power increased significantly in right frontal, centro-parietal and bilateral occipital regions during music condition. Beta and gamma band powers changed at few locations.

Conclusion: Cortical processing of music leads to differential hemispheric lateralization in the theta and alpha EEG bands.

Keywords: qEEG, Music, hemispheric lateralization, wavelet transform.

Blindness Enhances Texture Perception: Role of Haptic Sense

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Background: In congenitally blind subjects, visual experience and visual imaginary is lacking which in turn forces them to be dependent on haptic system for tactile discriminative task. Many studies suggest that visual experience facilitate the haptic processing of surrounding information making sighted and late blind more efficient in haptic perception compared to congenitally blinds. When it comes to texture identification, the role of visual imaginary is not clear. In the view of this, the present study want to investigate the utility of haptic system in texture discriminative task when congenitally blinds are compared with blindfolded sighted individuals.

Material & Method: This study was done on 30 congenitally blind Braille subjects & 30 age & gender matched sighted subjects who were blindfolded during the texture discriminative task. Participants were instructed to arrange the sandpapers of different grating from rough to smooth.
grating and performance was evaluated in terms of speed & accuracy.

**Result:** Congenitally blind subjects outperformed blindfolded sighted subjects, both in terms of speed & accuracy.

**Conclusion:** Congenitally blind subjects appear to get the benefit of their haptic sense in texture discriminative task resulting into faster & more accurate perception.

**Key words:** Haptic sense, blindness, texture perception, visual imaginary, tactile discrimination, haptic processing

**FP-NP-006**

**The Effect of the Herb Gymnema Sylvestre on Gustatory Sensation: A Pilot Study**

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**Background:** The herb Gymnemasyalvestre has been used for treating diabetes mellitus by Ayurveda doctors for many years. Gymnemasyalvestre can reduce blood sugar levels by increasing insulin secretion and by inhibiting glucose absorption. It is also shown that it reversibly inhibits sweet sensation by inhibiting sugar receptors which are G protein coupled receptors (GPCRs).

**Objective:** In the present study, we investigated the effect of Gymnema tea made from Gymnemasyalvestre leaf powder on different taste sensations mediated through G protein coupled receptors (sweet and bitter) and non-G protein coupled receptors (sour, salt and bitter).

**Materials & methods:** Vinegar, monosodium glutamate (Aginomoto), honey, artificial sweetener sucralose and paracetamol solutions were applied on the tongue and the appreciation of the five basic taste sensations (sweet, sour, salt, bitter and umami) were elicited on a scale of 0 to 10 on six healthy adult volunteers. Rating of zero indicated no sensation and 10 indicated intense taste sensation. Following rinsing of mouth with Gymnema tea, the volunteers again rated the taste intensity of the substances. The pre and post interventional ratings were compared using Wilcoxon signed rank test.

**Results:** There was a significant reduction in sweet sensation of honey (p 0.026) and sucralose (0.043) following the application of Gymnema tea. There was also a significant reduction in the bitter sensation (p 0.038).

**Conclusion:** Results from this study shows that Gymnemasyalvestre tea can significantly decrease sweet and bitter sensation. The decrease in sweet and bitter sensation could be due to the blocking of GPCRs.

**Keywords:** Gymnemasyalvestre, sweet, taste

**FP-NP-007**

**Incongruency Influences Perception during Binocular Rivalry**

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**Background:** Contextual regularity i.e. the probability of an object to be in a particular background affects the perception and helps in making faster judgements. On the other hand, scenes
with contextual violations have an easy access to awareness and are used in advertisements. How different is the perception of contextually regulated pictures otherwise known as congruent pictures from that of incongruent i.e. pictures with contextual violation is still not clear.

**Objectives:** The present study investigates the perceptual rivalry of visual scenes with contextual regularity (congruent) as well as contextual violation (incongruent).

**Material & Methods:** Forty subjects performed an intermittent binocular rivalry paradigm between congruent and incongruent pictures presented through a mirror stereoscope. A total of 900 trials were given. For each trial, stimulus was presented for 600 ms followed by 600 ms of interstimulus interval. Subjects were asked to make specific key presses for different percepts. The number of occurrences of congruent and incongruent percept and their mean reaction time (ms) were calculated for analysis.

**Results:** Paired t test showed significantly (p<0.001) higher number of occurrences for incongruent percept (43.55±3.93%) than congruent percept (38.43±3.584%) during intermittent binocular rivalry though no statistically significant difference was found between reaction time (421.42±95.15 ms for Congruent and 423.27±95.34 ms for Incongruent percept).

**Conclusion:** Incongruent pictures can attract attention and maintain it without disengaging. This suggests that incongruency is one of the stimulus feature which can actually determine perception.

**Keywords:** Binocular Rivalry, Congruent, Incongruent

**FP-NP-008**

**A Study of Motor Nerve Conduction in Non-Diabetic Offspring of Type II Diabetic Parents**

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**Background:** Diabetes is a leading cause of global morbidity and mortality. As genetic inheritance is implicated in the pathogenesis of the disease, polymorphism of various genes and genetic mutations could be implicated in the phenotype of the disease manifestation. Recently, studies on inheritance of type II diabetes mellitus have revealed the finding that the offspring of diabetic parents have forewarning findings of altered bioelectrical activity even in their non-diabetic state. Therefore, this study has been designed to assess the alterations in motor nerve conduction parameters in the same population.

**Objectives:** To assess the median motor nerve conduction parameters in non-diabetic offspring of diabetic and non-diabetic parents and infer the impairment in the study population by comparing between the groups.

**Material & Methods:** Nerve conduction study of median nerve (motor component) was carried out in both hands of 60 non-diabetic volunteers between 18-25 years (30 offspring of type II diabetic parents and 30 offspring of non-diabetic parents,
with equal gender population in each group) in normal BMI range.

**Result:** The comparison between the groups revealed no significant difference in mean latency, amplitude and conduction velocity in the motor component of median nerve between the groups.

**Conclusion:** From the observation of our study it could be inferred that impairment of neuronal function is not obvious in the non-diabetic state thus making the inference that neuropathy could be secondary to glycation of biological membrane that impairs conduction or the genetic mechanisms contribute to dysregulation of glucose homeostasis that predisposes to neuropathy in type II diabetes.

**Keywords:** Motor nerve conduction, Offspring of Type II diabetic parents

**FP-NP-009**

**D Wave is better than TcMEP (Transcranial Motor Evoked Potential) For Intraoperative Monitoring of Motor Tract during Neurosurgery of Spine**


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**Background:** The assessment of functional integrity of the motor pathways during the neurosurgery of spine is routinely done with TcMEP. D wave monitoring offers another alternative especially in cases with pre-operative motor deficits.

**Objective:** To compare the thresholds of m-MEPs and D wave in patients undergoing spinal cord surgeries who presented with preoperative deficits without history of prior neurosurgery.

**Method:** TcMEP and D wave recording was attempted in 24 patients. Muscle relaxant was not administered after intubation. TcMEP was recorded by transcranial electrical stimulation with biphasic pulse train at 200 – 500 Hz using corkscrew scalp electrodes placed at C3’ and C4’ in accordance with the international 10-20 EEG system. D wave was recorded by stimulation with single pulse of normal polarity with same electrodes. The MEPs were recorded using dual twisted needle electrodes placed in the appropriate muscles and D wave by a 2 recording points catheter electrode placed in epidural/subdural space placed caudal to the lesion.

**Result:** D wave was recorded in all 24 patients while the TcMEP was recordable in 21 patients. In 3 patients where the TcMEP was not recordable had severe spasticity. Threshold voltage required for eliciting D wave was 273.8 ± 160.9 V was lower than that for eliciting TcMEP 616.7 ± 242.6 V.

**Conclusion/Implications:** In patients with preoperative motor deficit D wave technique is better than TcMEP for monitoring motor pathways during neurosurgery of spine. The threshold for TcMEP is higher in patients with preoperative neurological deficits.

**Keywords:** D wave, TcMEP, motor tract, intraoperative neuromonitoring.
FP-NP-010

A Comparative Study of Cognitive Functions in Myopes and Emmetropes

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Background: Myopia is short sightedness or inability to visualise distant objects. It more often develops during adolescence and progresses with educational level probably due to greater use of near vision. Previous studies show significant association between cognitive function and myopia. So this study was conducted to establish whether certain domains of cognitive functions are indeed different in myopes and emmetropes.

Objectives: To assess and compare cognitive functions among myopes and emmetropes.

Materials & methods: A comparative study of cognitive functions was conducted on 120 students. 60 myopes & 60 emmetropes in the age group of 18–25 yrs were recruited based on preset eligibility criteria & were tested for Sustained Attention by Digit Vigilance Test (DVT), Mental Speed by Digit Symbol Substitution Test (DSST), Executive functions by Stroop Test and Learning & Memory by Complex Figure Test. Results were statistically analysed using students’ t test with P value <0.05 as statistically significant.

Results: Myopes performed better in all tests compared to Emmetropes with Sustained Attention (p=0.02), Mental Speed (p=0.01), Response inhibition (p=0.01), immediate recall (p=0.0046) & delayed recall (p=0.0029) which were statistically significant.

Conclusion: Myopes have better mental speed, sustained attention, executive functions & visual memory compared to emmetropes.

Keywords: Myopes, Emmetropes, Cognition- Attention, Mental speed, Executive functions, Learning & Memory

FP-NP-011

The Event Related Potential Paradigm in Response to Facial Affect Recognition in Patients with Schizophrenia

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Background: Event related potentials (ERPs) have been researched as indices of face perception and emotion recognition and it has been deduced from these studies that patients with schizophrenia exhibit deficits in facial affect recognition at both behavioral and neural levels. However, it is unclear as to which stage of facial affect processing is impaired. The aim of this study was to elucidate the significance of the face sensitive ERP components N170 and N250, in the recognition of facial emotions in patients with schizophrenia and explore the stages of facial affect processing that are dysfunctional in the patients

Methods: 10 patients with schizophrenia and 10 age-matched healthy controls

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participated in a facial emotion recognition task. A digitized series of Ekman faces displaying happy and sad facial expressions were simultaneously recorded using a 32-channel EEG system.

Results: The patients showed significant impairments in facial affect recognition for the two emotions evidenced by an increase in latency and decrease in amplitude of N170, which represents facial decoding however N250, which represents facial encoding did not show a significant increase in latency or decrease in amplitude.

Conclusion: The results of this study indicate an impairment in the decoding of facial expressions in patients with schizophrenia which may contribute to the cognitive symptoms of the disease.

FP-NP-012

Association between Childhood Seizures and Speech and Language Impairment.

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Background: A large group of children develop language impairment where an obvious cause for the same such as impaired hearing, mental retardation, cleft lip/palate, gross neurological or neuromuscular abnormalities affecting the speech apparatus, and autism cannot be found. This group is labelled as specific language impairment (SLI)

Objectives: The study aimed to assess the association between specific language impairment and childhood seizures.

Material & Methods: Ninety four patients of SLI were evaluated for history of seizures, their type and age of onset. Associated risk factors of SLI such as family history of seizures, prenatal, perinatal and postnatal factors were also assessed. Their EEG changes were also studied.

Results: Out of 94 patients of SLI, about one fifth (n=19, 20.21%) had history suggestive of seizures, of which 15 (78.9%) were males and 4 (21.05%) females. Majority (57.9%) of patients had generalized tonic-clonic seizures (n=11), in 21% of patients the picture was that of myoclonic seizures (n=4), in another 15.8% (n=3) history of status epilepticus was documented.

Conclusion: The current study observed a high association of seizures in our cohort of children with specific language impairment. Since SLI has a multifactorial etiology, seizures per se could not cause these disorders. Prenatal and perinatal insults, along with other risk factors may account for development of SLI. However, presence of seizures, particularly in infancy should be considered a warning signal to screen such children for development of specific language impairment.

Keywords: Seizures, specific language impairment, EEG,
Orthodontic Pain Alters Thermal Sensitivity of Masseter Muscle during Fixed Orthodontic Therapy

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**Background:** Fixed orthodontic therapy implies placement of brackets, arch wires and application of orthodontic traction forces for correction of malocclusion. These forces cause acute, severe, self-limiting but disturbing orthodontic pain. It begins as soon as the forces are applied, reaching a peak at 24 hours and subsides within a week. Reports suggest orthodontic treatment alters sensory perception intra-orally, but whether widespread sensitization occurs at extra oral sites is still questionable.

**Objectives:** The present study aimed to systematically record thermal sensitivity at masseter during fixed orthodontic therapy.

**Material & methods:** Quantitative sensory testing using thermal probe over masseter and hand as a reference site, was done at three time points, at baseline (before start of therapy), 24 hours and 7 days post arch wire placement and application of orthodontic forces.

**Results:** Sensory detection thresholds (cold, CDT; hot, HDT) and pain tolerance thresholds (cold, CPT; hot, HPT) were recorded. Significant differences were found in CDT and CPT 24 hours post wire placement (p= 0.0004 and 0.0001 respectively) in 20 patients (17±3.8 years). Interestingly significant gender differences were also found.

**Conclusion:** This suggests orthodontic pain causes widespread peripheral sensitization. Gender differences also exist in pain perception and experience

**Keywords:** Fixed orthodontic therapy, orofacial pain, peripheral sensitization, inflammation, sensory testing

Quality of Sleep is Associated with Body Mass Index and Psychological Status of Young Adults - A cross sectional study

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**Background:** The ill-health effects of inadequate sleep and sleep-related disorders are frequently overlooked and underestimated by the general population. Recent studies have reported a declining trend in the quality of sleep among young adults due to the extensive usage of electronic media. However, data regarding the quality of sleep and its association with body mass index and psychological status of young adults is very limited.

**Objectives:** This study aimed to assess the quality of sleep among young adults using simple self-reported pre-validated
questionnaires and to measure the extent of its correlation with body mass index (BMI) and psychological status of these individuals.

**Materials & Methods:** Four hundred young adults (200 males, 200 females) aged 20-23 years were recruited in the study and their BMI was calculated using the Quetelet’s index. Quality of sleep, daytime sleepiness and symptoms pertaining to depression, anxiety and stress of the study participants were assessed using Pittsburgh Sleep Quality Index (PSQI) score, Epworth Sleepiness Scale score (ESS score) and Depression Anxiety Stress Scale Score (DASS score) respectively.

**Results:** Statistically significant positive correlation (p < 0.001) was observed between PSQI scores and BMI, ESS scores and BMI, PSQI scores and ESS scores, PSQI scores and DASS scores and ESS scores and DASS scores. Duration of sleep hours showed a significant negative correlation (p < 0.001) with BMI, PSQI scores, ESS scores and DASS scores.

**Conclusion:** Poor quality of sleep and chronic sleep deprivation predispose to increased daytime sleepiness, increased body mass index and mood changes.

**Keywords:** sleep quality, PSQI scores, ESS scores, DASS scores, body mass index

**FP-NP-015**

**Localisation of DLPFC using scalp landmarks versus fMRI-guided neural navigation**

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**Background:** DLPFC has been gaining popularity as a pain management strategy ever since the analgesic effect of rTMS was found in 2006 for Fibromyalgia patients. However, the results are mixed and unexplainable inter-individual differences in the pain relief. Furthermore, the methods to accurately target the brain regions involved in pain management are also unknown.

**Introduction:** For transcranial magnetic stimulation, as a part of the standard practice, the DLPFC is located by using manually located scalp landmarks, that is by measuring 5 cm anterior to the motor hotspot of the hand motor cortex. Keeping in mind the individual differences in the scalp shape, cranial-cortex difference and recent reports highlighting the inconsistencies in the motor hotspot of the hand motor cortex, the localisation of the DLPFC appears to be uncertain.

Neuronavigation (NeNa) is one of the latest technological advancements which takes advantage of the functional MRI data as a scaffold to localise the brain area of interest. It is a frameless stereotactic device which can help in the accurate placement of the rTMS coil acquiring patient’s fMRI data in NIFTY format and co-registering it with the patient’s head placement in the physical space.

**Aim:** The study aims to quantify the discrepancy between the DLPFC located via fMRI-guided NeNa versus using manually identified scalp landmarks.
**Methodology:** Ten patients diagnosed with primary Fibromyalgia were recruited from Department of Rheumatology, AIIMS, New Delhi. They were subjected to a standardised fMRI protocol (modified Stroop test) which is known to activate the DLPFC. The DLPFC was located using NeNa and also using the manually identified scalp landmarks. The difference between these two points is reported in the present study.

**FP-NP-016**

**Salidroside Inhibits Mitophagy in Hypoxic Neurons**

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**Background:** Chronic hypoxic stress is known to increase lipofuscin deposition in hippocampal neurons. Salidroside is a glucoside derivative of β-Tyrosol and has been reported to protect neurons in hypoxia through maintenance of mitochondrial activity.

**Objectives:** The present study is therefore aimed at investigating the potential of salidroside in preventing autophagy during chronic hypoxia and to identify the molecular targets and underlying signaling mechanisms.

**Materials & methods:** Prophylactic efficacy of salidroside for chronic hypoxia induced neuronal ageing was studied in adult male Sprague-Dawley rats exposed to simulated altitude of 7600m for 21 days. Salidroside was supplemented at a dose of 25mg.kg⁻¹.b.w. p.o. during the period of hypoxic exposure following which ultra-structural and immunohistological studies were conducted for lipofuscin aggregation and mitophagy. Since Bcl-xL mediated mechanisms are crucial mediators of mitophagy, in-silico analysis for interaction with Bcl-xL was carried out using VLife MDS software. In-silico findings were validated using proteomic approaches to identify the molecular mechanism of action of salidroside.

**Results:** Administration of salidroside reduced deposition of lipofuscin in CA3 hippocampal neurons and prevented mitophagy. Salidroside binds to BH3 domain of Bcl-xL and stabilize thereby preventing PGAM5 phosphatase activity. Hence, FUNDC1 is maintained in phosphorylated state and does not interact with LC3 II which is crucial for mitophagy.

**Conclusion:** Salidroside demonstrates potential for preventing lipofuscin deposition during chronic hypoxic stress through modulation of Bcl-xL mediated mitophagic mechanisms.

**Keywords:** Hypoxia, lipofuscin, mitophagy, Bcl-xL, FUNDC1, salidroside.
FP-NP-017

A Comparative Study of Sleep Architecture in Non-Institutionalized Senior Citizens of Bangalore City and Normative Data of Sleep

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Background: Sleep disturbances are particularly common among even the apparently healthy aging population, and its role as a cause or consequence of chronic illness makes it an issue worth addressing.

Objectives: To record and score the sleep architecture in familial senior citizens using polysomnography. To compare the score with the normative data provided by American Academy of Sleep Medicine (AASM) for the same age group. To compare the polysomnographic recordings of male and female subjects.

Methodology: The study was done on apparently healthy 30 non-institutionalized senior citizens (15 males and 15 females) residing with their families in residential areas of Bangalore city. Eligible subjects underwent overnight polysomnography. The recorded sleep parameters included Total Sleep Time, Sleep Latency, REM latency, Wake after Sleep Onset, Sleep efficiency, stages N1%, N2%, N3%, REM%. The data was manually scored, tabulated and compared with normative data using the appropriate statistical tools.

Results: On statistical analysis, TST was not significantly altered. The Sleep latency, REM latency, WASO, N1% and N2% was significantly (P<0.05) increased in the study group compared to normative data. Sleep efficiency, N1% and N2 % is significantly decreased compared to the normative data. Also males had longer REM latency and females had greater percentage of N1% compared to each other.

Conclusion: The sleep architecture of the senior citizens under study are significantly deviant from the normative data and the causes for this may be altered circadian rhythm, nutritional, hormonal or psychosocial factors.

Keywords: Polysomnography, non-institutionalized, familial, senior citizens, normative data, AASM

FP-NP-018

Expression of SLC6A4 gene in Obstructive Sleep Apnea Syndrome

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Background: The serotonin transporter (5-HTT) is involved in the serotonergic system by regulating the serotonin effects on breathing and sleep-wake cycle. The gene coding for serotonin transporter-SLC6A4 might be important for the pathogenesis of obstructive sleep apnea syndrome (OSAS) and for future pharmacological approach for treating patients since as of now the
pharmacological drugs are limited for the treatment of OSAS.

**Materials & methods:** Total ten male subjects with OSAS at age group 40-60 years were included. Four healthy male subjects with no history of OSAS were taken as a control which was prerequisite for RT-PCR. Patients with OSAS for over three years or more were included. All the patients were previously diagnosed by overnight polysomnography (PSG) by physicians. Subjects were examined to exclude if any definite psychiatric disorders were present. Subjects having altered serotoninergic mechanism due to any illness or taking any medications with known effects on serotonin system were excluded. Subjects with chronic obstructive pulmonary disease were also excluded. RNA from blood were isolated and cDNA was synthesized and RT-PCR was done with specific primers for the gene SLC6A4 and housekeeping gene β-actin, to run the RT-PCR. The comparative (CT) method was used to analyze the data recorded in RT-PCR.

**Results:** The relative quantification is analyzed through RT-PCR and the down regulation of the SLC6A4 gene among nine subjects out of ten was identified.

**Discussion & conclusion:** We found that SLC6A4 is under expressed in OSAS. We concluded that 5-HTT protein which regulates serotonin actions is inhibited in OSAS due to its under expression of its coding gene. The gene associated with serotoninergic system in modulating serotonin effects is inhibited in OSAS. Thus, it might be a strong candidate gene for further research in sleep apnea syndrome patients.

**Keywords:** Obstructive sleep apnea syndrome (OSAS), serotonin (5-HT), serotonin transporter (5-HTT), quantities real-time PCR (qRT-PCR), cycle threshold (Ct)

**FP-NP-019**

**Role of Neurovascular Coupling in High Altitude Induced Cognitive Impairment.**

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Exposure to high altitude environment has been reported to cause cognitive impairment which is both altitude and duration dependent. We adopted a system biology approach for identifying modifiable physiological risk factors associated with high altitude induced cognitive impairment. Our studies using psychological test batteries showed impairment in specific cognitive domains. Considering reports on high prevalence of hypertension at high altitude, we investigated the association of hypertension, dyslipidemia and arterial stiffness mild cognitive impairment. Our findings show hypertension and arterial stiffness induced altered cerebral perfusion and neurovascular coupling in specific brain regions. Oral supplementation of Seabuckthorn oil capsules to hypertensive subjects with dyslipidemia did not only maintain the blood pressure at normal levels but also improved cerebral perfusion and cognitive performance in the subjects. These findings suggest identification and modulation of modifiable risk factors like hypertension can be a preferred strategy for stress induced cognitive impairment.
FP-NP-020

Effect of Binaural Beat Rhythm on Neuropsychological Measures and Brainwave Entrainment in Healthy Volunteers

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Background: Binaural beats are auditory stimulation that has been reported to influence neurophysiological measures and cognitive abilities by the mechanism of cortical entrainment.

Objectives: To assess the entrainment of brain activity to binaural rhythm by presenting a series of binaural beats of different frequencies. To analyze the impact of binaural auditory beats on neuropsychological measures.

Materials & Methods: Binaural beats of delta, theta, alpha and beta rhythms were presented to healthy subjects and their EEG was measured. Power spectral density and approximate entropy were used for EEG analysis.

Results: The peak values of PSD were observed at 5 Hz for theta band and at 10 Hz for alpha band that corresponds with the administered binaural beats. The neuropsychological measures conducted pre and post binaural beat presentation did not show significant difference.

Conclusion: Although no significant effect on neurophysiological measures was observed, the analysis of power spectral density provided evidence of brain wave entrainment.

Keywords: Binaural rhythm; EEG; Power spectral density; Approximate Entropy

FP-NP-021

Emotional Processing Requires Increased Synchronization in Gamma Oscillations

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Background: Emotions are complex processes, involving in-tandem working of several brain areas. Studying the synchronization pattern of Gamma band during an emotional experience further reflects which type of emotional condition requires involvement of more areas.

Objective: The study was designed to understand the changes in the coherence of Gamma band during the processing of an emotional information.

Materials & methods: High arousing Negative and Positive and low arousing Neutral IAPS pictures were used to induce emotions in 56 right handed subjects (Male: 30 and Female: 26) with a mean age of 26.5±3.3 yrs. EEG was recorded using high-density EEG sensor net (128-electrode) during baseline and emotional picture condition. EEG signals were filtered for gamma band range (31-99 Hz) and further pre-processed in Netstation and EEGLAB. Spectral coherence was estimated using Magnitude Squared Coherence function in Matlab. For comparison between conditions, statistical non-parametric mapping (SnPM) test was used.

Keywords: Gamma; EEG; Emotional processing; Spectral coherence
performed in Matlab with 1000 data permutations at p<0.01.

**Results:** All three emotional conditions showed statistically significant increase in coherence for gamma band compared with baseline. Neutral condition showed increase in coherence for maximum channel pairs (132) followed by Negative (41 pairs) and Positive (21 pairs).

**Conclusion:** Increased coherence for Neutral content could possibly be because of the conflict in the discrimination for neutrality vs. valance in the pictures itself. Negative emotions are activated as part of goal directed behavior more often, are high demanding in terms of appropriate responses to be made and thus recruit more brain areas than Positive emotions.

**Keywords:** Emotion, Gamma band, Spectral coherence

**FP-NP-022**

**Visual Evoked Potential in Non-Diabetic offspring (18- 25 years) of Type II Diabetes parents**

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**Background:** Parental history of type II diabetes increases the offspring’s risk of developing the diabetes. It was found that parameters like HRV and somatosensory evoked potential are altered in these population even before the onset of condition. As retinopathy is a common complication of diabetes, this study has been designed to assess the alterations in visual evoked potential in non-diabetic offspring of diabetic parents.

**Objectives:** To assess the Visual Evoked Potential in Non-Diabetic offspring of Type II diabetic parents and of non-diabetic parents and to compare p100 latencies between the groups.

**Materials & Methods:** VEP was recorded in 100 subjects (50 study and 50 controls) of age and sex matched subjects with normal BMI (18.5-24.9) using PHYSIOAP-PP4, Medicaid Systems, Chandigarh. Student unpaired t test was used to analyze the statistical differences of P100 VEP latency between offspring of diabetic and non-diabetic parents.

**Results:** The P 100 latency was significantly increased in diabetic offspring in left eye (P value 0.0038) when compared with that of controls, whereas the difference is not significant in right eye (P value 0.1062)

**Conclusion:** The increase in the latency of VEP suggesting a delay in the conduction may be a predictor of increased risk for developing diabetes in susceptible population. The latency delay in non-diabetic state observed in this study could be due to genetic predisposition to proneness to retinopathy as point-mutations and gene-polymorphisms are inherited.

**Keywords:** Visual evoked potential, diabetic off springs, delayed latency
FP-NP-023

The Impact of Hypertension on Speed of Processing and Executive Functions in Geriatric Subjects

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Background: Hypertension is a major contributor to cerebrovascular pathology causing dementia. Visual reaction time gives a better index of the cortical processing of Visual Stimulus. Trail Making Test provides information on visual search, scanning, speed of processing, mental flexibility, and executive functions.

Objectives: To compare simple reaction time, choice reaction time and trail making test scores between hypertensives and normotensives geriatric male subjects.

Methods: The present cross-sectional study was conducted on 60 Male hypertensives and normotensives aged >60 years, with BP <140/90 mm Hg were recruited as controls & BP >140/90 mm Hg were recruited as hypertensive’s. Both Simple Reaction Time (SRT) & Choice Reaction Time was assessed using Deary-LiewaldReaction Time Tester version 3.10. The computer programme recorded the response times. Trail Making test was used as executive function test.

Results: Data were analyzed using SPSS version- 20, Unpaired t-test showed a significant difference between the reaction time scores of normotensives (SRT: M:366.4 SD: 16.41; CRT: M: 737.6 SD:59.82 ) and hypertensives (SRT: M: 471.4 SD: 21.52 ; CRT: M: 902.4 SD:55.57).

In addition, the executive function showed significant difference between the executive ability of normotensives (TMT-B: M: 97.6, SD: 18.24) and hypertensives(TMT-B: M: 112.24 SD: 20.12).

Conclusion: The results showed that the hypertensive elderly males have a lower cognitive performance in comparison to age matched normotensives. Hypertension delays the speed of processing of information in elderly hence they are at higher risk for fall.

Keywords: Hypertension, Aged, Reaction Time, Trail making test, executive functions

FP-NP-024

Influence of Gender and Body Fat Distribution on Auditory Event Related Potential in Young Individuals

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Background: The escalating global epidemic of overweight and obesity is associated with serious health implications. While the negative consequences of overweight and obesity is widely acknowledged, the impact of body fat distribution on cognition has received less attention.

Aim: The present study aimed to assess the impact of gender and body fat distribution on the cognitive marker P300 auditory event related potential, in young individuals.
Materials & Methods: About 50 individuals involving both the genders in the age group of 18-21 years were recruited for the study. Body fat distribution was measured by bioelectrical impedance analysis (BIA). Auditory P300 was measured at C2 and Pz to assess the cognition. SPSS version 20 was used for statistical analysis. p< 0.05 was considered statistically significant.

Results: Body fat distribution was significantly different between males and females. There was no significant difference in the cognitive parameters between males and females. There was no significant correlation between body fat distribution and auditory P300.

Conclusion: Gender and body fat distribution does not influence the auditory event related potentials in the younger age group.

Keywords: Body fat distribution, Cognition, P300

CARDIOVASCULAR SYSTEM

FP-CVS-025

Effect of Non-Invasive Vagus Nerve Stimulation on SBP and QTc in Experimentally Induced Hypertensive Rats

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Background: Hypertension is known for its complex patho-physiology and multiple etiological factors. HTN poses a great threat worldwide over the cardiovascular status of an individual. Resistant hypertension cases are emerging even after use 3 or more antihypertensive drugs. Thus, research for non-pharmacological management for hypertension is needed.

Objectives: The study aimed to know the effect of non-invasive transcutaneous electrical stimulation at the level of tragus (supplied by vagus nerve) on BP and QTc in experimentally induced hypertensive rats.

Material & methods: A total of 12 male wister rats were included in this study. HTN was induced experimentally in Group II (N=6) rats by oral administration of L-NAME (40mg/kg) for 21 days. Vagus nerve at the level of tragus was stimulated after Ketamine (50mg/kg)/Xylazine (5mg/kg) anesthesia. BP and QTc were recorded by NIBP and Advanced CVS recording instrument (AD Instrument, Australia) respectively.

Results: Baseline SBP in control rats was 123.07± 4.51 mmHg while SBP after developing hypertension was 146.88 ± 4.81 mmHg. After stimulation SBP values in hypertensive rats becomes 119.74 ± 3.06 mmHg. QTc changes is to be discussed later.

Conclusion: Trans-cutaneous electrical stimulation of tragus is effective non-invasive method to lower the SBP.

Keywords: non-invasive vagus nerve stimulation, BP, QTc, hypertensive rats.
Uniqueness of RR Triangular Index in comparison with other Time domain, Frequency Domain and Geometric Indices. Corroborative Evidences from Cardiovascular, Anthropometry and Academic Performances in Young Adults.

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Background: Heart Rate Variability is an excellent predictor of cardiovascular morbidity and mortality. However due to the high variance of HRV indices and their dependency on age and basal heart rates makes it very difficult for them to reject the null hypothesis by conventional research agreements of the day inspite of higher sample sizes. Therefore it is imperative that further introspection must be carried out on this aspect that will overcome the aforementioned limitation. In the light of previous experience the authors have observed that RR Triangular index (RRTi) has better statistical outcome among other indices and therefore a scientific introspection is done.

Objective: The study aims to assess the uniqueness of RR Triangular index with other indices of HRV in rejecting a null hypothesis. To fulfill the aim, the study has the objective of comparing the statistical significance of the correlation coefficients of RRTi with cardiovascular, anthropometric and academic performances in young adults.

Material & Methods: 102 subjects (34 boys & 68 girls) between 18-22 years were included in the study by convenient sampling after assessing for the inclusion and exclusion criteria. Short term HRV is computed as per Task Force Recommendation. Time domain indices, Geometric indices and Frequency domain indices are computed. Cardiovascular parameters including resting blood pressures, heart rate, mean arterial pressures and rate pressure product are measured. Anthropometric indices including body mass index, Body fat percentage, triceps skinfold thickness and Waist Hip ratio were measured. First year university marks were taken as a measure of academic performance. Spearmann correlation was used to analyse the correlation between indices of HRV and other parameters. The r value and p value of all correlations are analyzed and presented. The number of occurrences of statistical significance for the same non-HRV parameter with RRTi is compared with other indices of HRV.

Results: Most of the correlation data showed a lower p values for RRTi with non HRV parameter. In many of the cases RRTi was the only parameter that showed a significant correlation. This was observed across cardiovascular, anthropometric and academic performance parameters. The total occurrence of statistical significance (p < 0.05) for RRTi was higher than any other HRV indices and found to be statistically significant.

Conclusion: RRTi is found to be much robust and unique among other HRV indices in rejecting a null hypothesis. This observation can be attributed to the very methodology of RRTi computation which may nullify the various known and unknown confounding factors. We further
conclude the need for finer mathematical explanation of this observation and possible normalization or correction formula to be identified and applied for other indices to nullify plausible confounders.

**Keywords:** RRTi, HRV, robust, statistical, significance, normalization

**FP-CVS-027**

Seismocardiography Based System for the Assessment of Electro-Mechanical (E-M) Window.

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**Background:** The E-M window is defined as the duration between electrical (QT) systole and mechanical systole (QS2). Traditionally, it is assessed using the electrocardiography (ECG) and phonocardiography (PCG).

**Objectives:** This work aimed to develop a wearable device to estimate the E-M window using Seismocardiography (SCG) in the replacement of PCG. The rationale is that SCG uses accelerometer, which is small in size and low in weight and hence it is convenient to wear. Further, it is robust to environmental noises.

**Material & Methods:** A wearable patch is developed to acquire the SCG and ECG signals simultaneously. The device is composed of AD8232 signal conditioning block to acquire single lead ECG and MMA7361 (three-axis MEMS) accelerometer to acquire the SCG signal. Further, wireless communication has to be incorporated in the developed device to transmit the acquired signals at a remote end where it can be analyzed using the developed software.

**Results:** The developed device is convenient to wear and it is robust to noise for the assessment of E-M window.

**Conclusions:** Such systems will not only be useful for long term monitoring but it can also be used under the noisy environment such as shopping mall, vegetable markets etc.

**Keywords:** E-M window, Seismocardiography, Electrocardiography, Remote health monitoring

**FP-CVS-028**

Association of Serum Uric Acid with Cardiovascular Risk Factors: A Hospital based Cross-sectional Study

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**Background:** Elevated serum uric acid levels are commonly seen in association with individual cardiovascular risk factors such as hypertriglyceridemia, hypertension, obesity and hyperglycemia, a cluster that when found together in the same person, characterizes the so-called metabolic syndrome.

**Objectives:** This study aimed to co-relate the levels of serum uric acid with atherogenic dyslipidemia (high levels of triglycerides and low levels of HDL-c)
**Material & methods:** 160 subjects aged 18-60 years were enrolled excluding those having any anatomical deformity, diabetes and/or hypertension for more than 5 years. Their anthropometric parameters, lipid profile, fasting plasma glucose and serum uric acid levels were measured.

**Results:** Association of serum uric acid levels with triglycerides (p < 0.003) and HDL levels (p < 0.001) was highly significant and also a significant co-relation was established between serum uric acid level and HDL (r = -0.3).

**Conclusion:** Higher level of triglycerides has a stronger association with serum uric acid level than all the other components of metabolic syndrome. Hypertriglyceridemia reflect the lifestyle of the patient more than genetic factors because obesity is also associated with these characteristics. Apart from this, the synthesis of fatty acids (triglycerides) in the liver is associated with the de novo synthesis of purine, thus accelerating uric acid production.

**Keywords:** hyperuricemia, triglycerides, metabolic syndrome, dyslipidemia

**FP-CVS-029**

**Effect of Series of Breath Holding On Arterial Blood Pressure**

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**Background:** Breath-holding (BH) is a voluntary act but after some time an involuntary mechanism overrides causing resumption of breathing (break-point). A single episode of BH is known to elevate the blood pressure. This prompted us to investigate whether and how a series of BH epochs affects the cardiovascular system differently.

**Objectives:** To observe arterial blood pressure changes associated with a series of “BH epochs” following maximum inspiration and maximum expiration.

**Methods:** Thirty-five healthy young adults were instructed to hold their breath repetitively, for 5 minutes, in two patterns, one following maximum inspiration and the other following maximum expiration. Arterial Blood Pressure (ABP) and ECG (for Heart Rate Variability) were continuously recorded at rest and during the maneuver. Capillary blood gases (BG) were analyzed at baseline and at break point of the last epoch of BH.

**Results:** ABP rose significantly at the breakpoint during the maneuver. There was a significant fall in PO2 and SPO2, and significant rise in PCO2 during breath holding (p < 0.05). However, no significant correlation between BG and BP was established. We observed significant decrease in SDNN, RMSSD, HFnu, total power and SD1/SD2 while LFnu, LF/HF and SD2 were significantly increased during both BH patterns (p < 0.05).

**Conclusion:** We conclude that rhythmic BH patterns affect the cardiovascular system in similar way as a single episode of BH. Blood gas composition does not correlate with BP changes. We postulate sympathetic over activity as the possible mechanism for the rise in BP during BH episodes.

**Keywords:** Breath-holding, Break-point, Cardiovascular system, Heart rate variability, Blood gases, Autonomic nervous system.
AUTONOMIC NERVOUS SYSTEM

FP-ANS-030

Association of LF: HF ratio and Baroreflex sensitivity with Cognitive Deficit in Postmenopausal Women.

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Background: Menopause is defined as permanent cessation of menstruation. Menopause includes autonomic dysfunctions like vasomotor symptoms, psychological and mental disturbances such as mood changes, insomnia, depression, irritability, forgetfulness and lack of concentration. These climacteric vasomotor symptoms are due to alteration of autonomic regulation like various cardiovascular reflexes. Cognition is evoked response to stored stimuli. It is a thinking process of brain, using both the sensory input and memory. Heart rate variability (HRV) and baroreflex sensitivity (BRS) analysis recorded by finapres, have been documented as sensitive measures of sympathovagal balance. Long-latency event related brain potentials are sensitive neurophysiological approaches for the assessment of cognitive functions. However, cognitive alteration in menopausal women and their association with autonomic dysfunction is not yet known.

Objective: To assess the association of LF: HF ratio and BRS with cognitive deficit in postmenopausal women.

Materials & Methods: Normal healthy, 50 postmenopausal and 55 premenopausal women without any systemic illness were included in the study. Resting heart rate variability was measured for 5 mins, BRS was measured for 10 mins and cognitive evoked potential was recorded by Nihon Kohon electrophysiology instrument. All data were recorded and analysed by SPSS version 19.

Results: Statistically significant difference in LF:HF ratio, BRS and P300 latency were found between two groups. LF:HF ratio and BRS was found to be significantly correlated with P300 latency in postmenopausal women.

Conclusion: The postmenopausal women showed autonomic dysfunction and cognitive deficit compared to premenopausal women. The cognitive deficit was linked to sympathovagal imbalance in postmenopausal group.

Keywords: Postmenopausal women, LF:HF ratio, Baroreflex sensitivity, P300 latency, cognitive deficit.

FP-ANS-031

Increased Prevalence of Cardiac Autonomic Dysfunction in Recurrent Stroke Patients As Compared To Patients with a First –Ever Stroke

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Background: Cardiac autonomic neuropathy (CAN) is a common complication in stroke patients. Multiple studies have found impaired parasympathetic function in stroke patients which may manifest clinically as
hypertension, tachycardia and cardiac arrhythmias leading to sudden cardiac mortality. 1 in 6 stroke patients have a recurrence, 25% of which are fatal within 28 days. To the best of our knowledge very few studies have investigated the prevalence of autonomic dysfunction in patients of recurrent stroke and first-time stroke.

**Aim:** To assess and compare, the prevalence of various grades of cardiac autonomic dysfunction, and therefore, the cardiovascular risk, in patients of recurrent stroke and first – ever stroke.

**Methods:** 60 stroke patients - 30 first – ever stroke patients and 30 recurrent stroke patients were recruited for this study. Deep breathing test (DBT), Valsalva ratio and LST (30:15 ratio and ΔSBP) were done. Ewing’s classification, Bellavere criteria and AIIMS AFT lab criteria were used for grading the severity of CAN.

**Results:** The prevalence of following “Abnormal” tests was higher in recurrent stroke group as compared to first – ever stroke group - DBT (83.3 % vs 43.3%, p=0.001), Valsalva maneuver (43% vs 16.7%, p=0.049), LST 30:15 (26.7% vs 13.3%) and LST ΔSBP (26.7% vs 16.7%). Higher prevalence of autonomic dysfunction was found using Ewing’s classification (86.67% vs 60%, p= 0.039), AIIMS AFT lab criteria (93.4% vs 60%, p= 0.007) and Bellavere Criteria (86.67% vs 56.6%, p= 0.021).

**Conclusion:** Our preliminary study shows that there is increased prevalence of autonomic dysfunction, more so of “severe” grades of autonomic dysfunction, in patients with recurrent stroke than in patients with a single stroke event. This may indicate an increased risk of adverse cardiovascular events and cardiac mortality in patients of recurrent stroke.

**Keywords:** Stroke, recurrent stroke, autonomic dysfunction

**FP-ANS-032**

**A Study to Understand the Effect of Antenatal Stress on Fetal Heart Rate Variability**

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**Background:** Antenatal stress is linked to later development of chronic diseases during adulthood. However, the mechanisms still remain unclear. One of the possible emerging mechanism by which maternal stress could bring about changes is by altering fetal autonomic nervous system activity.

**Objectives:** Present study aimed to evaluate the association between antenatal stress and fetal heart rate variability indices, a measure of fetal autonomic regulation. Also, the study aimed at comparing the fetal heart rate variability indices in mothers with low and high antenatal stress scores.

**Materials &methods:** Heart rate variability analysis was performed on maternal and fetal ECG obtained non-invasively from maternal abdominal ECG from 50 healthy pregnant mothers in their third trimester. Kessler Psychological Distress Scale (K10) questionnaire was administered to obtain antenatal stress scores. Subjects were categorized into low (n=32) and high

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(n=18) antenatal stress groups based on the mean K10 score

**Results:** The K10 scores showed a significant and positive association with fetal low frequency (by far an indicator of cardiac sympathetic system) ($r= 0.4, p<0.05$) and a significant negative association with fetal high frequency (indicator of cardiac parasympathetic system) ($p=-0.4, p<0.05$). Also, Independent t test showed fetal low frequency to be significantly higher and fetal high frequency to be significantly lower in high antenatal stress group ($p<0.05$)

**Conclusion:** The study suggests an increased cardiac sympathetic drive in the fetus in response to maternal stress. The results imply that moderate increase in prenatal stress can modulate changes in fetal autonomic nervous system.

**Keywords:** Fetal heart rate variability, antenatal stress, pregnancy, third trimester

**FP-ANS-033**

**Dysautonomia in Heavy Drinkers for More Than 5 Years of Alcoholic Consumption with Intact Liver Function**

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**Background:** It is known for long that alcoholic liver cirrhosis is characterized by autonomic dysfunction due to the underlying liver pathology. But alcohol can have a direct effect on the autonomic functions even before the liver functions are altered.

**Aims & objectives:** We have undertaken this study to test and compare the autonomic function status in apparently healthy alcoholics with normal liver function tests with age and sex matched healthy individuals.

**Materials & methods:** Thirty healthy non-alcoholics with normal liver function as controls and thirty apparently healthy alcoholics for more than 5 years with normal liver function tests were taken for this study. Autonomic function tests for both parasympathetic and sympathetic functions were performed in both these groups and the results were compared.

**Result:** Parasympathetic function tests were within the normal range except for the resting heart rate which showed a significant increase ($P<0.01$) in the study subjects compared with the controls. Sympathetic tests showed a very significant increase in BP response to postural change and a significant change in hand grip test.

**Conclusion:** Resting heart rate and BP response to postural change were increased and BP response to hand grip test has shown significant change in study subjects compared to controls which suggest that both sympathetic and parasympathetic functions are altered in them. We will conclude this study with the findings that alcohol has a direct effect on the autonomic nervous system even without any liver function tests alteration.

**Keywords:** Chronic alcoholism, heavy drinkers, intact liver function tests, autonomic nervous system, parasympathetic dysfunction, sympathetic over activity.
Heart Rate Variability and Quality of Life in Breast Cancer Survivors- Does Adjuvant Yoga Therapy Play A Role?

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Background: Female breast cancer strikes third among the leading cancers worldwide. Sufferance due to the disease is aggravated by the complications of the treatment targeted at the tumor and its recurrence inducing stress and compromise the quality of life of the diseased individual.

Objective: The current study was undertaken to demonstrate the effect of yoga therapy on the heart rate variability (HRV) and the quality of life (QOL) in breast cancer survivors undergoing loco-regional chest wall radiation.

Materials & Methods: Patients with breast cancer who have undergone modified radical mastectomy were recruited before the commencement of radiotherapy. Short term HRV and questionnaire based assessment of QOL of the patients were obtained. Randomized into two groups, one group of patients underwent conventional treatment while the other group of patients underwent yoga sessions for 20 min a day, 5 days a week lasting for 6 weeks in addition to the conventional treatment. The parameters were reassessed. Data were subjected to non-parametric analysis based on normalcy. Wilcoxon Signed Ranks test and Mann Whitney test were performed to compare the variables within the groups and between the two groups respectively.

Results: Statistically significant improvement was found in HRV indices following yoga therapy for 6 weeks (p<0.05). The quality of life improved in those who underwent the yoga therapy compared to the control group.

Conclusion: The current study demonstrates improvement in HRV and QOL in breast cancer survivors and hence supports the administration of yoga as an adjuvant therapy to the conventional treatment protocol for non-metastatic breast cancer.

Keywords: yoga, breast cancer, radiotherapy, heart rate variability, quality of life.

Evaluation of association of Maternal Prenatal Cardiac Autonomic Nervous function with Postnatal Psychological Stress Level

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Background: Maternal psychological health related problems are most common cause of morbidity during late pregnancy and postpartum. Pregnancy is characterized by profound changes in cardiac autonomic modulation, owing to fluctuations in ovarian and placental hormones. Also, psychological stress is known to cause changes in sympathovagal balance. The study aims to evaluate, whether changes in cardiac autonomic...
function during pregnancy predict the postnatal psychological stress level.

Objectives: To evaluate the association between maternal prenatal cardiac autonomic function and postnatal psychological stress level.

Materials & Methods: Twenty three healthy volunteers (26 ± 2 years) with singleton pregnancy were recruited during their 3rd trimester. Heart rate variability was assessed (PowerLab 26T, AD Instruments, Australia) and data obtained was analysed using LabChart software. Maternal postnatal psychological stress level was assessed using K10 questionnaire.

Results: Spearman correlation statistics between heart rate variability indices and postnatal psychological stress scores showed that low frequency (LF) spectral power (both absolute and normalised units), surrogate marker for sympathetic nervous system significantly correlates with postnatal psychological stress scores (LF_abs: p=0.03, LF_norm: p=0.05). Also, there was significant correlation between Total Power and postnatal stress scores (p=0.04). However, high frequency (HF) spectral power and LF/HF ratio did not show any association with postnatal stress scores.

Conclusion: Higher sympathetic nervous activity during late gestation was associated with postnatal maternal psychological stress. Hence, maternal prenatal heart rate variability indices can be used as an independent predictor of postnatal psychological stress level.

Keywords: Postnatal stress, Heart rate variability, Cardiac autonomic

FP-ANS-036

The Efficacy of Isometric Hand Grip Training on Arterial Stiffness and Blood Pressure in Prehypertensive Individuals - An Interventional Study.

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Background: It is well documented that prehypertensive individuals are at great risk of developing cardiovascular diseases (CVDs) and arterial stiffness is an independent marker of CVD risk. Recently, resistance exercise has been suggested as a new tool in the non-pharmacological treatment for increased blood pressure (BP).

Objectives: To evaluate the efficacy of Isometric hand grip (IHG) training exercise in reducing the vascular stiffness and blood pressure levels in prehypertensive individuals

Materials & Methods: All the 150 individuals of 2015 batch, screened during medical health checkup program organized by the institution at the time of joining were included in the study. Based on their BP recordings they were classified as normotensives (n=50) and prehypertensives (n=50). Arterial stiffness indices were assessed using finger photoplethysmography. IHG exercise training was given and BP and arterial stiffness were evaluated at the end of fourth and eighth week of training period. Paired t-test was carried out using SPSS version 16 and p value less than 0.05 was considered to be statistically significant.

Result: The prehypertensives BP and arterial stiffness indices reported to be significantly high compared to the
normotensives ($p=0.001$). At the end of 4\textsuperscript{th} week of IHG training period the prehypertensives didn’t report any statistically significant change in BP and arterial stiffness indices. After the 8\textsuperscript{th} week of training a significant decrease in BP ($p$ value, SBP=0.0001 and DBP=0.01) was reported among the prehypertensive group but arterial stiffness indices, that is, stiffness index (SI) and reflection index (RI) showed no change ($p$ value, SI=0.16 and RI=0.15)

**Conclusion:** The recommended IHG training period is concluded as an efficient tool to bring back the elevated levels of BP in prehypertensives but not sufficient to modify the altered vascular stiffness.

**Keywords:** Prehypertension, Stiffness Index, Reflection Index, Isometric hand grip.

**FP-ANS-037**

**Comparison of the Cardiovascular Autonomic Functions, Biochemical Markers between Heavy Smokeless Dipping Tobacco Users and Smoking Tobacco Users.**

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**Background:** There are few studies on cardiovascular autonomic functional status and BRS of smoking tobacco and limited studies on the smokeless tobacco users. But no studies found comparing autonomic functional status, BRS, MDA and IL-4 in smoking and smokeless tobacco users.

**Objectives:** This study aimed to compare cardiovascular autonomic functions, serum Malondialdehyde (MDA) and Interleukin-4 (IL-4) between heavy dipping smokeless tobacco and smoking tobacco users.

**Methods:** 67 subjects apparently healthy volunteers were recruited from the constructing workers who are having habit of using tobacco in any form, categorized them in to smoking tobacco group ($n=22$) based on the smoking index and Fagerstrom score for smokeless dipping tobacco group ($n=20$) and controls ($n=25$), who never used any form of tobacco. HRV, CAFT and BRS were recorded and 4 ml of venous blood sample was collected from all participants. Comparison and its association of HRV, CAFT, BRS, MDA and IL-4 was done by ANOVA and post doc test by Bonferroni.

**Results:** There is significant raise in sympathetic activity and reduced vagal activity reveals autonomic imbalance in the tobacco users. Elevated MDA and IL-4 levels in smoking tobacco users and smokeless dipping tobacco users respectively suggesting that the increased oxidative stress in both users.

**Conclusion:** The present study reveals the autonomic functional status, cardiovascular disease risk and antioxidant level in the heavy dipping tobacco users and smoking tobacco users. It revealed decreased LF- HF ratio, BRS, BP and elevated MDA in smoking tobacco user and IL-4 levels in heavy dipping tobacco users, suggesting tobacco users have pro-inflammation, oxidative stress and increased cardiovascular risk. To conclude smokeless dipping tobacco users...
have more risk compared to smoking tobacco users.

Keywords: Dipping tobacco, Autonomic function, Baroreflex sensitivity, Smoking tobacco, Cardiovascular risk

FP-ANS-038

Effect of Maturation of Cardiac Autonomic Axis on Time Domain & Frequency Domain Indices of Heart Rate Variability (HRV) In Pediatric Age Group of Urban Population: A gender based study

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Background: Within the age, there is very high heterogeneity in the magnitude of HRV. The HRV is a sensitive index in establishing the underlying cardiovascular derangements. Cardiovagal autonomic function declines with age and varies with gender. The study of cardiovascular autonomic function and its maturation in the pediatric age group has gained importance as there are no much data in the literature.

Objectives: To assess the gender based differences on HRV during the period of puberty, the age at cardiac autonomic axis matures

Material & Methods: The study was done on 145 children of both the genders of urban population categorized in two groups as Group I (7-9 years, n=65) & Group II (10-12 years, n= 80). Basal 5 minutes ECG was recorded and the standard time domain indices (mean RR, SDNN, PNN50 and RMSSD) and frequency domain indices (TP, LF, HF, LFnu, HFnu and LF/HF ratio) of HRV were calculated and analyzed.

Results: Time domain and frequency domain indices were significantly ((p<0.01)) more in females than males in younger group I and less in females in group II.

Conclusion: The study proposed that there are established gender differences in the autonomic axis maturation due to the onset of puberty in females (preferably adrenarche) may result in profound decrease in the HRV parameters. A similar finding was not seen in boys because of the natural delay in the onset of puberty in comparison to their female counterparts.

Keywords: Autonomic axis, maturation, Heart Rate Variability, gender

FP-ANS-039

Cardiovascular Autonomic Function Tests in Male Diabetics: Effect of Duration of the Disease

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Background & Aim: One of the most overlooked of all serious complications of diabetes is cardiovascular autonomic neuropathy (CAN). CAN can be diagnosed by non-invasive cardiovascular autonomic function tests (CAFT) like heart rate (HR) responses to breathing, Valsalva maneuver, HR and blood pressure (BP) response to standing and BP response.
isometric handgrip (IHG), which reflect the abnormalities in heart rate control and vascular dynamics. However, there are very few reports on the effect of duration of diabetes on autonomic function. Hence, we aimed to assess CAFT parameters in diabetics and to see the effect of duration of diabetes on autonomic function.

**Methods:** For this study, 44 male diabetic patients in the age group of 25 to 55 years were recruited from the medicine OPD, JIPMER and 42 healthy age and gender matched volunteers were taken as controls. Basal HR, systolic BP, diastolic BP and CAFT parameters like 30:15 ratio, E:I ratio, ΔDBP in IHG and Valsalva Ratio were measured. Biochemical parameters such as fasting blood glucose (FBG), fasting insulin were measured and Homeostasis model of assessment insulin resistance (HOMAIR) was calculated.

**Results:** SBP and DBP were significantly (P<0.0001 and P=0.0043) high in diabetic patients compared to controls. There was a significant reduction in E:I ratio (P<0.0001), 30:15 ratio (P<0.0001) and Valsalva ratio (P<0.0001) among the diabetics compared to controls. There was a decrease in 30:15 ratio, E:I ratio, Valsalva ratio and Δ DBP\textsuperscript{IHG} in diabetics with more than 5 years duration in comparison with diabetics of less than 5 years of duration.

**Conclusion:** We conclude that the reduced CAFT parameters could be the indicator of CAN in patients with diabetes. Also as the duration of the disease increases there is increased autonomic dysfunction.

**Keywords:** Cardiovascular autonomic neuropathy, autonomic neuropathy, Autonomic dysfunctions, Diabetes

**RESPIRATORY SYSTEM**

**FP-RS-040**

**Serum PARC/CCL18 levels in Active Smokers & Non-smokers with COPD and its Association with Disease Severity – An Interim Analysis.**

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**Background:** COPD is an independent risk factor for Cardiovascular disease, as reduced FEV\textsubscript{1} is associated with increased cardiovascular mortality and morbidity. There is paucity in Literature, revealing the association of Serum PARC/CCL18 (COPD specific biomarker) with Smoking status and disease severity of the patient. Moreover the Smoking status of the patient in these studies were assessed using Smoking index rather than using Serum Cotinine which is the recommended biomarker by Centre for disease control and prevention (CDC).

**Objective:** In our study we intended to assess the association of Serum PARC/CCL18 levels in Non-smokers (with SHS) and Active Smokers with COPD and also assess the association of Serum PARC/CCL18 with disease severity (GOLD STAGE CRITERIA)

**Methods:** This is a descriptive study done in collaboration between Department of Physiology Department of Pulmonary medicine, JIPMER. This study was done on n=84 male COPD patients. Anthropometric, basal, PFT & Biochemical
parameters such as Serum Cotinine and Serum PARC/CCL18 were assessed in them. Later, based on the GOLD stage criteria (Mild, Moderate, Severe, Very severe) and Serum Cotinine levels (Active smoker & Non-smoker with SHS) they were divided into 6 sub-groups. Data was analyzed by SPSS 20.0 version software. Kruskal Wallis test (>2 groups) and MannWhitney- U test (≤2 groups) were used to find any Statistical difference between the groups. Correlations between the variables were done using Spearman correlation test. Independent variables associated with PARC/CCL-18 was found using Multiple regression analysis.

**Results:** Statistically significant difference in Serum PARC/CCL-18 levels (p<0.05) and Duration of illness (p<0.05) were found between Non-smokers (with SHS) and Active Smokers with COPD. Statistically significant Correlation was found for Serum PARC/CCL-18 and Serum cotinine levels (p<0.05). However, no significant Correlation was found for Serum PARC/CCL-18 and FEV1, with no significant difference in Serum PARC/CCL-18 levels among different stages of COPD, but Serum PARC/CCL-18 levels increased as the disease severity increased. Multiple regression analysis showed significant association (p<0.05) of Age, Duration of illness, Serum cotinine with the levels of PARC/CCL-18.

**Conclusion:** Significantly increased Serum PARC/CCL18 levels with high Serum Cotinine levels and increased duration of illness in the test group indicates that Active smokers with increased duration of COPD are more susceptible for cardiovascular events in future.

**Keywords:** PARC/CCL18, Cotinine, COPD, Cardiovascular risk, FEV1, Non-smokers

**FP-FP-RS-041**

**Comparative Study of Pulmonary Functions in Athletes and Non-athletes**

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Department of Physiology, Rajendra Institute of Medical Sciences Ranchi, Jharkhand

**Background:** Lung function tests provide qualitative and quantitative evaluation of pulmonary function in patients with obstructive and restrictive lung diseases. Regular exercise as in athletes produces a positive effect on the lung by increasing pulmonary capacity and thereby improving the lung functioning.

**Objective:** To study and compare the dynamic pulmonary function parameters in athletic and nonathletic students of age group 17 years to 21 years.

**Material & Methods:** The study was conducted on male and female athletic students from Sports Authority of India centre, Ranchi. The pulmonary function test was done on 80 subjects out of which were 40 athletes and 40 non-athletes. Parameters analyzed were in the form of Forced Vital Capacity (FVC), Forced Expiratory Volume in 1 second (FEV1), Peak Expiratory Flow Rate (PEFR), FEV1/FVC and Forced mid Expiratory Flow rate (FEF 25–75%).

**Results:** In this study the values of FVC, FEV1, PEFR and FEF(25%-75%) significant difference was found. All the values were much higher in athletes as compared to non-athletes.
**Conclusion:** The FVC, FEV1, PEFR and FEF(25%-75%) were higher in athletes than in the non-athletes. This study suggests that regular exercise has an important role in improving the efficiency of respiratory system.

**Keywords:** Pulmonary Functions, Athletes, FVC, PEFR, FEV1

**FP-RS-042**

**Respiratory System Impedance with Impulse Oscillometry in relation to Waist Circumference**

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Department of Physiology, All India Institute of Medical Sciences, New Delhi.

**Background:** Obesity is a health hazard of global concern. Various indices of obesity has been associated with impaired respiratory function as assessed by conventional spirometry. There is not much literature available investigating the effect of obesity on respiratory resistance. Impulse oscillometry is a novel and sensitive method to measure indices associated with airway resistance and recoil of respiratory system.

**Objectives:** To evaluate airway mechanics in Healthy subjects using impulse oscillometry and to relate impedance parameters with Waist circumference (WC) as a surrogate marker of abdominal obesity.

**Materials & methods:** In this cross sectional study, healthy males (n=24) and females (n=22) aged 20 to 50 years were recruited. BMI, WC and Waist-hip ratio were measured. Spirometric and impulse oscillometry parameters FEV1/FVC, FEV1/FVC, R5,R20,R5-R20, AX,F(Res) and R5-R20 were measured. For analysis, subjects were divided into two groups based on cut-off values of waist circumference, WC>= 90 cm for males and WC>=80 cm for females.

**Results:** Subjects with higher WC had a lower FEV1/FVC (p= 0.027), X20 (p= 0.002), X20% (p= 0.004) and higher R5 (p= 0.011), R5- R20 (p= 0.004), AX (p=0.005) and F (Res) (p= 0.002) as compared to subjects with lower WC. WC was found to be positively correlated with R5 (r= 0.711, p<0.0001), R20 (r= 0.665, p<0.0001), AX (r= 0.684, p<0.0001), R5-R20 (r=0.421, p= 0.0003) and R5%-R20% (r= 0.396, p=0.006) and negatively correlated with R5% (r= -0.567, p<0.0001), R20% (r= -0.573, p<0.0001), F(Res) (r= -0.636, p<0.0001) and FEV1/FVC (r= -0.674, p<0.0001).

**Conclusion:** Total and peripheral airway resistance increases significantly with increase in waist circumference

**Keywords:** Impulse Oscillometry, Waist Circumference, Airway Mechanics, Spirometry, Airway Resistance, Lung Volume

**FP-RS-043**

**Induced T-regulatory Cells Generated invitro From PBMCs Show down Regulation of FOXP3 mRNA in Chronic Obstructive Pulmonary Disease (COPD)**

Anjana Talwar, Niti Yadav, Muzaffar Ahmed Bhat, Meghashree Sampath, Mudasir Bashir Baba, Randeep Guleria, Debabrata Ghosh
Background: Previous reports indicate involvement of strong local inflammatory responses and alteration in the inflammatory cells, cytokines and immunological factors in COPD. Of these critical processes, induction of naïve T-cells into iTregs (induced T regulatory cells) in peripheral blood is critical as iTregs suppress continual inflammation, allowing system to revert back to the previous state. Therefore, the capacity of conversion of naïve T-cells to iTregs may be compromised in systemic inflammatory diseases like COPD.

Objectives: Examining invitro induction capacity of human naïve T-cells from peripheral circulation into iTregs in presence of cytokines, in subjects with and without COPD followed by their functional characterization using FOXP3 transcript expression.

Methods: PBMCs were isolated from whole blood using Ficoll separation procedure. Separated cells were further selected based on CD4 marker for T cell selection using negative magnetic CD4 selection kit. Naïve CD4+ T cells were cultured in the presence of recombinant human TGF-β and IL-2 as to assess the ability of naïve CD4 T cells conversion into iTreg cell of COPD patient as compare to control. iTregs were confirmed and characterized by flow cytometry using CD4+CD25+CD45- cell fraction (n=4, COPD patients, n=4, controls). RNA was isolated from iTregs and qRT-PCR was done for quantification of FOXP3 mRNA expression (n=4, COPD patients, n=4, controls).

Results: There was no significant difference in the number of iTregs generated in COPD patients compared tonormal. CD4+CD25+CD45- cells were present in both CD127+ and CD 127- fraction. Real time qPCR results showed 10.2 fold lower expression of FOXP3 mRNA in iTreg cells of COPD patients as compared to controls.

Conclusion: Foxp3 is critically involved in the development and function of Tregs, therefore FOXP3 down regulation is suggestive of functional impairment in the induced T regulatory cells populations in COPD as compared to controls.

FP-RS-044

Effect of Modified Alternate Nostril Breathing Exercise on Pulmonary Function Parameters

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Department of Physiology, JIPMER

Background: Different types of breathing exercise have varied effects on pulmonary function parameters in an individual. Objectives: To study the effect of a modified form of alternate nostril breathing exercise (ANB) on pulmonary function parameters in young, male volunteers.

Materials & Methods: Ninety nine healthy, male volunteers were randomized into control group, n=50 and Modified ANB group (study), n=49. Alternate nostril breathing exercise training was given to the study group for 30 minutes a day, 5 times/week for a total period of 12 weeks, under supervision of certified yoga trainers. Forced vital capacity (FVC), Forced end expiratory volume at the end of 1 sec (FEV1), FEV1/FVC ratio, Peak expiratory flow rate (PEFR), Forced expiratory flow 25-75% (FEF25-75) were recorded at baseline and after 12 weeks. No intervention was given for control
group. Modified form of alternate nostril breathing exercise training was provided for study group.

**Results:** FVC, FEV1, FVC/FEV1, PEFR, FEF25-75 decreased significantly (P<0.05) in the study group following 12 weeks alternate nostril breathing exercise training group. No significant change was observed in the control group.

**Conclusion:** 12 weeks of modified alternate nostril breathing exercise improved pulmonary function parameters. This indicates that our modified alternate nostril breathing exercise is effective in improving the pulmonary function parameters.

**Keywords:** Alternate nostril, breathing exercise, pulmonary function, vital capacity

**EXERCISE PHYSIOLOGY**

FP-ExP-045

**Pulmonary Function and Maximal Oxygen Uptake (VO\textsubscript{2}max) In Female Athletes and Non-Athletes: A Cross Sectional Study**

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**Background:** Physical inactivity is an important cause for increase in non-communicable diseases and could be associated with decreased lung functions and cardiorespiratory fitness. Pulmonary function is a long term predictor for overall survival rates. Maximal oxygen uptake (VO\textsubscript{2}max) is the best measure of cardiorespiratory fitness. Regular exercises and sports activities may improve lung function and VO\textsubscript{2}max.

**Objective:** To assess the pulmonary function & VO\textsubscript{2}max of female athletes and to compare these variables with that of female non-athletes.

**Materials & methods:** Study subjects included 30 female athletes (18 to 25 years) & 30 female non-athletes of same age group. Pulmonary function test was done using portable electronic spirometer (MIR Spirobank II). Forced vital capacity (FVC), Forced Expiratory Volume in 1 second (FEV\textsubscript{1}), FEV\textsubscript{1}/FVC and Peak Expiratory Flow (PEF) were selected. VO\textsubscript{2}max was measured indirectly by Queen’s college step test in both groups. The data was analyzed using independent t test.

**Results:** Pulmonary function indices and VO\textsubscript{2}max are significantly better in athlete females compared to non-athlete females.

<table>
<thead>
<tr>
<th></th>
<th>Athletes females</th>
<th>Non-athletes females</th>
<th>t value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FVC (L)</td>
<td>2.99 ± 0.33</td>
<td>2.40 ± 0.35</td>
<td>6.71</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>FEV\textsubscript{1}</td>
<td>2.88 ± 0.34</td>
<td>2.22 ± 0.34</td>
<td>7.47</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PEF</td>
<td>5.87 ± 0.61</td>
<td>4.28 ± 1.32</td>
<td>5.97</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>FEV\textsubscript{1}/FVC</td>
<td>96.22 ± 6.38</td>
<td>92.45 ± 6.99</td>
<td>2.15</td>
<td>0.035</td>
</tr>
<tr>
<td>VO\textsubscript{2} max</td>
<td>39.13 ± 36</td>
<td>35.46 ± 21.1</td>
<td>8.14</td>
<td>&lt;0.001</td>
</tr>
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</table>

63\textsuperscript{rd} Annual National Conference of Physiologists and Pharmacologists of India, APPICON2017, Organized by Department of Physiology, JIPMER, Puducherry.
Conclusion: The results indicate that exercise can improve pulmonary indices (FVC, FEV₁, PEF, & FEV₁/FVC) and VO₂ max in females.

Keywords: Pulmonary Function, VO₂ max, Female athletes & non-athletes, Queen’s step Test

FP-ExP-046

Effect of Left Nostril Breathing On Post Exercise Recovery Rate

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Background: The nasal cycle marks the shift in autonomic function between the sympathetic and parasympathetic arms. The post exercise period is characterized by a shift from sympathetic dominance to a state of parasympathetic dominance.

Objectives: This study aimed to evaluate the effect of left nostril breathing on post exercise recovery times of heart rate and blood pressure.

Material & methods: Sixty young healthy male volunteers were instructed to walk on a flat treadmill for fifteen minutes at 6 km/hr, on two days with a gap of one day in between. Heart rate and blood pressure were recorded at baseline and every minute in the post-exercise period till complete recovery, and the time to recovery (in minutes) noted. On the second day, participants followed the same procedure, but practiced left nostril breathing in the recovery period.

Results: The mean recovery time of heart rate on day one was 9.97 ± 4.25 which fell to 7.48 ± 3.31 on day 3. The mean recovery times of systolic and diastolic blood pressures decreased from 6.68 ± 3.34 and 5.77 ± 3.70 on day one to 4.45 ± 1.57 and 4.05 ± 2.66 on day three respectively.

Conclusion: The significant decrease in the post-exercise recovery time on day three can be attributed to the immediate improvement in the parasympathetic tone after a single session of left nostril breathing. Thus, this technique may be used as an adjunct to pharmacological therapy in conditions of sympathetic over activity.

Keywords: Post exercise Recovery time Left nostril breathing

FP-ExP-047

Reduced Aerobic Fitness in Tobacco User Indian Adult Males.


Department of Physiology, Pramukhswami Medical College, Karamsad, Gujarat, India

Background: Usage of tobacco by oral route or in form of smoking is very common practice in Indian males. Tobacco usage in any form is associated with poor cardiorespiratory health. Cardiorespiratory diseases are very common in tobacco users. Reduced aerobic fitness is seen tobacco users.

Aims & Objective: The present study was undertaken to check effect of tobacco on aerobic fitness (VO₂ max) in Indian adult males.

Methodology: Participants for the study were recruited from staff members of
Pramukhswami Medical College and its affiliated institutes after approval of the study from Institutional Ethics Committee (IEC). A total 74 male adults (24 tobacco users and 50 non-tobacco user) of 18-60 years age groups were enrolled for the present study after their voluntary consent. All participants were apparently healthy at the time of Treadmill exercise test following Bruce protocol. VO$_2$ max was calculated on the basis of total exercise time on Treadmill following predicted equation of Bruce.

Results:

<table>
<thead>
<tr>
<th></th>
<th>Male (n=74)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal (n=50)</td>
</tr>
<tr>
<td>Age (in years)</td>
<td>35.26 ± 11.8</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>169.15 ± 5.15</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>70.55 ± 10.5</td>
</tr>
<tr>
<td>Fat mass (FM)</td>
<td>18.18 ± 6.31</td>
</tr>
<tr>
<td>Fat free mass (FFM)</td>
<td>52.36 ± 6.70</td>
</tr>
<tr>
<td>Total body fat% (TBF)</td>
<td>25.32 ± 6.42</td>
</tr>
<tr>
<td>Body mass index (BMI)</td>
<td>24.62 ± 3.31</td>
</tr>
<tr>
<td>Visceral fat (VF)</td>
<td>9.6 ± 3.8</td>
</tr>
<tr>
<td>VO$_2$ Max by Treadmill Test</td>
<td>36.47 ± 9.7</td>
</tr>
</tbody>
</table>

Table 1: Showing basic anthropometric profile and aerobic capacity of Indian adult males. Indicate $p < 0.05$, “$p < 0.01$, statistically significant also as compared to normal healthy non-tobacco user males.

Conclusion: VO$_2$ max was significantly less in tobacco users as compared to normal healthy non-tobacco user Indian adult’s male of 18-60 years age group.

Keywords: Aerobic capacity, VO$_2$ max, Treadmill test, tobacco users.

Effect of 8 Weeks Body-Weight Resistance Training on High-Normal Blood Pressure and Stage 1 Hypertension Subjects- Pilot Study to Validate the Protocol

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Background: Resistance has shown to decrease the blood pressure (BP) in Indians, but assessing 1 repetition maximum (1-RM) and use of equipment is difficult for individuals who wants to do it in home. Body-weight exercises are simple yet provide resistance to exercising muscles.

Objective: To see the effect 8 weeks progressive body weight resistance training (RT) on BP in subjects with high-normal BP and stage I hypertension.

Materials & Methods: A randomized controlled trial was conducted in Hisar, an urban area of Haryana and study was carried out during January to June 2017. 20 patients diagnosed with either high-normal BP or stage I hypertension were recruited after screening of inclusion
exclusion criteria. For RT group, participants were exercised 30-40 minutes/session and 3 Sessions/week for 8 weeks. Control group, there was no training for 8 weeks but offered exercise intervention afterwards. Outcome variable was BP which was measured at baseline as well as 2 week intervals thereafter up to 8 weeks. Data was analyzed using IBM SPSS v21.0 software.

Results: There was a significant gradual SBP reduction in RT group up to 6 weeks (MD -11.36, p=0.001 at 6 week), but insignificant rise in BP at 8 week (MD -10.85, p=0.03). RT reduced DBP significantly at 6th week only (MD -6.36, p<0.001). When the RT results were compared with control, there was no statistically significant difference in BP (p>0.05).

Conclusion: RT group current exercise protocol should be modified to reduce BP in this population.

Keywords: Resistance training; Blood pressure; Hypertension; Exercise therapy; Body weight

FP-ExP-049

A Randomized Controlled Study in Young Adults to Compare Changes in Creativity After Quadrato Motor Training Versus Simple Motor Training

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Background: Creativity is highly linked to our daily activities and helps in efficient problem solving, decision making and logical thinking. Creativity is an ability that can be learned which helps improve productivity in both professional life and in daily activities. Quadrato Motor Training is a new Mind-Body based intervention that has shown to improve creativity.

Objectives: The aim of present study is to compare the changes in measures of Creativity between young adults after receiving one month of Quadrato Motor Training (QMT) and Simple Motor Training (SMT) and to compare gender differences in these measures.

Methods: 40 young adults aged 18-30 years in and around St. Johns Medical College participated in this study. QMT and SMT were performed by the subjects continuously for 28 days. Reaction time and measures of Creativity like Ideational Flexibility and Ideational Fluency were assessed before and after intervention.

Results: Both Ideational Flexibility and Ideational Fluency were found to be greater in the QMT group when compared to the SMT group (p values <0.05) after one month of intervention. No significant differences were found between genders in both Ideational Flexibility and Ideational Fluency. Males showed a greater improvement in Reaction time when compared to females (p = 0.06).

Conclusion: One month of QMT, helps in enhancing creative ability among young adults. No significant effect of gender was found. Males showed a greater improvement in Reaction time when compared to females after QMT.

Keywords: Creativity, Quadrato Motor Training, Ideational Fluency, Ideational Flexibility.
FP-ExP-050

Study of Lean Body Mass and Fat Mass in Long Distance Runners.

Dr. S.G. Palashikar¹, Dr. P. P Waghmare², Dr. S. A Mundewadi²

¹R.C.S.M.G.M.C.Kolhapur, ²Dr. VMGMC Solapur.

Background: In the endeavor to achieve excellence in sport, all of the possible concomitants of performance have been subject to scientific research. Modern sport science is characterized by the purposefulness of its endeavor to improve elite athletes and to discover talents as precisely as possible. There is evidence to support the concept that an individual's physique greatly limits or enhances successful participation in physical activity.

Objectives: To assess and compare skinfold thickness of university and state level players and age matched controls.

Material & methods: The present study was carried out in thirty male long distance runners playing at university and state level, their age range from 16-20 yrs with an average of 17.2 yrs. Thirty age matched subjects taken as control group.

Skinfold thickness was assessed at standard sites by using skin fold caliper. Percentage of body fat was measured using Fat-o-measure.

Results: Body fat percentage and fat mass was lower in athletes than controls which was highly significant. Whereas lean body mass was also significantly lower in athletes than controls.

Conclusion: Body fat percentage of athletes was less as compared to the controls, which may be due to the training regimens through which the athletes are undergoing. Lean body mass was significantly less in athletes as their weight was very much less than controls.

Keywords: long distance runners, skin fold thickness.

FP-ExP-051

Skeletal Muscle Strength Is Lower Among Healthy Indians Compared To Western Population

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Background: Indians are generally considered to have a lower skeletal muscle mass compared to Western populations. However, there is a lack of objective data on skeletal muscle function among the healthy Indian population.

Objectives: The aim of the present study was to provide the first reference data of strength of the quadriceps muscle in young and middle aged populations of healthy Indian males and females. Study also aimed to compare muscle strength among healthy Indians with Western population.

Methods: 68 healthy male and females between the ages of 18 and 60 years were recruited. They were divided into young (18 - 35 years) and middle aged (36-60 years) study groups. Maximal voluntary isometric, isokinetic and endurance contractions were performed on the lower limb using isokinetic dynamometry.
**Results:** The results showed that males had significantly higher quadriceps strength compared to females and that the middle aged subjects were weaker than the young. Total work done demonstrated significant differences between the young and middle aged males, but not females. When compared to data in the published literature from western populations, the values of isometric and dynamic muscle strength were significantly lower in the Indian participants.

**Conclusion:** Data from the present study provides the first reference for muscle strength in healthy Indian population using isokinetic dynamometry. Comparisons between indices of muscle function from the present study with other studies performed on subjects belonging to similar age range and of either gender indicated that healthy Indians had less skeletal muscle strength.

**FP-ExP-052**

**Comparative Study of Health Related Physical Fitness between the Students of Jawahar Navodaya Vidyalaya Umathel (JNV-Umathel) and Kendriya Vidyalaya Langjing (KV-Langjing) of Manipur**

Dr. Maibam Nodiyachand Singh, Md Julman MPES

Department of Physical Education and Sports Science, Manipur University, Canchipur

Every day, millions of people of all ages in the existing world participated in games and sports or any physical activities to staying fit and healthy. It has been realized that fitness adds legibility and happiness life. The aim of this present study was to compare the health related physical fitness level between the students of Jawahar Navodaya Vidyalaya Umathel (JNV-Umathel) and Kendriya Vidyalaya Langjing (KV-Langjing) of Manipur. For this study 60 students were selected 30 students each from JNV and KV. The age of the Students were ranging from 14 to 16 years. Independents’-t- test were employed as the statistical tool for finding the significant difference between the health’s related physical fitness level between the students of JNV and KV at 0.05 level of significant. The data pertaining to this study were collected by using Sit & Reach, Bent-Knee Sit Up and Push Up tests. The finding of this study revealed that there is significant difference in health related physical fitness between the students of JNV-Umathel and KVS-Langjing, Manipur. JNV students are more physical fit than KV students .It may be conclude that the results may be due to JNV is a residential school and practice regular physical exercises but KV has less program for exercises in their daily routine due to a non-residential pattern.

**Key words:** Health-Related Physical Fitness, Cardiovascular endurance, Muscular strength, Flexibility, Physical Fitness, Body composition
REPRODUCTIVE PHYSIOLOGY

FP-REP-053

Assessment of Skeletal Muscle Strength, Fatigue and Respiratory Efficiency in Young Healthy Females during Different Phases of Menstrual Cycle.

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¹Sri Venkateshwara Medical College Hospital and Research Centre, Ariyur, Pondicherry.²Meenakshi Medical College and research centre, Kanchipuram

Background: Fluctuating levels of sex steroids across the menstrual cycle not only produce physiological changes in the reproductive system but also affect skeletal muscle strength and respiratory efficiency. Increasing participation of women in competitive sports has drawn attention of the scientists to understand the effect of menstrual cycle on athletic performance. Physical work capacity depends on respiratory efficiency and skeletal muscle strength.

Objectives: To evaluate skeletal muscle performance and respiratory efficiency during different phases of menstrual cycle in non-athletic eumennorheic women.

Materials & methods: Fifty non-athletic healthy female subjects aged between 20 - 30 years of age with normal BMI and history of regular menstrual cycle were selected. Muscle strength and time of fatigue was determined using hand grip dynamometer. Respiratory efficiency was assessed using respiratory blast test and respiratory endurance test during premenstrual and proliferative phase of menstrual cycle. Student’s paired t test was used for analyzing the data. P<0.05 was considered to be statistically significant.

Result: Muscle strength, respiratory blast test and respiratory endurance tests are not statistically significant during different phases of menstrual cycle. Time of fatigue is significantly higher (p<0.05) during the proliferative phase compared to the premenstrual phase.

Conclusion: In females, muscles undergo easy fatigability during premenstrual phase hence it has to be considered during athletic training and selection program.

Keywords: follicular phase, luteal phase, respiratory blast test, respiratory endurance, skeletal muscle performance

FP-REP-054

A Study on Sociodemographic Status of Infertile Men Attending IVF Centre of Geetanjali Medical College &Hospital, Udaipur, Rajasthan

Sandhya Sharma, Manjinder Kaur, Pooja Gandhi, Karunakar Kota

Background: Male infertility can be defined as an inability to induce conception due to defect in spermatic function. It is a worldwide problem and approximately 8-10% of couples within reproductive age group are infertile. It is estimated that globally 60-80 million couples suffer from infertility every year, of which probably between 15-20 million are in India alone. Considering its high prevalence and widespread impact, it has been included as a part of the national program for Reproductive and Child health in India.

Objectives: To study sociodemographic profile of infertile men attending IVF centre.
Material & methods: A Single centric, prospective, open label, randomized study was conducted at IVF centre of Geetanjali Medical College & Hospital, Udaipur. A total of 191 patients of age group 21-45 years were included in the study. A pretested, semi structured questionnaire were used for data collection and written consent was obtained from such patients. Data were analyzed in SPSS software.

Results: Out of 191 patient’s majority were of age group between 31-35 years (29.84%), Hindu (63.35%), from urban area (76.43%), vegetarian (66.49%), smoker/chewers (38.21), literate (87.43%), industrial or factory workers (23.03%), and belonged to class IV socio economic status (46.59%).

Conclusion: An overall improvement in living condition, type of diet, social habits, education, socioeconomic status and counseling is necessary to decrease the prevalence of infertility in men.

Keywords: Sociodemographic, infertile, IVF centre

FP-REP-055

Effect of Different Phases of Menstrual Cycle on Pulmonary Function Tests

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ESIC Medical College & PGIMSR, Chennai.

Background: Asthma is a clinical syndrome characterized by recurrent episodes of airway obstruction and its prevalence is increasing worldwide. It has been observed that there is an exacerbation of symptoms during the premenstrual period in females which has been associated to the cyclic changes in the female sex hormones. The role of the change in female sex hormones affecting lung function tests is still questionable due to existence of conflicting results from various studies.

Objectives: To assess the pulmonary function tests in different phases of menstrual cycle in normal females.

Materials and methods: Women in the age group of 15 – 40 years with regular menstrual cycle were recruited for the study. The patients who had suffered an asthmatic attack in last 2 months and those on medication for respiratory illness or any medical disease affecting lungs, Pregnant women and Women on oral contraceptives were excluded from the study. Computerized Spirometry testing was done during the three phases (3 days prior – LMP) - premenstrual phase, 9th-12th day proliferative phase, 19-22nd secretory phase) of the same menstrual cycle. Forced Vital Capacity (FVC), forced Expiratory Volume in one second (FEV 1), FEV1/FVC, Peak Expiratory Flow Rate (PEFR) were recorded.

Results: The FVC, FEV1, FEV1/FVC% (P<0.05) were higher in the secretory phase compared to proliferative and the premenstrual phase. PEFR and FEV1/FVC were significantly reduced in the premenstrual phase.

Conclusion: Our study findings indicate a definite role of female sex hormones on airways and, a higher pulmonary function in the secretory phase suggests a possible beneficial role of progesterone on the airways.

Keywords: Menstrual cycle, pulmonary function tests.
METABOLIC PHYSIOLOGY

FP-MEP-056

A Study of Magnesium Supplementation on Fasting Blood Glucose in Patients of Diabetes Mellitus Type-2

Pooja Chaurasia, Ashutosh Bharadwaj, Richa Srivastav
S.N. Medical College Agra

Background: Magnesium helps to maintain normal muscle & nerve functions, keeps heart rhythm steady, supports a healthy immune system & keeps bones strong. It also helps to regulate blood sugar levels and promote normal blood pressure. There is an increased interest in its role in preventing & managing disorders such as hypertension, cardiovascular disease & diabetes. Low serum & intracellular magnesium concentrations are associated with insulin resistance, impaired glucose tolerance & decreased insulin secretion.

Objective: To study the effect of magnesium supplementation on fasting blood glucose in patients of diabetes mellitus type-2.

Material & Methods: This interventional & comparative study was conducted in department of physiology & neurology, S.N.M.C, Agra. The study was done in 60 patients of diabetic neuropathy. These patients were divided in 2 groups, Group 1(n=30) receiving Magnesium & Metformin therapy for a period of 16 weeks & Group 2(n=30) receiving only Metformin therapy. The blood samples were collected & analyzed for serum magnesium & fasting blood glucose at 0, 4, 8, 16 weeks respectively. Patients of diabetes mellitus with other complications were excluded.

Results: In Group 1, mean baseline value for S.Magnesium is 1.79±0.032 mg/dl & after treatment values at 16 weeks 1.92±0.034 mg/dl, which is highly significant. In Group 2, Mean baseline value for S.Magnesium is 1.79±0.031 mg/dl & after treatment values at 16 weeks is 1.82±0.030, which is non-significant. In our study, values for mean fasting blood sugar level in group 1 before treatment was 146.33±1.60 mg/dl as compared to 127.07±0.96 mg/dl values after treatment, which is highly significant(p<0.001). In group 2 values for mean fasting blood glucose level before treatment (i.e first visit) was 145±1.81 mg/dl as compared to 136.53±1.31 mg/dl values after treatment, which is also considered significant.

Conclusion: Addition of magnesium supplements with metformin in type 2 diabetes mellitus patients shows significant improvement in fasting blood glucose levels.

Keywords: Diabetes mellitus, Magnesium supplementation, Fasting blood glucose level.

FP-MEP-057

Effect of Sprint Interval Training on Metabolic Syndrome Status

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Introduction: Metabolic syndrome (MS) increases the risk of not only Diabetes but also cardiovascular disorders & premature death. Traditional aerobic exercise is known to benefit by reducing the symptoms of the syndrome. However, traditional aerobic exercise requires more
time and has less compliance. Sprint Interval Training (SIT) is a newer alternative with increased intensity & reduced time requirement.

**Aims:** We hypothesized that SIT would be better than continuous moderate exercise with regard to its benefits in MS and associated parameters.

**Methods:** It is a parallel group randomized trial. Sample size was calculated for 80% power of study with \( \alpha \) as 0.05 for two sided hypothesis. Study was done at GMC, Aurangabad. Eighty subjects (32.4 ± 3.8 years) of MS as per IDF criteria were randomized to either moderate exercise for 30 minutes a day, 5 days a week or SIT for 10 minutes a day thrice a week for 6 weeks. Primary outcome measure was reversal of MS status & secondary outcome measures were waist circumference & aerobic capacity.

**Results:** The proportion of MS subjects reduced by 0.55 (CI: 0.4 to 0.69) in SIT group & by 0.2 (CI: 0.1 to 0.35) in moderate exercise group & the absolute risk reduction was -0.35 (CI: -0.52 to -0.14). There was a significantly better improvement in waist circumference & aerobic capacity in SIT group as compared to moderate exercise group.

**Conclusions:** High intensity SIT for shorter duration can be utilized for reversing factors relating to the MS.

**Keywords:** Sprint Training, Traditional aerobic exercise, Metabolic Syndrome, Aerobic capacity, waist circumference, Time

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**FP-MEP-058**

Cognitive and Behavioural Changes in Juvenile Diabetes - Role of Enriched Environment

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**Introduction:** Diabetes mellitus of early onset affects both the peripheral and central nervous system. However, diabetes induced behavioural and cognitive changes in children are less well documented and studied. Effective management of T1DM is another major challenge. Hence, easily available, affordable novel, non-invasive therapies like enriched environment is the need of time. The present study aimed to determine the effect of enriched environment cognitive and behavioural changes in juvenile diabetic rats.

**Methods:** Diabetes was induced in 25 days old Wistar rats, by STZ and reared in enriched environment 6 hrs/day for 30 days. Then, rats were tested in various mazes and differences assessed by using one way ANOVA test followed by Bonferroni multiple comparison test. Behavioural parameters were assessed by Kruskal - Wallis non-parametric test.

**Results:** The statistically significant (\(p<0.01\)) difference was observed between the enriched environment and diabetic group of rats. Additionally, few effects are comparable to conventional therapy, insulin (\(P< 0.05\)) in various parameters.

**Conclusions:** We have shown that diabetic rats reared in enriched housing conditions,
showed improved cognitive measures. The role of enriched environment has not previously been reported, hence identifies a potential new therapeutic target in diabetic encephalopathy. However further advanced studies needed to explore underlying mechanisms.

**Keywords:** Cognition, behavior, juvenile diabetes mellitus, learning, enriched environment

**FP-MEP-059**

**Relationship between Body Mass Index (BMI) and Bone Mineral Density (BMD) In Women of Manipur**

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Department of Physiology, RIMS, Imphal.

**Background:** Body mass index (BMI) is a good indicator for measurement of bone mineral density (BMD) which measures the density of minerals present in the bones. Dual energy X ray absorptiometry (DEXA) is the most accurate way to measure BMD.

**Objectives:** This study was performed to evaluate the relationship between BMI and BMD of lumbar spines in women.

**Material & Methods:** This study was conducted on 41 healthy women between the age group of 20 and 45 years. The height (m) and weight (kg) of all the subjects were recorded and BMI was calculated. BMD of lumbar spine was measured using enCORE based X ray bone densitometer (Lunar Prodigy Advance, GE Medical Systems, USA) based on DEXA scan. Statistical analysis was done by using SPSS software version 21.

**Results:** BMI (22.04± 2.36) kg/m2 shows a significant positive correlation with BMD (1.202 ± 0.119), r= 0.327, p< 0.05.

**Conclusion:** The results suggest that lower BMI is an important risk factor for the occurrence of low BMD. BMD can be used for screening of osteoporosis.

**Keywords:** BMI, BMD, Women, DEXA scan, Osteoporosis

**FP-MEP-060**

**A Study of Association of Low Total Testosterone Levels and Impaired Blood Glucose Levels in Middle Aged Men**

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**Background:** India is home to the second largest population of diabetics in the world, with an average age of diabetic onset being only 42.5 years. Besides the known risk factors, impaired fasting glucose (insulin resistant state) has also been found to be associated with low or low normal levels of serum testosterone in men. Most studies have researched upon elderly men and there is lack of information about such association in middle aged men.

**Objectives:** The aims and objectives of this work are to study the levels of serum total testosterone (TT) in middle aged men with diabetes mellitus (DM) or impaired fasting glucose (IFG); to compare TT in men with and without DM/IFG; and to observe the correlation between TT and fasting blood glucose (FBS), BMI and waist circumference (WC).
Methods & Materials: It is a cross sectional, observational study involving 150 non tobacco addict, nonalcoholic men (31-55 years). Anthropometric measurements, serum FBS, and serum TT were measured.

Results: Significant differences were present in levels of mean TT and WC, but not in mean BMI, when populations with and without DM/IFG were compared. Negative correlation present weakly between TT and FBS, BMI but strongly between TT and WC.

Conclusion: TT levels are low not only in men with DM but also in apparently healthy men who have IFG. By virtue of being associated with abdominal obesity low TT might have a role to play in pathogenesis of insulin resistance.

Keywords: diabetes mellitus, impaired glucose tolerance, total testosterone, insulin resistance

Materials & methods: This was a cross-sectional study, carried out in departments of Physiology and Medicine of RIMS, Imphal during the period of June, 2016 to April, 2017 with a study group of 60 T2DM patients, being selected on the basis of American Diabetic Association criteria and were compared with control group of 60 which were age and sex matched. PFTs and serum IL-6 were measured by computerised spirometer model Helios-702, RMS, Chandigarh and ELISA method respectively. Data were analysed by SPSS version 21 using student’s unpaired t-test and correlation test.

Result: Comparison of PFTs and IL-6 between cases and controls were found to be statistically significant for FEV1/FVC (P=0.00) and IL-6 (P=0.024), whereas they were statistically insignificant for FVC (P=0.76), FEV1 (P=0.71), PEFR (P=0.44) and PEP_{25%-75%} (P=0.26). Serum IL-6 is negatively correlated with FVC (ρ=-0.041) and poorly correlated with FEV1 (ρ=0.069), FEV1/FVC (ρ=0.14), PEFR (ρ=0.068) and PEP_{25%-75%} (ρ=0.006)

Conclusion: Increased serum IL-6 is associated with decreased lung functions among diabetic patients. Further these findings indicate that the clinicians need to be aware of this association.

Keywords: PFTs, IL-6, Diabetes Mellitus
FP-MEP-062

Correlation of High Sensitivity C-Reactive Protein With Body Mass Index In 25-45 Year Old Population Of Alappuzha, Kerala, India: A Descriptive Study

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Background: High-sensitivity C-reactive protein (hs-CRP) is known as a marker for low-grade inflammation and atherosclerosis. Due to its cardiovascular risk owing to atherosclerosis, its possible correlation with obesity in a local population was assessed, using BMI as the parameter.

Objective: To study correlation of hs-CRP with BMI in a population of 25-45 years in Alappuzha, Kerala.

Materials & Methods/Procedure: 111 subjects of either sex, with no history of coronary artery disease, ongoing systemic illnesses or steroid treatment, were selected; BMI and serum fasting levels of hs-CRP taken; arbitrarily divided into three groups, having hs-CRP levels (i)<1 mg/l, (ii)1-3 mg/l, and (iii)>3 mg/l, and the Mean BMI in each group calculated.

<table>
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<th>Gender</th>
<th>CRP (mg/L)</th>
<th>BMI (kg/m²)</th>
<th>No.</th>
<th>F</th>
<th>p value</th>
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<tr>
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<tr>
<td></td>
<td>&gt;3.0</td>
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<td>3.4</td>
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<tr>
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<tr>
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<td>28.3</td>
<td>3.4</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

**: - Significant at 0.01 level

Fig: Correlation of CRP with BMI, r=0.534**, p=0.000

Conclusions/Implications: Hs-CRP was found to have significant correlation with BMI (r=0.534; p<0.01). Further prediction model studies can be done with BMI, which, in turn should predict the Cardiovascular risk, in Kerala.

Keywords: High-sensitivity, C -reactive protein, Body Mass Index, Atherosclerosis, Coronary artery disease
FP-MEP-063

Prevalence of Pre-Diabetes among Medical Students and Its Correlation with Family History of Diabetes.

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Background: In 2008, an estimated 347 million people in the world had diabetes and the prevalence is growing, particularly in low- and middle-income countries. India had 69.2 million people living with diabetes as per the 2015 data. Of these, it remained undiagnosed in more than 36 million people. Pre-diabetes is a condition with blood glucose level higher than normal but not high enough to be diagnosed as diabetes. According to the National Urban Diabetes Survey, the prevalence of pre-diabetes is 14%-5-10% of people per year with pre-diabetes will progress to diabetes.

Objective: To study the prevalence of pre-diabetes among young medical students & to establish the co-relation between family history of diabetes, gender variation or obesity.

Materials & Methods: 110 medical students of age group of 20-24 years of AJIMS& RC volunteered for the study. Fasting plasma glucose level checked in biochemistry department after an overnight fasting for 8-14 hours. Anthropometric parameters collected by standard methods and BMI calculated. Written informed consent and ethical committee approval taken. Data analyzed using SPSS version 22.

Results: The analysis shows a statistically significant percent of medical student are pre-diabetic with positive association with gender variation and family history of diabetes. Overweight/obesity and development of pre-diabetic condition is also statistically significant.

Conclusion: Al though diabetes mellitus is a multifactorial metabolic syndrome, but some of its risk factors can be reduced by maintaining healthy lifestyle like doing exercise, avoiding junk foods & sedentary life style and give up the addictions like smoking or consuming alcohol etc.

Keywords: Pre-diabetes, Obesity, Fasting plasma glucose

FP-MEP-064

Assessment of Early Onset of Autonomic Dysfunctions in Hypothyroid and Hyperthyroid Patients.

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Background: Aging is associated with altered Cardiac Autonomic activity, manifested as diminished heart rate variability (HRV). Autonomic activity is also deranged in thyroid dysfunctions and may lead to cardiovascular morbidity and mortality.

Objectives: To observe the onset of autonomic dysfunctions in newly diagnosed young thyroid patients by
comparing the HRV in hypo-, hyper-thyroid patients and healthy controls.

**Material & Methods:** The study was conducted on age and sex matched hypothyroid, hyperthyroid patients and healthy controls (n=15 in each group, 20-30 years of age). Young volunteers were included in our study to rule out the age induced autonomic dysfunction. Autonomic activity was assessed by short term 5-min HRV.

**Results:** Significant decrease in RMSSD and SDNN was observed in hyper (p<0.0001) and hypothyroids (p<0.05) when compared to controls. pNN50 and RMSSD was significantly decreased in hyper-thyroids in comparison to hypothyroids and controls (p<0.0001). These results are suggestive of decreased parasympathetic tone in these patients. Total power was significantly reduced in both the groups.

**Conclusion:** We conclude that cardiac autonomic activity; primarily parasympathetic tone was more diminished in young newly diagnosed hyperthyroid patients. This is indicative of early onset and early manifestation of autonomic dysfunction in these patients, thus predisposing them to increased cardiovascular morbidity. We recommend early screening of hyperthyroid patients for cardiac problems.

**Keywords:** Cardiac Autonomic activity, Heart rate variability, Hypothyroid, Hyperthyroid, Aging, parasympathetic tone.

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**AYUSH**

**FP-AY-065**

**Evaluation of Effect of KadukkaiMaathirai (A Siddha Polyherbal Formulation) Against Ethanol Induced Liver Damage in Rats**

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**Background:** Kadukkaimaathirai (KM) is a polyherbal siddha formulation used in the treatment of liver disorders. There is lack of scientific data on its hepatoprotective effect.

**Objectives:** The aim of the study was to evaluate the prophylactic effect of Kadukkaimaathirai against ethanol induced hepatotoxicity in rats.

**Materials & Methods:** Four groups (n=6) of adult female Sprague dawley rats were used. Ethanol was administered in the dose of 45% v/v 15ml /kg/body weight twice a day in the study. The four groups were treated orally for 8 weeks with 2% gum acacia (control), ethanol (toxic control), ethanol + KM 72 mg/kg, and ethanol + KM 400 mg/kg, respectively. At the end of 8 weeks, blood was collected by retro-orbital puncture for estimation of liver enzymes (AST, ALT). Liver was dissected out for histopathology. Data was analyzed using one-way ANOVA followed by Tukey’s test.
**Results:** There was a significant ($p<0.05$) decrease in the serum AST and ALT level in rats treated with KM 72 mg/kg as compared to KM 400 mg/kg treated rats and toxic control. Liver parenchyma showed near normal Architecture in KM 72 mg/kg treated group as compared to ethanol treated group which showed extensive ballooning degeneration of hepatocytes and micro vesicular steatosis.

**Conclusion:** Kadukkaimaathirai, in the dose of 72 mg/kg, exerted hepatoprotective effect against ethanol induced liver damage in rats.

**Keywords:** Kadukkaimaathirai, hepatoprotective effect, micro vesicular steatosis, liver enzymes

**FP-AY-066**

**A Study to Assess the Effectiveness of Yogic Eye Exercises on Mild Myopia among First Professional Medical Students.**

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**Background:** Myopia (nearsightedness) is a refractive anomaly of eye in which parallel light rays entering the eyes are focused by the eye in front of the retina. In 1900 an ophthalmologist William H. Bate's theorized that myopia is nothing but a result of habitual strain of eyes and use of glasses to correct is like using crutches. Yogic eye exercises are supposed to strengthen the extra ocular muscles and prevent eye strain.

**Objective:** To study the effect of yogic eye exercises among the group of myopic students on the basis of visual acuity. This interventional and prospective study was conducted in department of Physiology in SN Medical College Agra. A total of 59 students between 18 to 25 years of age, who were mild myopic (<3Diopters) were included in the study after taking their consents. Exclusion criteria for myopia: Myopia (>3D), severely malnourished, other disease of eye and people with other systemic diseases were excluded. Visual acuity of each eye was determined by Snellen's chart. Then the students were divided into groups in two groups. Group A: who practiced exercises for 6 months. Group B: who did not do any eye exercises.

The exercises were done by group A both morning (supervised) and evening (not supervised) for 6 months. Visual acuity for all the myopic subjects was taken before the start of the study, at 3 months then after 6 months.

**Result:** The geometric mean of visual acuity in group A (experimental) was 6/18 before exercise while it was 6/16 in group B. After 6 months of exercise in group A it was 6/15 while 6/18 in group B. In group a visual equity mean (log MAR) decreased from 0.492±0.3 to 0.4853±0.3 which was statistically significant. In group B subjects' visual acuity mean increase from 0.4167±0.3 to 0.4645±0.3 after 6 months but the difference was statistically insignificant.

**Conclusion:** With the help of regular yogic exercises visual acuity in mild myopic can be improved and progression of myopia can be delayed.

**Keywords:** Myopia, Visual acuity, Mean visual acuity (log MAR).
FP-AY-067

Living Barefoot: An Experimental Study on Effect of Barefoot Contact with Earth in Reducing Stress

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Background: In the past, we lived in direct contact with earth almost all the time by being barefoot and sleeping on the ground. Modern lifestyle, wearing chappals and shoes, has disconnected us from earth’s surface. Research has confirmed that reconnecting the human body with earth using conductive cable reduces stress level. It is hypothesized that Earthing, i.e., direct contact of human body with earth’s surface by barefoot, may also produce similar effects.

Objectives: The present study aims to assess the effect of barefoot contact with earth on the psychological distress.

Materials & methods: It’s an interventional study involving 220 medical students residing in the hostel. Kessler Psychological Distress Scale (K10) was used to measure anxiety and depressive symptoms a person may have experienced in the past 4 weeks, and 56 participants, having mild-to-moderate distress, were selected for earthing. All the sessions were conducted near the hostel buildings for a period of one month under the supervision of researcher. During each session, participants remained barefoot, either in standing or sitting posture so that their feet were in contact with the ground for at least 30 minutes daily. At the end of study period, stress was assessed again by K10, and compared.

Results: There was a significant change (p<0.01) in the K10 score (pre-study 26 ±2.26, post-study 22.27±1.92) after a month of regular barefoot contact.

Conclusion: Earthing may have several benefits on our health and we believe that being barefoot, whenever feasible, can be a natural remedy for psychological distress.

Keywords: earthing, barefoot, stress, K10, medical, intervention

FP-AY-068

Effect of Yoga on Lipid Profile in Type II Diabetes Mellitus Patients with Dyslipidemia

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Background: Yoga which aims at harmonizing mind, body and spirit, has been shown to be useful in individuals with dyslipidemia in type II diabetes mellitus with dyslipidemia.

Objective: To assess the effect of Yoga on lipid profile in type II diabetes mellitus patients.

Methods: We conducted intervention study at Department of Physiology in collaboration with Yoga Training and Research Centre Kwakeithel, Imphal on 25 type II diabetes mellitus patients with dyslipidemia, between January 2017 - April 2017. Baseline parameters for serum lipid profile were recorded. Fasting sample was
collected from the ante-cubital vein. The same parameters were estimated after 3 months of Yoga Training. Paired ‘t’ test was done for comparison of means before and after Yoga. P<0.05 is taken as significant.

Results: Most of the participants were Male 16 (64%). There is a significant difference on lipid profile after yoga on total cholesterol (168.6±4.06;p value 0.031), triglycerides (144.84±27.15;p value 0.001), HDL (44.96±1.89;p value 0.010), LDL (95.00±4.91;p value 0.026) and VLDL (28.66±1.14;p value 0.021).

Conclusion: Mind-body therapy of yogic asanās for 3 months has been found profound effect in correcting dyslipidemia which is a modifiable risk factor in type II diabetes mellitus and its complications.

Keywords: Yoga, lipid profiles, type II diabetes mellitus

FP-AY-069

A Pilot Study to Assess the Effects of Alternate Nostril Yoga Breathing On Attention and Arousal

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Background: Focused attention is associated with an increase in sympathetic activity which is undesirable to health if prolonged. In separate studies alternate nostril yoga breathing has been shown to improve attention and reduce the overall activity of the sympathetic nervous system.

Objectives: The present study aimed to assess the immediate effects (15 minutes) of alternate nostril yoga breathing on attention and arousal.

Material & methods: Ten normal healthy male volunteers with ages between 20 and 30 years (group average age ± SD, 25.8±2.9 years) having at least 6 months of experience in yoga practice took part in the study. The study was a self as control study where each participant was assessed on two consecutive days for two interventions i.e, alternate nostril yoga breathing and breath awareness. Attention was assessed using P300 ERP (Nicolet EDX system, U.S.A) at Fz, Pz and Cz scalp sites with linked earlobes as reference while arousal was assessed using heart rate variability (HRV) (Biopac MP45 2 Channel polygraph, U.S.A). The two interventions were assigned randomly using an online randomizer (www.randomizer.org). The study had clearance from the Ethics Committee of the institution.

Trends and inferences: Considering that this is a pilot study with 10 subjects no statistical tests are attempted. The trends are presented here. The trends showed an increase in P300 ERP amplitude recorded at Fz, Pz and Cz sites.

Conclusions: Alternate nostril yoga breathing may be useful to improve attention by increasing attentional resources required during an attention task without undesirable changes in autonomic activity usually associated with focused attention.

Keywords: Attention, Arousal, Alternate nostril yoga breathing, Breath awareness, P300, Heart rate variability
FP-AY-070

Impact of Yoga Including TratakKriya on Intraocular Pressure in Glaucoma Patients

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Objective: To study the effect of Yoga based ocular exercises and modified TratakKriya on glaucoma by a randomized controlled trial.

Methods: We recruited 45 glaucoma patients from RPC, AIIMS, New Delhi into group A (control group, n=19) and group B (intervention group, n=19) after randomization. Both the groups continued their ongoing treatment. Group B patients performed the yogic ocular exercises and Tratak intervention (in addition to the ongoing medical treatment) for 2 weeks under supervision and then 2 weeks of follow up at home. The intervention was performed for 56 - 60 minutes per day for 28 days. Patients in both groups were tested at baseline, day 14 and day 28 for intraocular pressure (IOP) by NCT (noncontact tonometry) and Quality of life (QoL) by WHO BREF score.

Results: Mean age of patients were 44.68 + 12.42 years and 48.80 + 7.56 years in group A and group B respectively. Controlling the initial values difference in IOP of right eye was statistically highly significant between the two groups at day 28 (p= 0.001). Also, among the group B there was statistically significant (p<0.05) and highly significant (p<0.01) reduction in IOP of right eye at 14th and 28th day respectively as compared to the baseline values.

Conclusions: Intraocular pressure in glaucoma patients might be reduced by practicing short term yoga based ocular exercises and TratakKriya. This is first report regarding effect of short term yoga based ocular exercise and TratakKriya in glaucoma.

Key words: Intraocular pressure, glaucoma, Yoga, TratakKriya, ocular exercises, eye accommodation

PHARMACOLOGY

FP-PH-071

Adherence to Treatment in Patients Undergoing Dialysis

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Background: The prevalence and incidence of chronic kidney disease (end-stage renal disease) are continuously increasing, particularly in elderly patients. Poor adherence to complex multimodal therapies is a widely recognized problem in the daily care of dialysis patients, contributing to excess morbidity and mortality of this population

Aims & Objectives: To study the adherence to medications in Patients undergoing hemodialysis.
Methods: After obtaining approval from Institutional Ethical Committee, a cross sectional study was carried out among 200 patients undergoing dialysis in a tertiary care hospital, Hassan. More than 18 years of age of either sex & Dialysis of > 3 months were enrolled into the study. An eight item Morisky Medication adherence questionnaire was used to assess medication adherence. Descriptive statistics were used to analyse the results.

Results: Results will be duly presented in the conference.

Keywords: Dialysis, Adherence, chronic kidney disease, morbidity, mortality, Morisky Medication adherence questionnaire.

Objective: To compare the effect of LC-MS/MS based standardized hydroalcoholic extract of leaves of Aegle marmelos with its polarity guided fractions, phytoconstituent-rutin and standard drugs metformin and pioglitazone, on markers of fructose induced IR using HepG2 cell line.

Method: The hydroalcoholic extract of leaves of Aegle marmelos (AM-HM) and its fractions (n-hexane(AM-H), chloroform (AM-C), ethyl acetate (AM-EA), n-butanol (AM-B), aqueous(AM-A) were standardized for rutin content using ESI-LC-MS/MS. Human hepatocellular cancer cell line (HepG2) was grown for 48 hrs, either in -DMEM-glucose+0.55mM fructose (FC1), DMEM-glucose+1mM fructose(FC2) or DMEM-glucose+1mM fructose(FC2)+0.1µM insulin(FC3) with. Cells in each arm were treated with AM-HM, AM-H, AM-C, AM-EA, AM-B, AM-A, Rutin, Metformin and Pioglitazone and assessed for levels of aldehyde dehydrogenase, hexokinase, ketohexokinase, phosphofructokinase, glycogen, hypoxia-induced factor (HIF-1α), mitochondrial target of rapamycin (mTOR), phosphatidylinositol kinase (PI3K), signal transducer and activator of transcriptions-3(STAT-3), vascular endothelial growth factor (VEGF) and tumour necrosis factor (TNF-α).

Result: Rutin concentration in AM-HM and AM-B was 1.973±0.04932 and 7.210±0.01178 µg/ml, respectively. AM-B raised the activity of glycolytic enzymes, decreased gluconeogenesis enzymes, reduced markers of inflammation, hypoxia, lipogenesis and improved insulin resistance in FC2. AM-B holds potential to be further developed for management of fructose induced IR.

Butanol Fraction Of Hydroalcoholic Extract Of Leaves Of Aegle Marmelos Fares Better Than Metformin, Pioglitazone Or Rutin In Ameliorating Fructose Induced Insulin Resistance In Hepg2 Cells

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Background: Insulin resistance (IR) is characterized by hyperinsulinemia, altered glucose metabolism and pro-inflammatory state. Its management suffers from lack of exclusive pharmacotherapeutic agents and often managed symptomatically.
FP-PH-073

Analysis of Cost between Branded Medicines and Generic Medicines in a Tertiary Care Hospital

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Background: There is much debate regarding the importance of promoting the use of cheaper generic alternatives over brand-name drugs. While generic drugs have been noted to be comparable to brand-name drugs in their ability to treat conditions, significant debate surrounding their bioavailability, or the concentration of the drug that reaches its site of action, has arisen. Many experts continue to believe that generic and brand-name drugs are bioequivalent and equally viable options for effective drug treatment, as assumed in this review.

Aims & Objectives: To compare and evaluate the costs of various branded and generic medicine and to ascertain the rationality of emphasizing generic versus branded prescription.

Materials & Methods: Prices of commonly used branded and generic medicines available as both branded and generic forms and in same concentration, dosage form and combination will be compared with the help of Indian Drug Review, brochures of pharmaceuticals and pharmacies. Mean of all the prices available, of branded medicine and generic medicine, will be calculated, and the percentage difference in the mean costs of generic and branded medicines will be calculated.

Results: Results are under statistical analysis, will be duly presented in the conference.

Keywords: Generic Drugs, Branded Drugs, Mean costs, Debate, Cost-Analysis, Pharmacoeconomics.

FP-PH-074

A Comparison of Efficacy and Safety of Combinations of Tamsulosin with Dutasteride & Silodosin with Dutasteride in patients of BPH (Benign Prostate Hyperplasia) with LUTS (Lower Urinary Tract Symptoms)

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Background: α-1 antagonists and 5α-reductase inhibitors in combination are commonly used medical treatment in patients of benign prostate hyperplasia (BPH) with lower urinary tract symptoms (LUTS).

Objectives: A pilot study to compare the efficacy and safety of combination of tamsulosin with dutasteride & silodosin with dutasteride in patients of BPH with LUTS.

Material & methods: Twenty two male patients aged ≥45 years diagnosed with BPH and LUTS were randomized to receive tamsulosin (0.4 mg) with dutasteride (0.5 mg) [Group I] & silodosin (8 mg) with dutasteride (0.5 mg) [Group II] over 8 weeks. The efficacy outcome measures
were International Prostate Symptom Score (IPSS) and Maximum Urinary Flow Rate ($Q_{\text{max}}$). The safety was evaluated by using standard adverse drug reaction (ADR) reporting form of Central Drugs Standard Control Organisation (CDSCO).

**Results:** IPSS improved by 49.1% and 50.6% in tamsulosin & silodosin groups respectively (p value <0.001). $Q_{\text{max}}$ improved by 0.55 ml/sec & 0.45 ml/sec in tamsulosin & silodosin groups respectively (p value <0.001). Both the treatments were found to be equally effective (p value >0.05). Both the combinations had potential for causing ADRs, dizziness being common in tamsulosin group whereas retrograde ejaculation and headache in silodosin group.

**Conclusion:** Combinations of tamsulosin and silodosin with dutasteride are equally effective and safe medical therapy in patients of BPH with LUTS.

**Keywords:** Benign prostate hyperplasia (BPH), selective α-1 antagonists, tamsulosin, silodosin, dutasteride, lower urinary tract symptoms (LUTS)

**FP-PH-075**

**Development and Validation of UHPLC-MS/MS Method for Simultaneous Determination of 8 Calcium Channel Antagonists (CCAs) and its Subsequent Utility in Cassette Dosing Ocular Pharmacokinetic Studies**

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**Background & Objectives:** It is of particular interest to develop a bio-analytical method of CCAs to study intraocular penetration after systemic administration for the development of QSPR algorithm. Therefore, the present study has been conducted to develop and validate UHPLC-MS/MS method for simultaneous quantification of 8 analytes in human plasma.

**Methods:** An isocratic chromatographic separation of selected CCAs was achieved using Atlantis T3 analytical column for elution of all analytes using mobile phases consisted of (A) milli-Q water with 0.1% formic acid (FA), (B) acetonitrile with 0.1% FA and (C) 5mM ammonium formate buffer at a ratio of 10:50:40 v/v pumped at a flow rate of 0.5 ml/min in total run time of 20min. Multiple reaction monitoring (MRM) mode employing the respective $[M+H]^+$ ions (m/z) was used for identification and quantification of each analyte in plasma. This newly developed method was validated according to the currently accepted USFDA guidelines.

**Results:** After several permutations, an isocratic separation of each analyte was achieved by the developed method. All analytes were found to be linear in the range of 0.078-5ng/mL (nicardipine), 0.078-10ng/mL (lercanidipine), 0.156-10ng/mL (amlodipine, azelnidipine, nifedipine), 0.39-25ng/mL (nisoldipine, nimodipine) and 1.56-50ng/mL (felodipine). Intra-day and inter-day accuracy were found in the range of 93.94-103.89% and 93.58-106.65%, respectively. Intra-day and inter-day precision (%CV) were found below 12.81% and 8.79%,
respectively. Absolute recovery and absolute matrix effect of all analytes in plasma were found in between 91.19-109.8% and 83.73%-110.9%, respectively.

**Conclusion:** A highly sensitive, reliable, and fast UHPLC-MS/MS method was developed and validated for cassette dosage analysis of 8 CCAs drugs in plasma to investigate ocular pharmacokinetics.

**Keywords:** Calcium channel antagonists, liquid chromatography, mass spectrometry, pharmacokinetics

**FP-PH-076**

**Effect of the Ocular Inflammation on Expression of Transporters in the Blood Ocular Barriers**

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**Background & Objective:** Drug transporters of the ocular barriers are known to regulate the drug levels reaching the humors and tissues of the eye. Therefore, the aim of this study was to evaluate the impact of inflammation on various drug transporters in the experimental model of Uveitis.

**Methods:** Wistar rats of either sex (n=6) were used for this study. Endotoxin (LPS) was administered at the dose of 200 µg into the hind paw and saline was injected in control animals. Expression of 15 transporters of SLC and ABC family was performed in the ocular tissues (Cornea, Iris Ciliary body, Retina-Choroid) and Kidney by qRT-PCR at 24 hrs post LPS challenge. Fold change in the gene expression was calculated by ΔΔCt method.

**Results:** Site-specific mRNA expressions for various transporters in solute carrier (SLC) group and ATP-binding cassette transporters (ABC transporters) were shown 24hrs post LPS injection as compared to the control group. All the transporter expression in different tissues were significantly down regulated when compared to the saline controls whereas in Iris ciliary body all the drug transporters have shown up regulation in their expression levels (p<0.01).

**Conclusion:** This study revealed that various ocular SLC and ABC transporters mRNA levels are dysregulated in the experimental model of inflammation. Further studies are in progress to evaluate their importance in the drug transport across the barriers.

**Keywords:** Uveitis; Endotoxin; SLC transporters; ABC transporters; qRT-PCR; inflammation

**FP-PH-077**

**Pharmacovigilance Of Anti Retrovirals Drugs: Trends and Predictors of Adverse Drug Reactions**

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**Background:** Adverse drug reactions (ADRs) are a big threat to successful HAART continuation and are leading cause
of treatment modification and compliance in HIV care

**Objective:** To assess the trend of ADRs due to antiretroviral drugs in ART centre located in western Maharashtra.

**Method:** ADRs were reported from ART centre to the pharmacovigilance department by active and passive surveillance. During study period, 161 ADR forms were reported containing 200 reactions. These reactions were analysed as per gender, age group, system organ class and HAART regimen. Treatment modification pattern and possible ADR predictors were identified.

**Result & discussion:** Females and adults between 17 years to 69 years were involved in highest number of ADRs. Skin reactions were the most reported (29.5%) followed by blood disorder (19%). Neurological disorders were reported in 13% ADRs while urinary tract disorders in 10.5% ADRs. Treatment modification was seen in 64% of the ADRs, in which neuropsychiatric reactions associated with the efavirenz use and nephrotoxicity due to tenofovir had high impact on treatment modification. Severe anaemia and severe skin reactions were also responsible for treatment modification.

**Conclusion:** Pharmacovigilance of antiretro viral drugs is required to minimise the harmful consequences of adverse effects of HAART treatment. Skin, blood disorders, urinary, gastrointestinal and CNS were the main organ system class affected by ADRs.

**FP-PH-078**

**Effect of Memantine and Trimetazidine against Ethambutol induced Retinal Toxicity using Optomotor response (OMR) in Goldfish**

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**Background:** Tuberculosis is still considered to be one of the global health problems. Among the anti-tubercular drugs, ethambutol (EMB) causes the ocular toxicity on prolonged administration. The protective effect of NMDA and non-NMDA receptor antagonists against ethambutol induced ocular toxicity using Optomotor response (OMR) in goldfish.

**Objectives:** To study the protective effect of NMDA and non-NMDA receptor antagonists against ethambutol induced ocular toxicity using Optomotor response (OMR) in goldfish.

**Material & methods:** Either sex of goldfishes was randomized into three groups, each group consisting of eight animals (n=8). Group 1, 2 and 3 were exposed to daily doses of ethambutol (1 mg/ml for one hour) up to 26 days. Only group 2 and 3 animals were
given intravitreal injections of 1 µl of a solution of 20 µg memantine (MEM)/ml and 1 µl of a solution of 10 µg trimetazidine (TMZ) /ml respectively on 10, 15, 20 and 25th day. After drug exposure, animals were all allowed to the OMR setup and fish pattern velocity was recorded on 11, 16, 21st and 26th day at 5 rpm in different light condition (Blue, Green and Red). All intravitreal injections were performed by using 31-gauge needle attached to a Hamilton syringe under the methane sulphonate (150 mg/L) anesthesia condition.

Results: After chronic exposure (1 hr in bathing solution/day) of ethambutol at the dose of 1 mg/ml fishes showed a statistically significant decrease in the percentage relative frequency (PRF) at 7th day as compared to their baseline values on day 0. Significant decrease in PRF was observed with the green (550 nm, p=0.002) and red color (605 nm, p=0.001) and this effect persisted up to 21st day. After the induction of ocular toxicity as evidenced by a significant decrease in PRF on day 7, both memantine and trimetazidine showed varying degrees of protection on the 16th days after their intravitreal administration on day 10 and 15.

Conclusion: Chronic administration of ethambutol at the dose of 1 mg/ml/day for the period of one hour caused significant decrease in PRF-OMR in red and green color. Intravitreal administration of trimetazidine and memantine offered significant protection in the PRF-OMR, indicating the possibility of their use as a therapeutic intervention in the patients developing ocular toxicity during antitubercular therapy (ATT).

Keywords: Ethambutol, Retinal toxicity, Optomotor response, Trimetazidine, Memantine, Goldfish.

FP-PH-079

Study of Antibiotic Prescription Pattern and Drug Utilization in the Department Of Paediatrics at Tertiary Care Hospital, Navi Mumbai

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Background: Infectious disease represent a major cause of mortality and morbidity in India, particularly in children. Lack of uniformity in prescribing and irrational use of antibiotics cause emergence of antibiotic resistance and overall rise in health care cost.

Aim & Objective: To observe drug utilization pattern emphasizing more on antibiotics prescription pattern in pediatrics wards and the ICU cases

Methodology: Study was conducted after obtaining approval from IEC and informed consent from legal guardian. Demographic data, diagnosis and treatment were recorded in CRF. Participants were followed up till discharge.

Results: 200 participants were enrolled from wards, PICU & NICU. In Ward third generation cephalosporin were the most common prescribed drugs (30-60%) which was followed by aminopenicillin and
aminoglycoside. In NICU minimum use of third generation cephalosporin was observed while more of ESBL and Carbepenem either alone or in combination with Aminoglycoside were prescribed. Pattern of antibiotic selection was similar to the ward. Duration of treatment and number of antimicrobial prescribed were more in ICU areas compare to the ward, commonly prescribed miscellaneous drugs were bronchodilator and steroid for Respiratory disorders .Antiepileptic and diuretic for CNS disorders. Inotropic agents, antihypertensive and diuretics for cardiovascular disorder. Rehydrating fluids, antispasmodic, zinc and probiotic for gastrointestinal tract disorders.InNICU caffeine was used for respiratory disorder.

Conclusion:we conclude that commonly prescribed drugs were third generation cephalosporin and from amino penicillin in wards and PICU, whereas in NICU carbepenem andureidopenicillin were more used drugs.

Key words:Antibiotic prescriptions, paediatricwards NICU, PICU
FP-PH-080

Drugs in Ocular Emergencies: TransReConTM aided Topical Therapy of Piperacillin with Tazobactam

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Background: Development of resistant to antimicrobial agents warrant the need of newer agents while initiating empirical treatment in the management of corneal infections.

Objective: This study evaluated suitability of TransReConTM aided dispensing of piperacillin with tazobactam (PT) in healthy volunteers.

Method: Sterile powder of PT equivalent to 50mg of piperacillin with 6.25mg of tazobactam and sterile water for injection were dispensed in separate sterile polyethylene eye droppers and were sealed. TransReCon technique was used for their sterile reconstitution to reach the concentration of 10 & 1.25% for piperacillin and tazobactam respectively. Effect of light and temperature was studied on the drug stability in the reconstituted solution. Tear residence time of PT was evaluated after instilling single and multiple doses (5 times instillations of PT in 1 or 2 hours intervals) in the lower fornix of healthy volunteers. Tear concentration of PT was assessed by using LC-MS/MS at various time intervals.

Result: The results showed that the solution is stable up to 3 days (above 90%) in room temperature where light showed no additional effect. Whereas storing it at 4-6 Deg C increased the stability upto 12 days. Topically instilled single dose kinetics showed the tear-film half-life as 0.5hrs for both P & T. Repeated instillations increased tear levels by 8 times reaching 50µg/ml which is in the range of MIC90 of Pseudomonas aeruginosa.

Conclusion: This pilot study successfully showed the utility of TransReCon technology for unstable drugs. This sterile, user friendly drug reconstitution device is expected to have a potential utility in ophthalmic emergency situations. *TransReCon technique is the patent of AIIMS

Keywords:TransReConTM; Ocular emergency; LC-MS/MS; Piperacillin; Tazobactam

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**FP-MISC-081**

**Integrating Ethics into the Physiology Curriculum: A Multi-Centric Study in South India**

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**Background:** Integration of ethics into Physiology curriculum—“Thinking ethics” was implemented at St John’s Medical College as a novel, pilot program for MBBS students of 2015-16 batch. Intent was to provide ‘lived-in’ experience of application of ethics in medicine. It was largely welcomed by students as indicated in their feedback.

**Objective:** To assess the relevance and benefits of incorporating ethics into Physiology curriculum as perceived by the students across three colleges - a scale-up study.

**Methods:** First year MBBS students of St John’s Medical college (SJMC), Sri DevarajUrs Medical College (SDUMC) and RajaRajeswari Medical College (RRMC) (N=449; SJMC=149; 59M, 90F; SDUMC=150; 78M, 72F; RRMC=150; 48M, 102F) were exposed to 7 sessions of integrated ethics program during routine Physiology course. Triggers related to the day’s theory or practicals like confidentiality, informed consent, etc were included. The faculty who volunteered from each institution conducted open-ended sessions with feedback from neutral observers. Topics, contents and methods were predefined to maintain uniformity. Student’s feedback was obtained through semi-structured questionnaire.

**Results:** The students felt that the program was relevant (92-98%), effectively integrated (85-98%) into the course and seldom interfered with physiology teaching (60-66%). They expressed that the program created awareness, prepared them for profession and felt the need to continue for future years.

**Conclusion:** Scale-up study of integrating ethics program into Physiology course was found to be relevant and beneficial by students and neutral observers across three medical colleges. Students expressed the need of discussion of ethical issues that evolved through physiology course.

**Keywords:** integrated ethics, Physiology, relevant, awareness, beneficial

**FP-MISC-082**

**Lipid profile, Thyroid profile and Eating behavior in Pre-hypertensive women**

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**Background:** Hypertension is a common health problem in developed countries. Individuals with systolic blood pressure between 120 and 139 mmHg or diastolic blood pressure between 80 and 89 mmHg are categorized as pre-hypertensive. This group is at high risk for developing essential hypertension and cardiovascular diseases. Prevalence of pre-hypertension was found higher in females.

**Objectives:** To observe lipid profile, thyroid profile and eating behavior in pre-hypertensive women.

**Materials & methods:** Thirty cases of pre-hypertensive women between the age of 25-50 years and thirty age matched non pre-hypertensive were included in the study after obtaining written informed consent. Thyroid profile, Total Cholesterol, Triglycerides, High density lipoprotein and Low density lipoprotein were estimated by standard methods. Eating behavior was assessed by using eating attitude test-26 (EAT-26). Data was analyzed by using SPSS 20.0. Student t test was applied to observe the significance of difference. P<0.05 was considered significant.

**Results:** Significantly lower levels (P<0.001) of High density lipoprotein, significantly higher (P<0.001) Low density lipoprotein, very Low density lipoproteins, triglycerides, total cholesterol were observed in pre-hypertensive women when compared with healthy controls. Thyroid profile and EAT-26 was not significantly different between control and pre-hypertensive women.

**Conclusion:** High lipid profile was observed in pre-hypertensive women when compared with healthy controls. We recommend further detailed studies in this area to understand the underlying mechanisms.

**Keywords:** Pre-hypertension, Lipid profile, thyroid profile, women.

**FP-MISC-083**

**Cognizance of Applied Clinical Physiology Principles among Interns in a Southern Teaching Tertiary Care Medical Institution: A Cross-Sectional Survey**

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**Background:** Physiology is one of the basic preclinical subject which is taught in first year medical academic curriculum as regulated by the Medical Council of India [MCI]. Knowledge of basic sciences in medical field is important in clinical practice to deliver the better medical health care. Basic preclinical subjects form the sound foundation to become a good clinician. Hence it has been planned to study the cognizance of applied clinical physiology principles among interns in a southern teaching tertiary care medical institution.

**Objectives:** To study the cognizance of applied clinical physiology principles among interns in a southern teaching tertiary care medical institution

**Materials & Methods:** An observational study was done at Southern teaching tertiary care medical institution. This study was conducted using prevalidated questionnaire survey consisting of open ended questions on seventy two medical
interns who formed the study population. Study participants were asked to mark the questionnaire forms completely and which were finally subjected for analysis and were represented as percentage. ICMR human bioethics principles were adhered throughout the conduct of the study.

Results: It was noted that, only less than half of the study participants were able to mark the correct responses to all the questions describing the different domains of applied clinical Physiology principles. Interestingly it was also noted that, 87.5% of study participants opined as ‘Physiology is an important basic medical science which helps in better understanding the concepts in various medical disciplines’. Majority of the study participants [81.94%] willing to undergo various educational learning strategies for improving their knowledge in applied clinical Physiological concepts through continued medical education, lecture series and integrated modular teachings.

Conclusion: This study concluded that, there was a poor knowledge but with positive attitude towards the applied clinical Physiology principles among interns in a southern teaching tertiary care medical institution.

Keywords: Physiology, Medical, Interns, Applied Clinical Principles, Basic Science

FP-MISC-084

Relationship between Socio-Economic Status and Vision of Beneficiaries of the Fixed Facility under National Program for Control of Blindness

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Background: Blindness is major disabling condition. Though majority of blindness is treatable, many people avoid or choose to postpone seeking the treatment which further has adverse outcomes. This is especially true for senile cataract, which leaves the person disabled for length of time as it requires surgical procedure to correct.

Objectives: To study demographic and socio-economic profile, of patients referred from periphery for their ocular complaints. To study the correlation of demographic and socio-economic background on pre and post-surgical vision.

Method: Descriptive cross sectional study was planned to study the patients referred to SGH from periphery for visual status and family’s socio-economic status. Other demographics including age, sex and occupation are also studied. The final diagnosis, type of surgery, pre-operative and post-operative vision and prognosis of patients are studied. Correlation between demographics and vision was done.

Results: Age 65.84 years (16-95years). Males(51%) females(49%). Socio-economic profile: - poor(“67%), "below-poverty-line”(20%) and lower-middle(11%) upper-middle(1%). Pre-operative visual acuity:- below 6/60(88%), 6/60 or better(12%). Total 252 eyes operated (242 for cataract) other procedures were:- Chalazion extraction, Dacrocystostomy, drainage of abscess, Keratoplasty, pterygium extraction. Post-operative vision: -below 6/60(20%), 6/60 or better(80%).

Conclusion: Senile cataract was most prominent cause of blindness. Majority of patients were farmers, working or retired. Improvement of vision was seen following intervention. Post-operative vision may require further correction which can only be confirmed 15 days post-operatively. People come mainly from poor and very poor socio-economic background. On comparing pre-operative vision, it was found that, lower socio-economic status showed poorer vision. Further studies needs to be conducted to include vision after longer post-operative period.
Keywords: blindness, socio-economic status, cataract, vision

FP-MISC-085

Cardiac Autonomic Functions and Disease Activity in the Patients of Rheumatoid Arthritis

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Background: Rheumatoid arthritis (RA) is an autoimmune disease which alters autonomic nervous system and cause increased cardiovascular morbidity and mortality. However cardiac involvement in RA is underdiagnosed because many of the manifestations like myocarditis, coronary artery disease may be subclinical at the time of presentation. Cardiac autonomic function testing is a non-invasive method of detecting early autonomic impairment of heart.

Objectives: In this study, we attempted to assess the cardiac autonomic function and disease activity and to identify their association among rheumatoid arthritis patients.

Material & Methods: It's a part of ongoing randomized control trial done on (n=74) newly diagnosed RA patients attending outpatient Department of Clinical Immunology, JIPMER. Anthropometric parameters (Body mass index, Waist circumference, waist-to-hip ratio, waist-to-height ratio) were obtained. Autonomic function tests such as short term heart rate variability, heart rate variability during deep breathing, heart rate & blood pressure response to standing, and isometric-handgrip were also recorded. Using disease activity scale 28, we have divided the patients into three sub groups (low, moderate, high disease activity group) and further sub group analysis was done.

Results: Using One-way ANOVA, we found statistically significant difference (p<0.05) in frequency domain indices such as LF, HF, LFnu, HFnu, TP and LF: HF ratio between the groups and statistically significant correlation was found for frequency domain indices with disease activity. However, no significant difference was found in the time domain indices such as RMSSD and SDNN between the groups, however we found the pattern of decrease in the values of RMSSD and SDNN as the disease activity increases. Our study showed, no statistically significant difference in AFT parameters such as 30:15 ratio, E:I ratio, ∆DBP between the groups.

Conclusion: It may be concluded that sympathovagal imbalance is found in the patients of rheumatoid arthritis and sympathetic dominance is positively correlated with disease activity in these patients.

Keywords: Autonomic dysfunction, cardiovascular risk, Heart rate variability, Disease Activity scale 28, Rheumatoid arthritis.
Correlation of Blood Pressure and Pain Sensitivity in Healthy Normotensive Adults

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Background: Many literatures have stated Hypertension induced hypoalgesia in patients with musculoskeletal complaints. Hence we intend to see the relationship between pain sensitivity and blood pressure in normotensives

Objectives: The study aims to measure the duration of pain onset and correlate the pain sensitivity with blood pressure in normotensive adults.

Material and methods: 40 adult normotensive males were subjected to cold pressor test (7°C ± 5°C). Pain onset was assessed using visual analogue scale and correlated with blood pressure.

Results: Acute pain induced by cold pressor test showed a significant positive correlation between pain onset and blood pressure (r=0.373, p<0.01)

Conclusion: The above findings suggest blood pressure induced hypoalgesia indicating the association between baroreflex sensitivity and pain modulation in normotensives.

Keywords: Pain sensitivity, blood pressure, normotensive, cold pressor test, visual analogue scale, hypoalgesia.

FPP-NP-2
A Study of F Waves in Young Healthy Individuals.
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Background: The F wave is a CMAP (compound muscle action potential) evoked by a supramaximal stimulation of a motor nerve. F waves are particularly useful for the diagnoses of polyneuropathies at a very early stage and proximal nerve lesions. F waves may be quite prolonged in AIDP (Acute Inflammatory Demyelinating Polyneuropathy) while in CIDP (Chronic Inflammatory Demyelinating Polyneuropathy) may be absent.

Objectives: To study F waves in normal healthy individuals to establish normative data and to study the effect of anthropometric parameters on it.

Material and methods: Healthy males (n=64) and females (n=26) medical students of BPKIHS were enrolled in the study as per inclusion criteria. Anthropometric parameters and F waves of bilateral median, ulnar and tibial nerves were recorded in Neurophysiology Lab II of BPKIHS. Maximum and minimum F wave latencies, F persistence and chronodispersion were recorded. The mean and S.D were derived from anthropometric and F wave parameters while Pearson correlation was applied between anthropometric and F wave parameters.
Results: Height and weight showed significant effect on F wave latencies (p<0.001 and p<0.05 respectively) while age and gender did not show any significant relation to F wave parameters. F persistence was above 80% for all nerves.

Conclusion: Height and weight showed a significant relationship with the F wave latencies of the tested peripheral nerves. These factors must be taken into consideration in the evaluation of patients.

Key words: anthropometric, chronodispersion, F wave, persistence

FPP-NP-3


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Background: As the proportion of older people in modern societies increases, there has been a greater emphasis on understanding the changes associated with ageing, especially cognitive ageing. Reaction time (RT) is time interval between application of stimulus and appearance of voluntary response which indicates efficiency of central nervous system. As it involves speed and accuracy, it can evaluate attention, concentration and cognitive skills; with well proven diagnostic and predictive validity. So, in present study we assessed effects of ageing on cognition using audio-visual reaction time and compared amongst different age groups.

Objectives: To study and compare cognition using simple and choice audio-visual reaction time in different age groups.

Materials & Methods: Total Sample size consists of 120(n=120) subjects in age group of 21-60 years according to inclusion and exclusion criteria. Reaction Time apparatus (RTM-608) was used for measuring simple & choice auditory & visual reaction time and was compared between 21-30, 31-40, 41-50 & 51-60 years age groups consisting of 30 subjects each.

Results: One way Analysis Of Variance (ANOVA) Holm-Sidak test was used to assess statistical significance. There were statistically significant differences across all age groups; and as age advances simple & choice auditory & visual reaction time increases gradually (p value= 0.000).

Conclusion: Our results show that cognition reduces as age advances. The practical implication of this finding is that elderly people need to be more cautious during general movements; as they are unable to react quickly in an unforeseen emergency.

Keywords: Ageing, Reaction time, Cognition, Stimulus, Response.
FPP-NP-4

A Study of Ear Phone Influence on Brain Stem Auditory Evoked Potential in Medical Students

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Background: Over a period of just a few years, mobile phones have produced a revolution, involving not only communication systems and the technological sphere, but also the whole social and environmental domains. Now a days the younger generation increased to use portable equipment like earphones for communication and to listen music. The use of earphones, in a short or long term, bring irreversible damage to the auditory system.

Objective: To compare the brainstem auditory evoked potentials between study groups.

Materials and Methods: After obtaining institutional ethical committee clearance, 60 subjects, aged between 18 and 22 years, from institutional campus using ear phones were selected for this study. 30 subjects who used ear phones for < 2hours/day formed the control group, while 30 subjects who used their mobile phones for >2 hours /day formed the test group. Brain stem auditory evoked potential was done on all the subjects.Comparison of hearing between the groups were done by Chi-square test. P value < 0.05 was considered significant.

Result: No significant difference (p>0.05) was found in latencies and interpeak latencies of brain stem auditory evoked potential waves between study group.

Conclusion: In our study there is no evidence of cochleo-vestibular lesion caused by ear phone.

Keywords: Ear phone, Brain stem auditory evoked potential.

FPP-NP-5

Comparative Study of Executive Cognition in Deaf and Normal Hearing School Going Subjects between the Ages of 8 to 18 Years

Manjusha N. Kawale, D.N.Shenvi, Suchita Shinde

Background: As it is very challenging to survive for normal human being in today's life for making his earning,we can imagine how difficult it would be for a physically challenged individuals. But if we study the literature we get to know that if one sense is deficient, the power other sense is enriched. As in deaf, the visual area of brain is more developed and widened as compared to normal hearing subjects.

Objectives: To study the executive cognitive function by comparison of

1) Eriksen Flanker Test (EFT) - Response Time

2) EFT - Accuracy

Materials and Methods: The study population of 8 to 18 years of age and sex matched school going children. Group A were 20 deaf students, Group B were normal hearing 20 students under the criteria of inclusion and exclusion. Informed written consent and assent was taken. The ability of attentiveness is assessed by noninvasive computer based standardized test named Eriksen flanker test by using software cognitivefun.in.
Statistical analysis was done by using GraphPad Prism 7 online software by Unpaired Student-t test.

**Results**: Comparison of response time and accuracy was highly significant (p< 0.001) between the groups which was suggesting that deaf children showed markedly faster response in execution of task as well as are more accurate in the Eriksen Flanker test as compared to normal hearing children.

**Conclusions**: The purpose of this study is to observe whether executing a target task in deaf children in respect to vision is superior to that of in normal hearing children. When flankers were presented, it was seen that deaf children gave more correct answers than the hearing children. These findings suggest that deaf individuals may allocate their visual resources over a wider range than those with normal hearing. It may represent an alternative pathway for information transfer between different sensory and/or motor cortical areas. The learning may allow a faster transfer and even an integration of information across modalities.

**Keywords**: execution, cognition

**FPP-NP-6**

**Visual Evoked Potential as a Tool for Early Diagnosis of Neurological Dysfunction in Hypothyroidism.**

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**Background**: Hypothyroidism affects the CNS through its role in gene expression, myelin production, axonal transportation & neurotransmitters. As the myelination is affected, there is delay in conduction of impulses resulting in abnormal VEP.

**Objectives**: To compare the VEP of newly diagnosed hypothyroid patients with healthy controls & to find its correlation with TSH levels.

**Material and methods**: VEP was measured using RMS EMG EP MK2 machine in 30 patients (Serum TSH ≥ 10 ml IU/L) between 18-50 years of age along with 30 aged matched healthy controls.

**Results**: The mean age (± SD) of the patients was 31.8 (± 8.3) years. There was prolongation of VEP latencies more significant for P100 (msec) wave form (p<0.001). significant positive correlation was found between P100, N75 latency & serum TSH levels.

**Conclusion**: VEP is a useful, non-invasive & sensitive method to detect subtle early changes in the CNS & to access the response to treatment.

**Keywords**: visual evoked potential, hypothyroid, TSH

**FPP-NP-7**

**Effect of Caffeine on Cognition in Young Adults**

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**Aim**: To study the effect of caffeine on Memory in younger population.

**Background**: Caffeine has been found to enhance mental performance, mood, vigilance and cognition. Few studies have examined the effects of caffeine on cognition on healthy individuals.
**Objectives** The purpose of this study was to investigate the possible effect of caffeine on cognitive neural function primarily memory in healthy human volunteers.

**Material and Method:** The study was conducted on MBBS student in the age group 17-22 years at IGIMS, Patna. A double blind, counter-balanced, placebo controlled, crossover was used. Each participant was tested under two different drug conditions [placebo and caffeine (250mg)] separated by a seven-day ‘wash-out’ period. The doses selected were based on previous research that found significant behavioral effects at this dose, but being low enough to minimize the possibility of side-effects, such as nausea, which could confound the results. Verbal, visual and working memories were assessed with Rey’s Auditory Verbal Learning Test (RAVLT), Rey’s complex figure test (CFT) and Wechsler Memory Scale (WMS) – spatial span.

**Result:** Ingestion of caffeine improved significantly in RAVLT: Total score, average, immediate recall and delayed recall; CFT: delayed recall; spatial span - forward and backward when compared with control group.

**Conclusion:** We reached to a conclusion that ingestion of caffeine may have beneficial effect on memory.

**Keyword:** Caffeine, Memory, Neuropsychological test

**FPP-NP-8**

**Conditioned Pain Modulation as a Tool to Study Diffuse Noxious Inhibitory Controls (DNIC) in Trigeminal Neuralgia Patients.**

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**Background:** Trigeminal Neuralgia (TN) is a neuropathic facial pain disorder affecting the fifth cranial nerve, characterized by recurrent unilateral brief electric shock like pains, triggered by innocuous stimuli like eating or shaving the face. Poorly understood pathophysiology makes its treatment a challenging task. A deficit in the descending pain modulation (endogenous) could contribute to the pain of TN.

**Objectives:**The main objective of the present study was to test the integrity of endogenous pain modulation and status of DNIC in trigeminal neuralgia by comparing them with healthy controls.

**Methods:**Ten TN patients and 10 healthy controls were recruited. To study endogenous pain modulation paradigm of conditioned pain modulation was used. The ‘test’ stimulus (hot stimuli, by thermode) was given on the area supplied by TN nerve (most affected branch). Cold pressor test (CPT) as a ‘conditioning’ stimulus was then conducted by immersion of contralateral foot in a water bath maintained at 5°C for 90 seconds at the most. Hot pain threshold were recorded at the facial site before and after condition test stimuli. Pain rating (Numerical pain rating scale) of the subject were recorded before and after CPT.

**Results:**In patients, the hot pain threshold was higher than the healthy controls (TN patients= 38.50± 2.77; HC= 36.82 ± 1.46; p=0.108).After CPT, TN patients (TN patients=39.75±3.5; HC=39.0±2.0) did not show any significant reduction in pain.
(p=0.16) for hot pain thresholds but in healthy controls a significant difference was observed (p=.001).

**Conclusion:** TN patients have a reduced DNIC when compared to healthy controls which is suggestive that a deficit of DNIC system may contribute to the pain experienced by patients.

**Keywords:** Trigeminal Neuralgia, conditioned pain modulation, DNIC, hot pain threshold, Cold pressor test.

**FPP-NP-9**

**Effect of Instrumental Music on the Concentrating Ability of Students**

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**Background:** Music is ubiquitous. It has become quite common for students to listen to music while studying. Now, some may say that this is distracting. But some say that music helps in concentrating.

**Objectives:** To demonstrate the effect of instrumental music on the concentrating ability of students and to determine whether instrumental music has a beneficial role in the same.

**Materials and Methods:** Institutional ethics committee approval was obtained. 136 MBBS students volunteered for the study and they were categorized randomly into 2 groups (control group - 70 & study group - 66). Students with color blindness and far-sightedness were excluded from the study. The students in both the groups were asked to perform STROOP TEST (The subject is given color words which are printed in an incongruent ink color. The subject is asked to report the ink color) for a duration of 1 minute. While performing the test, the control group did not listen to any music, while the study group listened to instrumental music (Mozart). The mean scores of each group were calculated and compared.

**Results:** The mean score of the control group were slightly higher than that of the study group. On statistical analysis, the difference was found to be insignificant.

**Conclusion:** Listening to instrumental music does not have any significant effect on the concentrating ability of students.

**Keywords:** concentration, instrumental music, Mozart, stroop test, color words.

**FPP-NP-10**

**Acute Predator Stress Affects Short Term Memory in A Zebrafish Model**

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**Background:** Zebrafish (Danio rerio) is the new emerging model for human diseases. 70% of the genome of zebrafish matches with human genome. Adult zebrafish and larvae forms are being used in neurobehavioral studies. Many of the details of the underlying mechanisms of learning and memory are yet to be established. The stress system in zebrafish is represented by the hypothalamus–pituitary–interrenal (HPI) axis, similar to human HPA axis. Like humans, zebrafish form spatial memories and its cholinergic system is involved in learning and memory.

**Objectives:**

1. To model learning and memory in zebrafish using predatorstress
2. To evaluate the influence of predator stress
Materials and methods: 12 adult zebrafishes were randomly divided into 2 groups (6 in each): Control group and Stress group. All were subjected to color cued plus maze test for 6 days for establishing memory to find the food in the red arm. Then test group fishes were subjected to predator stress and then the test is repeated again the same day and day 14 to check for short term (STM) and long term memory (LTM) respectively. The data were analyzed using SPSS by repeated measures of ANOVA.

Results: Stress group fishes showed significant prolongation in STM (p=0.003), whereas LTM seems to be unaffected (p=0.985). Control group fishes showed no significant changes in both.

Conclusion: STM was affected due to acute stress, whereas LTM did not have any profound effects. Thus, this zebrafish model worked out to study the learning and memory, which gives further scope to evaluate the mechanisms underlying memory.

Keywords: Zebrafish, short term memory, long term memory, predator stress, plus maze.

A Hierarchical Regression Modeling on Predictors of Psychological Health in Medical Students.

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Background: Emotional intelligence (EI) has a potential to improve psychological health and work performance of a person. However, research on mechanisms underlying the link between EI and psychosocial health is still premature.

Objectives: Present study was conducted to examine the impact of socio-demographic status and emotional intelligence EI on psychological health of medical students and, to isolate significant predictors for the same, using a hierarchical multiple regression approach.

Methods: 132 medical students (76 males; 56 females) participated in cross-sectional, questionnaire-based study. Hierarchical regression analysis was performed with three sets of independent variables (socio-economic, education-related, EI) against one dependent variable (psychological health). Socio-economic, education-related and EI data were entered at steps 1, 2 and 3 respectively.

Results: Model 1 with six predictors (age, gender, student’s residence, hometown, parental education, income) was not significant (p>0.05), accounting for only 5% variance. Model 2, with nine predictors (Model 1 predictors + study medium, career choice, number of attempts), was an improvement over the previous model, with R=0.400, ▲R²=0.107, ▲F(3,122)=5.205, p=0.002, accounting for 10% variance. Model 3, with ten predictors (Model 1&2+EI), escalated the R value to 0.634, with ▲R²=0.242, ▲F(1,121)=48.967, p<0.001, accounting for 24% variance. Significant predictor variables extracted from three models were, constant(p<0.001), study medium, career choice, number of attempts(p<0.05) and EI(p<0.001). Thus, a linear combination of these variables was the best fitting model for predicting psychological health of medical students.

Conclusion: The results indicate that psychological health of medical students is
dependent on their emotional intelligence as well as education related factors. Enhancing EI through training may prove beneficial in fostering better mental health in them.

**Keywords:** Emotional intelligence, hierarchical regression, medical students, psychological health, socio-demographic.

**FPP-NP-12**

**Diagnosis of Brachial Plexus Injury: H Reflex Vs F Wave.**

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**Background:** Brachial plexus injury is usually traumatic injury requiring urgent surgical attention if associated with open wound. The diagnosis and extent of lesion is mostly not significant for attending trauma surgeon. Surgical closure of wound without proper brachial plexus integrity assessment may leave the patient incapacitated for entire life. So quick non-invasive assessment of brachial plexus injury is essential for timed intervention to limit the handicap of patient. Hoffman reflex and F wave are both good indicators of nerve integrity. Both these tests do not require access to the actual wound site i.e. near the brachial plexus region and hence can serve as a diagnostic test even in acute settings.

**Objectives:** This study aimed at studying the possibility of Diagnosing the acute brachial plexus lesion by H reflex and F wave.

**Material & Method:** The assessment of reflex arc is better done by H reflex whereas integrity at spinal level is better judged by F wave. Thirty patients of either sex with chronic traumatic brachial plexus injury were assessed for H reflex and F wave. The results were analyzed by graph pad software using unpaired T test.

**Result:** The F wave showed consistent and significant change in radial nerve in affected limb as compared to non-affected limb. The H reflex was absent in the affected limb or reduced in amplitude and M latency.

**Conclusion:** H reflex is a better parameter to quantify the severity of lesion. F wave parameters were not much consistent but in radial nerve they showed some consistency. H reflex can be used in diagnosis of acute brachial plexus injury and measurement of its extent.

**Key words:** Brachial plexus injury, H reflex, F wave.

**FPP-NP-13**

**Exploring Strategies to Enhance Novel Object Recognition Memory in Middle Aged Mice**

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**Background:** Middle age is often characterized by decline in working memory due to several factors like stress, social isolation, decreased physical activity or poor nutritional quality. The benefits of exercise, environmental enrichment and dietary supplementation on mental health are well documented. However, there are no studies elucidating the effects of supplementation of essential brain nutrients like choline and docosahexaenoic acid (Ch-DHA) or...
environmental enrichment on age associated decline in working memory.

**Objective:** To compare the effects of Ch-DHA supplementation or enriched environment in enhancing novel object recognition memory in middle aged mice.

**Material and Methods:** 12 to 15 month old CF1 male mice were grouped into normal control (NC) which remained undisturbed, enriched environment group (EE) exposed to enriched environment and, Ch-DHA group fed with choline 45mg and DHA 300mg/kg body weight for 30 days (n=6/group). All groups of mice were tested for novel and familiar object recognition. Data were analyzed by one way ANOVA followed by Tukey’s post hoc test and a value of P<0.05 was considered statistically significant.

**Results:** Ch-DHA supplemented group of mice had significantly higher preference (p<0.05) for novel objects as compared to NC and EE groups of mice. Alternately, EE group of mice made significantly more number of visits to familiar object (p<0.05) as compared to NC and Ch-DHA groups of mice.

**Conclusion:** Ch-DHA supplementation or environmental enrichment may be useful to enhance novel object recognition memory during middle age in mice.

**Key words:** choline, DHA, enriched environment, novel object recognition memory.

**FPP-NP-14**

A Study of Neuropsychological Problems among Shift Duty Nurses from a Tertiary Care Hospital in Trichy.

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**Background:** Shift work have increased in every field as to provide round the clock service. As staff nurses in health sector are worst affected with this rotation and prolonged duty hours and are in continuous stressful situation in emergency and surgical care in order to save lives. It needs to be addressed for the wellbeing of their personal health status.

**Objective:** To study the prevalence of insomnia, excessive sleepiness, anxiety and depression (neuropsychological problems) among nurses doing shift duties.

**Materials and Methods:** An observational study was conducted with approval of IRB on staff nurses working in shift duties in a tertiary care CMCH&RC, Irungalur Trichy with written consent. This study includes a sample size of 127 female nurses with 1 to 2 years of exposure to shift duties between age group of 20 to 26 years without any history of neuropsychological problems. Participants were given Bergen insomnia scale to rule out sleeplessness, Epworth sleepiness scale to rule out excessive day time sleepiness, Hospital anxiety and depression scale to rule out anxiety and depression were filled up by them and collected. The scores were analyzed using descriptive statistics with SPSS software version 23.

**Result:** The mean age of 127 nurses was 23.51 years. According to Bergen insomnia scale 87 (68.5%) nurses were found to have sleep problems, Epworth sleepiness scale 79 (62.2%) nurses were found to have excessive day time sleepiness, Hospital Anxiety and Depression scale 42 (33.1%) nurses were found to have anxiety and depression.
Conclusion: Shift duties increase the incidence of insomnia in nurses which in turn leads to excessive daytime sleepiness, anxiety and depression. To overcome this they should be given proper counseling and shift duties should be in clockwise rotational basis.

Keywords: staff nurse neuropsychological problems shift duties.

FPP-NP-15

Prevalence of Migraine in Undergraduate Medical Students of A South Indian Medical College – A Cross Sectional Study

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Background: Headaches are common among medical students and migraine is one of its common etiologies. Detection and treatment of migraine is important as it affects quality of life and academic performance of medical students. There is scant data of its prevalence among Indian undergraduate medical students.

Objectives: To determine the prevalence and triggers of migraine among undergraduate medical students of a South Indian medical college.

Methods: After ethical clearance, a questionnaire containing Identification of Migraine (ID Migraine) test, headache severity scale and MIDAS (Migraine Disability Assessment) questionnaire along with questions related to demographics and other parameters was administered. All undergraduate medical students who had suffered from headache for more than 1 year were included. Students whose headaches were associated with diseases like hypertension, refractive errors or head injuries were excluded.

Results: 366 undergraduate medical students participated in the study. 156 (43%) were males.

219 (62%) reported headache. Of these, 110 (50%) were recognized as migraineurs. 69 (63%) of the migraineurs were females.

Family history of migraine was seen in 54 (49%).

42 (38%) migraineurs had headaches lasting for more than 4 hours.

Most common triggering factor was emotional stress or anxiety reported by 10 (9%) migraineurs.

Of the 71 (65%) migraineurs who used medicines for relief, 44 (62%) used prescription medicines.

Conclusion: Prevalence of migraine among the undergraduate medical students was higher compared to the studies conducted in Kuwait, United States and other studies in India. Stress, exposure to sun, and hair wash were the most common triggers.

Key words: undergraduate medical students, migraine, triggers, MIDAS questionnaire, ID migraine test, triggers.
Auditory Brainstem Responses (ABR) in Different Phases of Menstrual Cycle in Females of Reproductive Age Group

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Background: Ovarian hormones (oestrogen and progesterone) have known to effect the sensory information in brain. Auditory being one of the sensory modalities gets influenced by sex hormones. These have been found to modulate the conduction of sensory information in different phases of menstrual cycle.

Aims & Objectives: ABR is a non-invasive test to evaluate functional integrity in auditory pathway. Aim of study is to observe the changes if any in ABR in different phases of menstrual cycle in females of reproductive age group.

Material & Methods: Twenty females of 18-35 years having normal menstrual cycle of 28±5 days participated for ABR. It was conducted in PG Research Laboratory, Department of Physiology, LLRM Medical College, Meerut using Neurostim NS-4, after taking written consent, explaining the purpose and procedure in 3 different phases of menstrual cycle i.e. menstrual phase (1-3 day), pre ovulatory phase(11-14 day), luteal phase(23-26 day) excluding those taking OCPs or having history of hearing loss or discharge.

Results: Our study showed a trend of increase in Absolute Latencies of wave II, IV & V and also increase in Inter Peak Latencies of I-V, III-V in pre ovulatory phase compared to menstrual and luteal phase. Different studies showed that oestrogen and progesterone modify the speed of transmission of auditory nerve at the brainstem by secretion of GABA in counter regulatory fashion. As study is still in process, therefore statistical significance will be produced at the time of presentation.

Keywords: Auditory Brainstem Response, phases of menstrual cycle, oestrogen, progesterone.

Targeting Motor Cortex with Neuronavigated Repetitive Transcranial Magnetic Stimulation in Management of Chronic Migraine

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Background: Chronic Migraine (CM) is moderate to severe headache (generally unilateral) over >3 months with associated features like nausea, vomiting, photophobia, phonophobia and osmophobia. Anxiety, depression and disability are significant coexisting factors. With time CM become medically refractory and makes its treatment difficult. Non-invasive repetitive transcranial magnetic stimulation (rTMS) of the cortex has been implicated in pain relief in such chronic conditions.

Objectives: Purpose of the study was to examine the effects of Neuronavigated rTMS of left motor cortex on pain status, quality of life, depression, anxiety in CM patients.
**Methods:** Patients were randomised into real (n=9) and sham rTMS (n=10) groups. Real rTMS (10 Hz) administered with figure of 8 coil (5 days/week for two weeks) and compared with sham group. VAS rating, headache frequency and questionnaires-WHOQoLBREF, BDI-II, STAI-Y were assessed before and after therapy.

**Results:** Real rTMS group showed significant VAS reduction and improved associated symptoms from baseline when compared with sham TMS group.

**CONCLUSION:** Left motor cortex rTMS significantly reduced pain and improved related symptoms suggesting its role as adjuvant analgesic treatment modality for chronic migraine.

**Keywords:** Chronic Migraine, headache, rTMS, Neuronavigated, Motor cortex

**FPP-NP-18**

**Anxiety and Depression among Medical Students during Exams**

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**Background:** Young medical students are considered in significant psychological distress during their training. Several studies suggest a high prevalence of stress and depression among medical students as compared to their aged match peers. Academic demands, exams, too much work load, inability to cope, these factors are considered to be cause of depression. Associated risk factors are female gender, having family history of depression, loss of relative and substance abuse. It has been observed that medical students have marked undue stress during examination period.

**Objective:** To find frequency of anxiety and depression among undergraduate medical students of Guntur medical College during exams.

**Material and Methods:** In a cross sectional observational study, conducted by administering Hamilton Anxiety and Depression rating scales to 100 students enrolled in first professional MBBS at Guntur medical College during the examinations.

**Results:** Depression and anxiety were present in 65% and 85% of students during exams. Female students were more prone to both depression and anxiety than males during exams. In our study among Anxiety scale most had Fear, among Depression scales most had insomnia.

**Conclusions:** In our study we found that majority of students experience depression and anxiety during exams. There is need for greater attention to the psychological wellbeing of medical students.

**Keywords:** Anxiety, depression, insomnia, fear.

**FPP-NP-19**

**Effect of Semantic Association on Audio-Visual Interaction**

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**Background:** In our multimodal environment we are constantly
bombardeed with simultaneous inputs from different sensory modalities which merge together to form a unified percept, this is known as crossmodal interaction. The effect of one modality (visual) on other modality (auditory) can lead to response facilitation or response suppression. This can be affected by various factors, such as nature of stimulus and nature of task.

**Objective:** To study the effect of semantic association (Congruent and incongruent) during audio visual interaction.

**Material and methods:** Twenty five healthy adults (27.4±2.76 years) performed two blocks of object detection task. Each block comprised of 3 subblocks containing auditory, visual and audio-visual stimuli respectively. The audio-visual stimuli were presented in 3 forms: CAn (Congruent: animal picture with animal sound), IAnP (Incongruent: animal picture with artefact sound) and IArP (Incongruent, animal sound with artefact picture). Subjects were asked to respond with key press for animal features in stimuli (1 for yes, 2 for no). The mean reaction time (RT) for the correct trials were analyzed.

**Results:** Mean visual RT (481.3±56.66) was significantly lower than mean auditory RT (727.2±108.8) (p<0.0001) and mean IAnP RT (545.4±74.83) (p=0.0094). There was no significant difference between mean visual RT and mean CAn RT. Mean auditory RT (727.2±108.8) was significantly higher than mean CAn RT (511.5±73.13) (p<0.0001), There was no significant difference between mean auditory RT and mean IArP RT.

**Conclusion:** Visual modality is the dominant modality but auditory stimuli, if semantically incongruent can suppress visual perception. Whereas, semantically congruent visual stimuli can facilitate auditory perception.

**Keyword:** multisensory processing, semantic, perception, cognition, audio-visual, reaction time.

**FPP-NP-20**

**Correlation of Sleep Quality, Perceived Stress and Reaction Time in Medical Students- A Cross Sectional Study**

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**Background:** Sleep is important for homeostasis. A bidirectional association has been shown between sleep and stress. The effect these entities have on an individual’s reaction time is now being explored in research, as we have done in our study.

**Objectives:** The aim of this study was to correlate sleep quality, perceived stress and reaction time in medical and dental students, and to determine the extent the correlation of sleep quality and perceived stress had on reaction time.

**Material and Methods:** The Pittsburgh Sleep Quality Index was administered for sleep; Cohen’s perceived stress scale-10 for stress and the Digital Display Multiple Choice Apparatus for reaction time. To establish the degree of association between the variables such as sleep quality, stress, auditory and visual reaction Pearson’s Coefficient of Correlation (r) was computed.

**Result:** Along with the high incidence of poor sleepers and highly stressed students, we observed a critical point value in both administered questionnaires, beyond which both auditory and visual reaction time increased exponentially.
**Conclusion:** These findings bring to light a threshold value in both sleep quality and perceived stress, after which an exponential rise in auditory, visual reaction times is seen; in contrast with a linear rise approaching this threshold value.

**Keywords:** Medical students, Dental students, Sleep, Perceived stress, Reaction time

**FPP-NP-21**

**Incidence of Long Qt Interval in Deaf Children: A Case Control Study**

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**Background:** A Deaf-mute child loses his ability to lead a completely independent life thereby affecting the mental and physical wellbeing due to complete loss of perception and reciprocation of sound. Numerous studies suggest evidence of syndromic deafness associated with cardiac abnormalities.

**Objectives:** To look for incidence of long Qt interval in 12 lead ECG among deaf children in comparison with age matched children with normal hearing.

**MATERIALS AND METHODS:** A case control study was conducted with 120 subjects, 6-18 years of age comprising of 60 deaf and 60 normal children. Cardiart 6108T of BPL healthcare a portable 12-lead electrocardiograph with a single channel printing system, capable of processing all ECG leads simultaneously was used to take 12 Lead ECG of 120 subjects after adequate rest in their own school campus. The Qt interval calculated was analysed statistically using unpaired t test and Mann Whitney U test.

**Results:** 16.7% (n=10) of deaf children showed prolonged QTc compared to 3.3% (n=2) in normal children. QT interval comparing male and female cases showed highly significant difference (Mann Whitney U test -295; p value-0.019). Also QT interval comparing male cases and controls showed significant difference (Mann Whitney U test-279; p value-0.010)

**Conclusion:** Incidence of long QT interval is higher in deaf individuals compared to normal which could be representation of part of syndromic or non-syndromic deafness. Further genetic and thorough cardiac evaluation is necessary to comprehensively establish the relation between co-occurrence of long QT interval and deafness.

**Keywords:** Long QT interval, deaf children, 12 Lead ECG, electrocardiograph.

**FPP-NP-22**

**Effect of Iron-Folic Acid Supplementation on Brainstem Auditory Evoked Potential in Iron Deficiency Anemic Adolescent School Girls**

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**Background:** Iron deficiency anemia, a major nutritional public health problem, is linked with cognitive abnormalities. Evoked potentials are used to index the functional integration of the CNS. Supervised weekly iron-folic acid therapy is an effective alternative approach to daily administration.
Objectives: This study aimed to investigate the effect of iron-folic acid supplementation on brainstem auditory evoked potential (BAEP) in iron deficiency anemic adolescent school girls.

Material & Methods: This prospective intervention study was conducted on adolescent school girls (n=150) of Dharan, Nepal, selected by systemic random sampling method. They were screen for anemia analyzing their hemoglobin and ferritin levels. Supervised weekly iron-folic acid supplementation (12 weeks) was given to these screened iron-deficient anemic girls. Pre- and post- intervention BAEP and hematological profile were recorded. Paired t-test was applied.

Results: From the 33.33% (50/150) anemic girls, iron deficiency was identified in 17.33% (n=26/50) girls. In these girls (n=26/50), hemoglobin showed an increasing trend (Hb: 11.18 ± 0.85 vs. 11.33 ± 0.94 gm/dL) post supplementation. In BAEP, Wave V latency, III-V interpeak latencies and I-V interpeak latencies of right ear were decreased post-supplementation (Wave V latency: 6.31 ± 0.58 vs. 5.86 ± 0.59 ms, p=0.002; III-V interpeak latencies: 2.68 ± 0.52 vs. 2.39 ± 0.58 ms; I-V interpeak latencies: 4.61± 0.69 vs. 4.29 ± 0.52 ms).

Conclusion: These findings suggest that weekly iron-folic acid supplementation improves conduction velocity in auditory pathway in iron-deficient anemic girls.

Key words: anemia, adolescent girls, brainstem auditory evoked potential, iron-folic acid supplementation

FPP-NP-23

Nerve Conduction Study of Median Nerve in Diabetes Mellitus Type II

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Background: The prevalence of chronic disease diabetes mellitus is rapidly rising all over the globe. The number of diabetic mellitus patients with diabetic neuropathy is increasing as estimated as 45% of patients develop diabetic polyneuropathy.

Objectives: To evaluate latency, amplitude and NCV of median nerve in DM type II.

Material & Methods / Procedure: The study was done in 10 (M=4, F= 6, Age 51.38±11.71yrs) consenting Diabetic patients. Median nerve motor and sensory parameters, proximal, distal latency, amplitude, conduction velocity were recorded. Values obtained were compared with normal value. Independent t test was applied to analyze the data.

Results: Onset latency (2.83±0.253 vs. ≤ 4.4 ms, P < 0.0005) and proximal latency (6.60±1.99 vs. ≥ 13.2 ms, P< 0.0005) of right median nerve were decreased significantly. Distal amplitude (7.63±2.53 vs. ≥ 4 mV, P< 0.005) and Proximal amplitude (8.68±2.41vs≥ 4 mV, P< 0.005) of Rt. Median nerve were increased more significantly. F wave minimum latency (28.38±7.03 vs. ≤ 31 ms, P=0.05) of right median motor and F wave minimum latency (24.33±4.51 vs. ≤ 31 ms, P<0.05) of left median motor were decreased significantly. Amplitude of Rt. median sensory (10.80±6.00 vs. ≥ 20 µV, P <0.0005) was decreased significantly. SNCV of Lt. median sensory (42.95±12.52 vs. <3.5 ms, P <0.05) were decreased significantly.

Conclusion: The results suggest neuropathy can be detected early by NCV test. Sensory nerve parameters are affected earlier than motor. Median nerve has the highest abnormalities in diabetic patients with early neuropathy.
Keywords: NCV, sensory conduction velocity, motor conduction velocity, Diabetes mellitus, F-wave latency, Onset latency

FPP-NP-24

To Investigate the Relation Between Pattern Reversal Visual Evoked Potential Parameters and Height in Healthy Subjects.

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Background: The aim of this study was to investigate the relation between pattern reversal visual evoked potential parameters and height in healthy subjects.

Design: It was a cross-sectional study.

Material and Method: Pattern reversal visual evoked potential (PRVEP) recordings from 240 eyes from 120 normal subjects were performed over a period of one year after approval from the institutional ethical committee in the electro-physiology laboratory of Physiology Department, SGT Medical College Hospital and Research Institute, Gurgaon-NCR. PRVEP latencies, duration and amplitude were measured in both the eyes of all subjects. PRVEP parameters were correlated with height by Pearson’s correlation co-efficient (r) using spss statistical software.

Results: A significant positive correlation was observed between N70 latency and height. A positive correlation of P100 latency and N155 latency in the subjects in relation to height was observed. It was found that P100 amplitude has negative correlation with height in the subjects of various age groups. Whereas P100 Duration was found to be non-significant negatively correlated with height of the subjects.

Conclusion: Our findings suggest that PRVEP parameters (latency, amplitude and duration) are influenced by the height of the individual. The positive correlation between VEP latencies with increasing height shows that with increase in height the length of optic nerve between the optic nerve head and the visual processing area increases. This increase in length of nerve may be responsible for increase in VEP latencies.

FPP-NP-25

Effect of Glycemic Control on Short Term Memory in Type 2 Diabetics

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Background: The increase in diabetes among the elderly is of concern because in addition to the wide range of traditional complications, there is evidence that diabetes is associated with memory decline. Short term memory plays a very important role in day to day activities.

Objectives: To find out the effect of glycemic control on short term memory in type 2 diabetics.

Materials and Methods: The study was carried out in 150 individuals aged between 40-65 years consisting of 100 diagnosed cases of type 2 Diabetes who were further divided into Group I: Controlled diabetes (HbA1c levels <7%) and Group II: Uncontrolled Diabetes with (HbA1c level> 7%) compared with Control Group consisting of 50 non-diabetics HbA1c<6 % from OPD of Mc Gann Hospital. Neuropsychological batteries were used to assess short-term memory. Statistical analysis was done using SPSS 21.
**Results:** Uncontrolled Diabetics showed a significantly reduced score compared to non-diabetics and controlled diabetics (p<0.001) and controlled diabetics showed a significantly (p<0.001) reduced score compared to non-diabetics for all the three memory tests used to assess short term memory.

**Conclusion:** The main hypothesis to explain the pathophysiology of decline in short term memory in type-2 diabetes may be glucose dysregulation, accumulation of senile plaques, metabolic oxidation products associated with hyperglycemia, insufficient action or effect of insulin due to insufficient secretion, activit, or both.

**Key Words:** Diabetes; Glycemic control; short term memory

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**FPP-NP-26**

**Long Lasting Effect of Iron Deficiency on Auditory Pathway of Children Visiting Tertiary Care Hospital Unit of Southern Rajasthan**

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**Background:** It is stated in Physiological hypothesis states that iron deficiency anemia causes demyelination of auditory pathway. Hence proposed study deals with, the effect of iron deficiency anemia on auditory pathway of children of age group 5 to 10 years.

**Aim:** Study the effect of Iron deficiency anemia on status of auditory pathway in children of age group 5-10 years.

**Methodology:** A case control study on children with Iron deficiency anemia, visiting the Dept. of Pediatrics, GMCH has been done. Iron deficiency anemia was diagnosed and confirmed by several haematological tests which include peripheral blood film, haemoglobin content, serum ferratin level.

BERA test was also performed on all iron deficiency diagnosed cases (30) and non iron deficiency normal childrens i.e. control (10).

**Result & conclusion:** Analysis of 30 anemic children & 10 controls for their auditory pathway development using BERA revealed that in few children (3) there was delayed transmission of signals to midbrain i.e. .06ms. Delayed transmission is results of demyelination of auditory pathway due to iron deficiency.

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**FPP-NP-27**

**Role of Visual Evoked Potential in Primary Open Angle Glaucoma**

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**Introduction:** Primary open angle glaucoma(POAG) is the most predominant form of glaucoma in the world. The clinical diagnosis of POAG is commonly based on increase in intraocular pressure(IOP), characteristic optic nerve head cupping, and typical visual field defects. The Electrophysiological tests like Visual Evoked Potential (VEP) records electrical brain activity and offers the potential of providing more specific objective functional testing.

**Aims&Objectives:** To compare pattern reversal visual evoked potentials (PRVEP) in patients with Primary Open Angle Glaucoma and in healthy controls.

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*63rd Annual National Conference of Physiologists and Pharmacologists of India, APPICON2017, Organized by Department of Physiology, JIPMER, Puducherry.*
Methodology: The present study was conducted in the departments of Physiology & Ophthalmology, IGMC Shimla, in 40 cases of POAG diagnosed on the basis of increased IOP, fundus examination & glaucomatous visual field defects and 40 normal. VEP was recorded in all the subjects to record latency and amplitude of P100.

Result: The results of our study showed statistically significant prolongation in latency of P100 in 76 eyes of 40 patients among POAG group (115.66±8.09 ms in patients and 104.92±6.42 ms in controls, p=0.000). Significant reduction in P100 amplitude was also observed in POAG patients as compared to controls (5.30 µv±2.47 and 7.4µv ±3.59 respectively, p=0.000) as evaluated by students t-test.

Conclusion: From our results, we conclude that PRVEP can be used as an objective tool for monitoring progression of optic nerve pathology in patients of POAG.

Key Words: Glaucoma, electrophysiological tests, Visual Evoked Potential, electrical brain activity, objective tool.

FPP-NP-28

Low Frequency Repetitive Transcranial Magnetic Stimulation as a Therapeutic Intervention in Chronic Tension-Type Headache: A Randomized Control Study

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Introduction: Tension-type headache (TTH) is the most common type of primary headache disorder. Its chronic form is often the most ignored and challenging to treat. The exact pathogenesis of chronic tension-type headache (CTTH) is still unclear and the oscillation between peripheral mechanisms (myofascial nociception) and central mechanisms (sensitization and inadequate endogenous pain control) remains. The aim of our study was to explore the effect of repetitive transcranial magnetic stimulation (rTMS) on pain status in CTTH by subjective and objective pain assessment.

Trial design: Single blind randomized control trial.

Methods: Patients (n=30) diagnosed with chronic tension-type headache were recruited and randomized into real (n=15) and sham (n=15) rTMS groups. Pre-intervention detailed history of the patient was taken, Numerical pain rating scale as well as questionnaires (Headache impact test-6, McGill pain questionnaire, Pain Beliefs Questionnaire, Coping Strategies Questionnaire, State- Trait Anxiety Inventory test and WHO-Quality of Life questionnaire-brief version) were filled and objective assessments such as nociceptive flexion reflex and conditioned pain modulation were done.

Intervention: 1Hz 1200 pulses in 8 trains consisting of 150 pulses at 110% of the resting motor threshold were given on the right dorsolateral prefrontal cortex for 20 days (5 days/week) in the real TMS group. Post intervention the assessments and questionnaires were repeated.

Result: We got subjective improvements in the numerical pain rating scale, headache impact test, McGill present pain intensity, trait of anxiety and psychological pain beliefs. The increase in thresholds of nociceptive flexion reflex served as an objective marker for improvement in pain status.

Conclusion: Low frequency rTMS on right dorsolateral prefrontal cortex may be used...
as a therapeutic intervention in chronic tension-type headache.

FPP-NP-29

Effects of Structured Exercise Therapy on Ulnar Nerve Conduction Velocity in Asymptomatic Young Patients with Newly Diagnosed T2 DM: A Randomized Controlled Study

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Background: Diabetic neuropathy (DN) is one of the most commonly occurring microvascular complications accounting for 28% of all the complications in diabetics. It is a progressive process that has a long asymptomatic stage. Nerve conduction studies (NCS) and Audio Visual reaction time are electro diagnostic tests which are used to evaluate the ability of the conduction of the motor nerves.

Objectives: The aim of the present study was to study the effect of structured exercise therapy on motor nerve conduction velocity of ulnar nerve & audio visual reaction time in neurologically asymptomatic patients newly diagnosed young adults with T2DM.

Material & Methods: Study was done in Research Laboratory, Dept. of Physiology, J. N Medical College and performed after obtaining informed consent & institutional ethical clearance. The study was conducted on 140 clinically diagnosed cases of T2DM of age group 20-45 years. In-person assessment was done followed by a physical examination and then divided randomly into Diabetic Group(n=70) & Interventional Group(n=70) by computer generated, randomized number sequence as per inclusion criteria and 70 age- matched healthy controls were also enrolled. The structured exercise therapy was practiced for 6 months and the readings were taken in the beginning of the study, at the end of 2nd, 4th and 6th months.

Statistical Analysis: ANOVA & Multivariate Analysis were used and p value < 0.05 was taken as significant.

Results: Statistically significant improvement was observed in study variables with interventional therapy.

Conclusion: The results of this trial have provided novel data to indicate exercise improves cognition for a vulnerable group of young adults. This has set the stage for larger trials to further examine protective potential and disease modifying effects of exercise therapy

Key words: Newly diagnosed T2DM, NCV, Structured exercise therapy

FPP-NP-30

Brainstem Auditory Evoked Potential in Uncontrolled Diabetics without and with Complications

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Diabetes mellitus is a chronic metabolic disorder affecting the worldwide population in all age groups. If not controlled, it is known to affect all body systems especially nervous system, retina and kidneys. Peripheral neuropathy is the commonest manifestation of neural involvement. Central neuropathy is seen in uncontrolled diabetes as evidenced by
involvement of cranial nerves. The central neural involvement is not fully explored and got due attention. BAEP is a noninvasive test to evaluate the functional integrity of auditory pathways. The possibility of abnormal BAEP is greater in uncontrolled diabetes specifically with complications. Therefore, the present study is undertaken. 50 uncontrolled diabetics including 20 with peripheral neuropathy and 10 with retinopathy participated for BAEP test after taking written consent and explaining the purpose and procedure to them. None of them was having complaint of hearing loss which was also confirmed by otoscopy and tuning fork tests. BAEP was recorded on Neurostim NS 4. It was found that patients with retinopathy and neuropathy were having significant delay in AL III, V and IPL III-V \((p < 0.05)\) as compared to the uncontrolled diabetics without any complication. However, the patients with retinopathy were also having significant \((p < 0.05)\) increase in AL I also. The delay in the mentioned parameter indicates the involvement of central auditory pathways. Therefore, though the poor glycaemic control is associated with central neuropathy but the magnitude is greater in uncontrolled diabetics already having the complications. Therefore, it is recommended to do BAEP screening in diabetic subjects to know early involvement of central auditory pathway.

**Background:** Pain is one of the most exciting fields of nervous system research. A small number of studies have looked at pain sensitivity in obese people but many of these studies report conflicting results. Pain has tremendous effect on quality of human life.

**Objectives:** To determine pain threshold and pain tolerance in healthy obese male subjects.

**Material and methods:** The present cross sectional study was undertaken after obtaining ethical clearance and informed written consent. Ninety four healthy male medical students of age group 19-21 of were the participants. Obesity classification recommended by WHO consultation for Asian population was used to classify obesity on the basis of body mass index. The pain threshold and pain tolerance were measured by Cold Pressure Task. Anova test was used to analyse the differences of pain threshold and pain tolerance among healthy obese and non-obese subjects.

**Results:** Statistically significant increased pain threshold in obesity group compared to normal group \((20.4 + 9.25 \text{Vs} 29.9 + 18.97, p<0.001)\) was observed. There was increase in pain tolerance in obese groups compared to normal group which was not statistically significant

**Conclusion:** The perception of pain is lower in obesity. Further large scale research can be undertaken to strengthen this finding.

**Keywords:** Pain perception, Pain threshold, Obesity, Cold Pressor Task.

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**FPP-NP-31**

**Pain Perception among Healthy Obese Students- A Cross Sectional Study**

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A Comparative Study of Visual Reaction Time for Red Color in School Bus Drivers with Normal Population (Controls)

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Background: Reaction time is the speed with which an individual can respond to a stimulus. Reaction time is very important aspect in occupation like driving, in which quicker level of response is one of the measure by which number of road traffic accidents can be reduced.

Objective: To compare mean visual reaction time for red color in school bus drivers with normal population.

Materials and Methods: 100 healthy school bus drivers and 100 normal populations (controls) of age (20-50 years) and sex (male) matched, were taken as per inclusion criteria. A self-made questionnaire was administered. A thorough clinical examination was done. Drivers and controls with normal visual function tests (visual acuity and color vision) were assessed for visual reaction time test for red color with the help of audio-visual analyzer.

Results: Data thus collected were tabulated and analyzed statistically by student t-test. Visual reaction time for red color of drivers were shorter as compared to controls and the data obtained were statistically significant (p<0.05).

Conclusion: Mean visual reaction time for red color was shorter in drivers as compared to controls which indicate drivers react faster than controls.

Key words: Audio-visual analyzer, visual reaction time, student-t test.

ABR in Females Having Type II Diabetes

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Diabetes Mellitus (DM) refers to a group of metabolic disorders that share the phenotype of hyperglycemia. Depending on the etiology, the associated metabolic dysregulation causes secondary pathophysiological changes in multiple organ systems that impose a tremendous burden on the individual with diabetes and on the healthcare system. Nervous system involvement in mixed population suffering from diabetes mellitus is well documented, but studies detailing the effects seen particularly in women are very few. Electrophysiological studies have objectified the peripheral nervous system and CNS damage caused by diabetes both in patients and experimental models.

Evoked potentials represent an obligate neuronal response to a given stimulus. The amplitude and latency depend on the physical characteristics of the eliciting stimulus. It was reported that early involvement of the central auditory pathway can be detected with fair accuracy with auditory evoked potential studies. Therefore the present study was planned with a view to observe the CNS involvement in ladies with diabetes.

Twenty-seven newly diagnosed and thirty established diabetic female patients between 30 – 70 years of age were taken from the OPD of Department of
Endocrinology and Department of Medicine of SVBP Hospital, Meerut. Thirty-eight age and sex-matched non-diabetic female patients, who had no complaint of hearing loss and had normal hearing tests, were selected for the study. BAEPs were conducted in an outpatient basis after getting a written and informed consent from patients, using the software Neurostim NS-4 (Medicaid, Chandigarh). Each ear was tested twice to ensure the reproducibility of the result.

In the results it was observed that the absolute latencies of both the newly-diagnosed as well as established diabetic women were increased as compared to the control participants. The interpeak latencies were also raised in newly-diagnosed subjects but decreased in established females.

The study revealed the early involvement of ear in female diabetic patients. It can be used for educating the patient about the aural involvement in the disease with time. The ABR may be used for prognostic purposes during follow-up.

FPP-NP-34

A Comparative Study of Nerve Conduction Velocity in Patients with Type 2 Diabetes Mellitus and Healthy Adults.

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Objectives: To compare NCV in diabetics and healthy adults and to study the strength of correlation between (HbA1c) and nerve conduction velocity.

Material and methods: Total of 60 subjects; 30 patients (15Males, 15Females) with established T2DM recruited into test group and 30 healthy age matched controls (30Males, 30Females) recruited into control group. Determination of nerve conduction velocity of both median nerves and Blood sampling for assessment of HbA1c to assess glycaemic control, was done for both the groups

Results: Among male participants mean NCV was lower in cases (Right 37.9±14; Left 40±16) compared to the controls (Right 59.4±11.4; Left 60±11.3); and among female participants was also lower in cases (Right 41.8±13; Left 42±12.4) in comparison with controls (Right 54.6±17.8; Left 55.1±17.6). Among the cases, the p value for Right NCV was 0.021, which was found to be statistically significant (p value <0.05), and p value for Left NCV was 0.9.

Conclusion: These findings suggest that NCV is delayed in diabetics compared to healthy adults

Keywords: Nerve Conduction Velocity(NCV), Type2 Diabetes Mellitus(T2DM), Diabetic Polyneuropathy(DPN)
FPP-NP-35

Evaluating the Clinical Applications of Visual Evoked Potentials in Patients with Visual Dysfunctions- A Retrospective Study

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Background: The neuro-ophthalmological applications of visual evoked potentials have been extending over the last decade. The tests can provide important electro-diagnostic informations in patients with visual disorders.

Objectives: The present study was hence planned to assess the clinical role of PRVEPs (pattern reversal visual evoked potentials) in patients presenting with visual loss with presumptive optic nerve involvement.

Materials and methods: PRVEP records of 48 patients with unilateral/bilateral visual loss in a study-period of one year were retrospectively analysed. P100 latencies and N75-P100 amplitudes were compared with those of 50 age and sex-matched controls. Significant abnormalities were defined as variations beyond three standard deviation. PRVEP records obtained by monitoring/follow-up in some conditions were also assessed.

Results: Traumatic optic neuropathy (33.33%) was the most common condition confronted, with major PRVEP finding as absent waveforms/reduced amplitudes. Monitoring of the records revealed improvement in 50% of the patients on corticosteroid therapy. Malingering and factitious disorders constituted 29.17% of the patients with 92.8% confirmed by PRVEP. Ethambutol-induced toxic optic neuropathy (20.83%) was associated with significant P100 delay bilaterally, in the majority. Out of which, 50% showed improved PRVEP records after 1 month of cessation of the drug. Multiple sclerosis and optic neuritis though rare conditions (4.17% and 8.33% respectively), exhibited significant latency delays which helped confirming the diagnosis.

Conclusion: Visual evoked potentials are sensitive adjuncts to diagnosis in various visual disorders. By objectively monitoring the ocular functions in conditions like traumatic and ethambutol-induced toxic optic neuropathy, they can further contribute as cheaper and sensitive investigations.

Keywords: Malingering, monitoring, N75-P100 amplitude, optic neuropathy, P100 latency, pattern reversal.

FPP-NP-36

Comparative Study of Median Motor Nerve Parameters in Newly Diagnosed Hypothyroid Patients in a Tertiary Care Centre Alappuzha, Kerala

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Background: Thyroid hormones play a role in the growth and development of neuromuscular system. Hypothyroidism causes neurological dysfunctions like peripheral & entrapment neuropathy, cerebellar ataxia, myxedema coma etc. Studies show that motor symptoms increases with increase in TSH levels. The common nerve involved is motor part of median nerve. Electrophysiological studies conducted early in the course of disease play significant role in the medical management of entrapment neuropathies
before switching to surgical treatment. The present study assessed median motor conduction parameters in recently diagnosed and untreated hypothyroid patients.

**Objectives:** To study and compare median motor neuropathy in two groups of newly detected hypothyroid patients with TSH values \( \geq 70\mu IU/ml \).

**Material & Methods/Procedure:** Newly detected hypothyroid males and females with age 20 to 50 years were included. Patients with neurological disorders, diabetes mellitus, those taking drugs causing neuropathy, alcoholics and smokers were excluded. Study variables were distal latency, conduction velocity and amplitude of median motor nerve, TSH, free T3 &T4. These were compared between two groups of hypothyroid patients with TSH values \( \geq 70\mu IU/ml \).

**Results:**

**Conclusions/Implications:** Median motor parameters were significantly impaired \( (p<0.01) \) in both groups but increased duration of distal latency, reduced amplitude and velocity noted more in the group with TSH levels more than \( 70\mu IU/ml \). This showed that TSH values have got an influence on motor performance of peripheral nerves and early medical intervention can reduce the symptoms.

**Keywords:** Hypothyroidism, motor neuropathy, electrophysiological study

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**FPP-NP-37**

**Comparative Study of Visual Evoked Potential in Persons with Immature Cataract and Persons with Normal Visual Acuity.**

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**Background:** Cataract is opacification of crystalline lens in the eye, which initially starts with minimal visual disturbances and eventually progresses to complete blindness if untreated. Visual evoked potentials (VEPs) are electrical potential differences recorded from scalp in response to visual stimuli. Many studies have proven that VEP is useful for identifying local optic nerve pathology and opacification of lens in the late stages. This study is to assess the role of VEP in early stage of cataract.

**Aim / Objectives:** To compare the VEP changes in persons with immature Cataract with persons with normal visual acuity.

**Material and Method:** Pattern reversal visual evoked potential was recorded using EMG EP MK II equipment in the department of Physiology. 20 immature cataract individuals in the age group of 40 - 60 years were included in the study group. Control group comprised of 20 normal age matched subjects. VEP Parameters – N75, P100 & N145 latencies and amplitude in study group were compared with control group.

**Results:** Statistical analysis revealed that the amplitude of P100 was significantly decreased in study group compared to that of control group \( (p=0.01) \). Other parameters (N75 and N145) are non-significant.
**Conclusion:** P100 amplitude is significantly decreased in immature cataract individuals when compared to control group suggesting that even early stages of lens opacification can be measured by VEP.

**Key words:** cataract, immature cataract, visual evoked potential.

**FPP-NP-38**

**Assessment of Cognitive Functions in Children of Hypertensive Parents - A Cross Sectional Study**

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**Background:** Sympathetic hyperactivity with early parasympathetic attenuation is seen in children of hypertensive parents, who may in long run show impaired neuro-cognitive functions. The rising prevalence of hypertension calls for early evaluation to prevent morbidity and mortality associated of the disease. Reaction time is one of the modality to test the cognitive functions like intelligence and quickness of an individual to process a given stimuli.

**Objectives:**

1. To assess audio visual reaction time and academic performances in children of hypertensive parents.

2. To find correlation between audiovisual reaction and academic performance

**Material and methods:** This is a cross sectional study conducted on 42 healthy medical students who fulfilled study inclusion criteria and have given written informed consent. Ethical clearance was obtained from the institutional ethical committee. Audio visual reaction time was measured using audiovisual reaction time analyzer. Academic performance was assessed by theory test scores obtained in preliminary examination. The data was analysed by using independent t-test and Karl Pearson’s correlation test.

**Results:** Visual reaction time was found to be slower than auditory reaction time within the group and statistically significant association was for white light visual stimuli between two groups. No significant correlation was found between reaction time and academic performance.

**Conclusion:** Audiovisual reaction time was faster in children with non hypertensive parents and no correlation was found between reaction time and academic performance. A detailed study on larger scale may confirm the correlation.

**Keywords:** Hypertension, Sympathetic Hyperactivity, Audio Visual Reaction Time

**FPP-NP-39**

**Assessment of Cognitive Function in Patients with Alcohol Dependence: A Cross-Sectional Study.**

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**Background:** This study aimed to evaluate cognition in patients with alcohol dependence. During the past decade, there has been an increasing interest in the evaluation of cognitive function in substance use disorders. Substance use includes the use of licit substance such as alcohol, tobacco, diversion of drugs as well as illicit substances.
Alcohol in beverage form is among the most widely used psychoactive drugs in the world and it has dependence producing properties. Ethanol in alcohol is a chemical and after consumption has a multitude of effects.

**Objectives:** Assessment of cognitive function in patients with alcohol dependence.

**Methods:** This study included 44 patients with alcohol dependence diagnosed as per ICD-10 criteria with a mean age of 43.61 ± 7.38. Cognition was tested using a sensitive battery of psychometric testing MiniMental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA).

**Results:** Compared with healthy subjects ($n = 44$), patients had lower total scores of cognitive testing (MMSE), ($P = 0.010$) and Montreal Cognitive Assessment (MoCA), ($P = 0.000$).

**Conclusion:** Our results indicated cognitive impairment in patients with alcohol dependence. This is important to determine prognosis and managing patients.

**Key words:** Substance use, Cognition, alcohol dependence.

**FPP-NP-40**

**Study of Brainstem Auditory Evoked Response in Patients of Alcohol Use Disorder**

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**Background:** Previous studies have reported abnormal brainstem auditory evoked potentials in chronic alcoholics. Therefore this study has been undertaken to focus on the effects of chronic alcoholism on BAER, especially in North India.

**Objectives:** To study the latencies and interpeak latencies of waves in Brainstem auditory evoked response in chronic alcoholics and compare them with non-alcoholic controls.

**Material and methods:** This case control study was carried out in the department of Physiology, which included 40 chronic alcoholic males (study group) and 40 healthy males (control group) in the age group of 20-60 years. The BAER test was performed using Octopus NCS/EMG/EP (Clarity) machine.

**Results:** We observed statistically significant increase in mean latencies of wave III ($p=0.007$) & wave V ($p=0.000$) of left ear and wave V ($p=0.02$) of right ear in chronic alcoholics as compared to non-alcoholics. The mean interpeak latencies of wave I-III ($p=0.000$) of left ear and of wave I-III ($p=0.000$) & wave I-V ($p=0.01$) of right ear in chronic alcoholics were also statistically significantly increased as compared to non-alcoholic controls.

**Conclusion:** The present study shows that chronic alcohol consumption affects the auditory pathways and delays the auditory transmission time which may suggest possible demyelination of auditory tracts. Further studies are warranted to elucidate the mechanisms of structural and neurochemical alterations involved.

**Keywords:** Chronic Alcoholism, Brainstem Auditory Evoked Response, Latency, Interpeak latency

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Nerve Conduction Studies on Patients of Sciatica

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Background: Low-back pain (LBP) is a major health problem around the world and a major cause of medical expenses, absenteeism and disability. Although LBP is usually a self-limiting and benign condition that tends to improve spontaneously over time, a large variety of therapeutic interventions is available for treatment. Sciatica can result when the nerve roots in the lower spine are irritated or compressed. The aim of the study was to observe the effect of nerve conduction velocity in sciatica subjects.

Method and materials: In this study we involved the participants either sexes; aged >21 years; treatment for LBP; in the acute, subacute or chronic phases, with sciatica. Patients were selected on the basis of routine clinical examination and complaint with pain during walking. The selected Patients initially send for Nerve conduction investigation in the department of Physiology. Nerve conduction study was done on RMS EMG EP Mark-II. The sites of stimulation for Sciatic nerves were ankle & at or below popliteal fossa and recording site were motor point of Extensor digitorum brevis and Abductor Hallucis respectively. Reference electrode was placed 4 cm distally over 4th metatarsophalangeal joint. Ground electrode was placed between stimulating and recording electrodes. Recording surface disc electrode was placed below lateral malleolus of ankle for sural nerve.

Result: The mean value of latency was 3.152 ± 0.255 in normal side and it was 2.876 ± 0.4002 on the affected side which was significantly decreased. Motor nerve conduction Velocity in the normal side was 51.27 ± 3.98 and the Motor nerve conduction Velocity of sciatic patient was 47.34 ± 5.659 on the affected side decreased significantly.

Conclusion: In this study we concluded that, this will be helpful for the early detection of demyelination & nerve injuries in the patient of sciatica.

Key words: NCV: Nerve conduction velocity, Sciatica, LBP: Low back pain, DML: distal motor latency.

Delayed Occurrence of Neurological Deficit May Masquerade as False Negative Intraoperative Neuromonitoring.

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Background: The occurrence of post-operative new neurological deficits in cases without intraoperative neurophysiological alarm during neurosurgeries is considered as false negative and is detrimental for the surgical outcome.

Objectives: Two cases reported here show that post-operative deficits developed despite post-instrumentation intraoperative neuromonitoring without
alarm may be due to delayed development of new neurological deficit rather than false negative reporting.

**Material and methods:** Intraoperative neuromonitoring was done using standard anaesthetic, stimulation and recording protocols in two cases of corrective spine surgery for congenital kyphoscoliosis. Motor cortices were stimulated by transcranial electrical stimulation. The transcranial motor evoked potential (TcMEP) were recorded bilaterally from needle electrodes placed in limb muscles.

**Results:** Case 1: TcMEP were unchanged during surgery and there were no new neurological deficits in the immediate postoperative period. On the second postoperative day the patient had loss of power in both the lower limbs. Case 2: Episodes of alarms were sounded with decreased TcMEP amplitude on left side which correlated with surgical intervention and later recovered on corrective instrumentation steps. At the time of skin closure, the TcMEP was same as baseline. However, in the immediate postoperative period there was weakness on left side that progressed to complete loss of motor power on the left lower limb by post-op day 2. In both the cases the patients were re-operated to remove the causative factor (bony fragment in case 1 and displaced D6 screw in case 2). The TcMEP improved intra-operatively. Both the patients had improved motor power in the immediate post-operative period that progressed to complete recovery.

**Conclusion/Implications:** Careful analysis of the records of TcMEP and the surgical context must be done before labeling the case as false negative intraoperative neuromonitoring in an event of development of new neurological deficits. The development of delayed neurological deficits is a distinct entity and should not be overlooked.

**Keywords:** Intraoperative neurophysiological monitoring, motor evoked potential, delayed neurological deficit

**FPP-NP-43**

**Effect of Use of Internet Usage on Sleep Quality and Cognition among Adults**

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**Aim:** To determine the effect of internet addiction on sleep quality and cognition.

**Method:** This cross-sectional study was done among students of IGMC Shimla and HPGDC Shimla HP in Feb–August 2017 and Data were collected by self-report. Data collection tools were Internet Addiction test (IAT), Pittsburgh Sleep Quality Index (PSQI) and Montreal Cognitive Assessment (MOCA) Questionnaire. Data was analysed by SPSS ver 23. P<0.05 was considered statistically significant.

**Results:** The mean score of PSQI, IAT and MOCA is 4.860±2.297, 36.115±13.953 and 24.395±2.420 respectively. 20.5% (95% CI=15.12 - 26.8) of students had moderate internet addiction and 13.5% (95% CI= 9.09 -19.03% ) of the students were suffering from sleep disorders. Also 52 % (95% CI= 44.84 - 59.10) of the students had below normal MOCA score. Between internet addiction and sleep disorder components, subjective sleep quality, sleep latency, sleep duration, sleep disturbances, habitual sleep efficiency and daytime dysfunction and GPSQI, there was a significant positive correlation (P< 0.05) and there was no correlation between internet addiction and cognition of students.
**Conclusion:** The result shows that excessive use of internet is associated with sleep disturbances and increase day time sleepiness. So it is important to promote the essential awareness among students to promote the correct pattern of internet use to reduce sleep problems in students.

**Keywords:** Internet addiction, Cognition, Sleep latency, Day time sleep disturbance, Sleep medication, Sleep quality.

**FPP-NP-44**

**High Frequency Monopolar Stimulation Protocol is better than Bipolar Stimulation for Intraoperative Identification of Motor Cortex during Neurosurgery**

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**Background:** Direct cortical stimulation is the standard method for intraoperative identification of the motor cortex during neurosurgery of fronto-parietal region of the brain.

**Objective:** To compare efficacy of monopolar and bipolar stimulation using high frequency protocol for identification of the motor cortex during neurosurgery.

**Material & methods:** Motor mapping was attempted in 30 patients. Surgeries were performed either under GA or under awake protocol. Muscle relaxant was given only during intubation, not during surgery. After the exposure, cortex was stimulated with monopolar and bipolar probe by a train of 8 square wave each 100 µs long electrical pulses given at 275 Hz at 2 Hz. Responses were recorded with the help of bipolar needle/surface electrodes which were inserted/placed in appropriate muscles depending on the site of lesion. The cortical areas which on stimulation lead to motor evoked potential (MEP) from corresponding muscle were considered as functionally eloquent motor areas. Current strength was titrated for each case with threshold intensities ranging between 7-35 mA for monopolar and 10-30 mA for bipolar probe.

**Result:** The motor cortex stimulation was achieved by monopolar stimulation in 26 cases and only in 12 cases with bipolar stimulation. The threshold current was always higher with bipolar stimulation. The average threshold current intensity was 17.04±7.769 mA with monopolar and 19.50±7.477 mA with bipolar stimulation. In the 4 patients where the motor cortex could not be identified did not have any post-operative neurological motor deficit.

**Conclusion:** Monopolar stimulation is more reliable as compared to bipolar stimulation of motor cortex and the intensity of current required is significantly lower with monopolar as compared to bipolar stimulation. Thus with high frequency protocol, monopolar stimulation is the method of choice for motor mapping.

**Keywords:** Monopolar, Bipolar, Motor mapping, Direct cortical stimulation, High frequency protocol

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63rd Annual National Conference of Physiologists and Pharmacologists of India, APPICON2017, Organized by Department of Physiology, JIPMER, Puducherry.
Environmental Enrichment Ameliorates Stress Induced Behavioural Depression and Spatial Learning Deficits by Modulation of Expression of Neurotrophic Factors and Glucocorticoid Receptors

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Background: Traumatic stress is the main exogenous factor that precipitates depression, anxiety and cognitive dysfunctions. Exposure to environmental enrichment (EE) has been shown to induce progressive plasticity in the brain and improve learning and memory in various neurological and psychiatric disorders.

Objectives: To evaluate the effect of EE on chronic immobilisation stress (CIS) associated changes in spatial learning and memory, behavioural measures of anxiety, depression and molecular markers as well as structural alterations.

Material and methods: Male Wistar rats were subjected to CIS for 2 h/day/10 days followed by 2 weeks of exposure to EE. CIS resulted in weight loss, anhedonia, increased immobility, spatial learning and memory impairment, enhanced anxiety, and reduced expression of BDNF, VEGF, GFAP and glucocorticoid receptors (GR) in different brain regions.

Results: EE ameliorates behavioural depression, spatial learning and memory impairment and reduced anxiety behaviour. In addition, EE restored BDNF, VEGF, GFAP and GR expression and normalized atrophy of dentate gyrus and hippocampus in CIS animals. In contrast, EE did not restore hypertrophy of the amygdalar complex. Thus, EE ameliorates CIS-induced cognitive deficits by modulating the neurotrophic factors, astrocytes and GRs in the hippocampus, frontal cortex and amygdala.

Conclusion: Our findings throw light on the beneficiary role EE by reducing depressive-like behaviors and improving cognitive abilities. Enrichment shows antidepressant-like effect by restoring BDNF, VEGF, GFAP and GR expression in the hippocampus and fronto-cortical areas. Therefore, EE may be considered as one of most potential therapeutic approach to treat neuropsychiatric diseases.

Key words: Stress, depression, hippocampus, cognitive deficits, neurotrophic factors

FPP-NP-46

A Study of Brainstem Auditory Evoked Potential in Infants with Different Grades of Hypoxic Ischaemic Encephalopathy

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BACKGROUND: Infants with hypoxic ischemic encephalopathy (HIE) frequently develop neuro-developmental delay.

Brainstem auditory evoked potential (BAEP) provides a non-invasive and objective method to assess the functional integrity of auditory pathway. Presence of wave V at 70 dB and its latency were assessed in this study.

The aim of the study is to show whether there is any BAEP changes in infants with different grades of HIE.
METHOD: An observational, cross-sectional study was undertaken where 55 infants (110 ears) with HIE and 30 controls (60 ears) were subjected to mono-aural BAEP testing following routine protocol using acoustically shielded headphones after proper consent and ethical clearance. Both cases and controls were in the age group 0-12 months and were obtained from Pediatrics OPD. Unpaired Student t-test was used and p-value < 0.05 was taken as significant.

RESULT: Of the 110 ears, 22 (20%) belonged to HIE Stage I, 60 (54.55%) to HIE Stage II and 28 (25.45%) to HIE Stage III. Absent wave in Grade I (n=22) were 0 (0%), in Grade II (n=60) were 18 (30%) and Grade III (n=28) were 24 (85.7%). There was statistically significant delay in Wave V in Grade II and III.

CONCLUSION: Absence of waves were more in grades III and II compared to I. There was prolongation of Wave V latency in both ears compared to age matched controls in Grade II and Grade III, but not in Grade I indicating auditory pathway immaturity. BAEP may thus be used to assess the neurological damage according to the severity of HIE.

KEYWORD: Brainstem Auditory Evoked Potential, Infants, HIE

FPP-NP-47

Hypercapnia Induced Impairment of Cerebral Autoregulation as Quantified by Autoregulatory Index

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Background: Cerebral autoregulation is maintenance of constant flow over wide variation in perfusion pressure. Dynamic component of cerebral autoregulation (dCA) can be evaluated by measuring relative change in cerebral blood flow to rapid change in blood pressure.

Objective: Autoregulatory index (ARI) which quantifies dCA from 0 (no autoregulation) to 9 (maximum autoregulation) is used here to assess the effect of hypercapnia on cerebral autoregulation.

Material and methods: Bilateral middle cerebral artery blood flow velocity (CBFV) and continuous arterial blood pressure measurement was done on 26 healthy subjects (27.6 ± 2.87 years). Transient hypotension was induced to assess dCA by releasing thigh cuff after inflation for 3 minutes and repeated with 3% and 5% CO₂ breathing. CBFV was averaged for 10 seconds just before and after thigh cuff release. ARI was calculated with Tieck’s model.

Results: Sudden deflation of thigh cuff leads to significant drop in blood pressure (11.8 ± 4.69 mmHg, p<0.0001) for all three-breathing trial. CBFV decreased in response to blood pressure drop but recovered within 10 seconds after thigh cuff release during normal breathing but recovery was delayed and significant (p<0.001) drop was there during hypercapnia trials. ARI values decreased significantly from (ARI_R 5.46±1.47, ARI_L 5.46±1.14) to (ARI_R 2.0±1.35, ARI_L 1.65±1.37, p<0.0001) during 3% CO₂ trial and (ARI_R 1.64±1.09, ARI_L 1.41±1.18, p<0.0001) during 5% CO₂ trial.

Conclusion: Hypercapnia leads to impairment of dCA which leads to decreased rate of recovery of CBFV. ARI can be used as a valid measure to quantify dCA and assess the effect of hypercapnia on dCA in response to rapid change in arterial blood pressure.

Keywords: Dynamic cerebral autoregulation, Autoregulatory index, Hypotension, Hypercapnia
**RESPIRATORY PHYSIOLOGY**

**FPP-RS-48**

**Study of C-reactive protein Levels in Stable and Acute Exacerbation Copd**

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**Background:** Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases. COPD may be punctuated by periods of acute worsening of respiratory symptoms called exacerbations. C-reactive protein is synthesized by the hepatocytes in response to inflammation.

**Objective:** To compare C-reactive protein levels in clinically stable and acute exacerbation COPD patients.

**Methods & Materials:** Data of serum C-reactive protein levels of 35 stable COPD and 35 acute exacerbation COPD patients was collected from TB & chest hospital in Hyderabad and SVS hospital in Mahabubnagar.

**Inclusion Criteria:** Patients included in the study were clinically stable based on having no exacerbation for previous 2 months. Staging of COPD was based on Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria using post-bronchodilator FEV1% predicted.

**Exclusion Criteria:** History or presence of tuberculosis, inflammatory diseases such as malignancy, arthritis were excluded from study.

**Results:** Unpaired students t-test was used. P< 0.05 was considered statistically significant. C-reactive protein levels were significantly higher in exacerbated COPD (26.8± 2.3mg/l) than stable COPD (3.9± 1.4mg/l).

**CONCLUSION:** C-reactive protein blood levels may be a useful biomarker in the management of exacerbations appearing in patients with severe disease.

**Keywords:** stable copd, acute exacerbation copd, C-reactive protein

**FPP-RS-49**

**Comparison of Pulmonary Function Tests among the Athletic and Sedentary Individuals among 1st Year Mbbs Students.**

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**Background:** In the era of computers and internet, most of the young individuals are not involved in regular exercises but restricted to computer games and social media. This study was conducted to determine whether this lack of physical activity had any effects on pulmonary function tests.

**Objectives:** Comparison of pulmonary function tests among the athletic and sedentary individuals among 1st year MBBS students.

**Material and method:** The study included 50 subjects of both sexes of whom 25 were involved in regular and moderate level exercise in various sports (Athlete group) and 25 subjects were not involved in any sports and did not have regular exercise (sedentary group). The parameters...
used as determinants of lung functions were inspiratory reserve volume(IRV), inspiratory capacity(IC), forced vital capacity(FVC), forced expiratory volume in first second(FEV1), vital capacity(VC), maximum voluntary ventilation(MVV) and vital index(VI). All parameters were recorded as per standard procedure using ndd medzetnik USB spiroyser.

**Results:** The study showed that the athletic group had better pulmonary functions than the sedentary group with a significant difference in VC (p=0.021), FVC (p=0.005), FEV1 (p=0.005), MVV (p=0.0008), VI (p=0.004) among two groups.

**Conclusion:** The study conducted shows the individuals involved in regular exercises have better pulmonary functions than sedentary individuals.

**Key words:** Physical activity, pulmonary function tests.

FPP-RS-50

A Study of the Use of Forced Oscillation Technique in the Evaluation of COPD Patients: Analysis of Different Parameters and Utility Compared with Spirometry

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**Background:** The ability to objectively measure lung function in COPD patients is critical in the assessment and treatment of COPD. We thus determined the effectiveness of Forced Oscillation Technique (FOT) as a non-invasive technique to assess lung function in COPD patients and in comparison to Spirometry for sensitivity and specificity.

**Objectives:** The study was to undertake to (1) evaluate the clinical potential of the FOT Technique in early detection of respiratory changes in COPD patients, (2) to compare the sensitivity and specificity of FOT and spirometric data and (3) to check the reproducibility of FOT.

**Material and Methods:** A total of 80 individuals were analyzed: 40 healthy and 40 suffering from COPD. The clinical usefulness of the parameters was evaluated by investigating the sensitivity, specificity and the area under the receiver operating characteristic curve.

**Results:** Average FOT of COPD and Control group was 199.93 ± 75.01 and 70.75 ± 44.41 respectively whereas mean FEV1 (%) of COPD and Control group was 55.29 ± 19.42 and 92.11 ± 11.17 respectively. We found significant higher specificity associated with FOT than Spirometry with consistent reproducibility. FOT showed 97.5% specificity. The results of this study revealed that FOT is useful tool for detecting pulmonary function in obstructive conditions.

**Conclusion:** The results of the present study provide substantial evidence that the forced oscillation technique can contribute to the easy identification of initial respiratory changes that are not detectable by spirometric parameters in COPD patients. FEV1% and FEV/FVC was found higher in healthy subjects. FOT value was more in COPD patients. The diagnostic method is intended for use as a diagnostic tool and not as a screening technique.

**Key words:** Forced Oscillation technique, Spirometry, Sensitivity, Specificity, PFT, FEV1
**FPP-RS-51**

A Comparative Study of Airway Resistance, Conductance and Residual Volume in First Year MBBS Day Scholars and Hostelites from Rural Areas of Bangalore Medical College and Research Institute.

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**Background:** Literature states that exposure to automobile pollution is a proposed marker for future development of acute or chronic respiratory disease. Hence the current study was undertaken with a view to investigate the effect of automobile pollution on pulmonary function parameters of First year MBBS day scholars.

**Objectives:**

1. To record airway resistance, conductance and residual volume in day scholars and hostelites from rural areas (population <20,000) of First year MBBS.
2. To test the hypothesis that there is decline in parameters in First year MBBS day scholars due to long term exposure to air pollutants after comparing 2 groups.

**Materials And Methods:** 100 Firstyear MBBS students were divided into Group A: 50 healthy day scholars of First year MBBS residing in Bangalore for ≥5yrs. Group B: 50 healthy hostelites of First year MBBS from rural areas (population <20,000). Pulmonary function test was carried out, parameters like FEV₁, FVC, FEV₁/FVC, PEFR, FEF₂₅-₇₅ were measured using MEC PFT and airway resistance (RAW) and specific airway conductance were measured using body plethysmograph in both the groups.

**Results:** There was significant decrement in pulmonary function parameters like FEV₁, FEV₁/FVC, PEFR, FEF₂₅-₇₅ (p value < 0.001) and significant increase in airway resistance in First year MBBS day scholars when compared with hostelites counterparts.

**Conclusion:** Results of our study showed that obstructive type of pulmonary abnormality is observed in First year MBBS day scholars exposed to automobile pollution for longer duration.

**Key Words:** Airway resistance; Automobile exhaust; Automobile pollution; Flow parameters; Specific airway conductance; Particulate Matter

**FPP-RS-52**

A Study of Peak Expiratory Flow Rate among Sports Persons and Normal Healthy Adult Population

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Department of Physiology, Sri Venkateshwara Medical College Hospital and Research Centre, Pondicherry.

**Background:** Physical activity is known to improve physical fitness and to reduce the incidence of Obesity, Hypertension, Diabetes and other non-communicable diseases. Regular exercise as in athletes produces a positive effect on the lung function by increasing vital capacity and make them more fit than non-athletes.

**Objectives:** To study the PEFR among sports persons and normal healthy adult population and their relationship with anthropometric and cardiovascular parameters.
Materials and method: 140 subjects comprising of 70 sports person and 70 normal healthy adult population were taken as the study population. PEFR was measured using Mini Wright’s peak flow meter. Height, weight, BMI, RHR, SBP, DBP and RPP were recorded.

Results: Unpaired t test is used to find out the differences between two groups. Our study shows that PEFR is higher(p<0.001) and RHR(p<0.0001), SBP(p<0.0001), DBP(p<0.0001), BMI(p=0.008) are found to be lower in sports person which are statistically significant when compared to the normal population but RPP is lower which is not statistically significant.

Conclusion: The study indicates that PEFR is higher and RHR, SBP, DBP, BMI and RPP is lower in sports person when compared to control group and suggests that regular exercise produces a positive effect on the lung function by increasing the pulmonary capacities and also improves cardiovascular functions by decreasing sympathetic activity or by increasing vagal tone. This emphasizes the need to change our lifestyle and adopt measures like exercises to improve our wellbeing.

Keywords: Athletes, Exercise, lung function, PEFR

FPP-RS-53

Evaluation of Pulmonary Function Test in Diabetes Mellitus Type2

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Back Ground: There is an alarming increase in the incidence and prevalence of diabetes mellitus in Asian Indians. It is estimated that 20 per cent of total diabetic patients are in China and India. The important changes occurring in diabetes mellitus are reduced elastic recoil, reduced lung volume, diminished respiratory muscle performance.

Aims And Objectives:
1. The co-relation of the HbA1c with PFTs in DMT2 patients.
2. The co-relation of the duration of the disease with PFTs in DMT2 patients.
3. The co-relation of the HbA1c and duration of the disease together with PFTs in DMT2 patients.

Material And Method:
The subjects divided into 2 groups – Group A: 50 subjects were apparently healthy attending the OPD, having history of DMT2
Group B: 50 Normal control individual having no DMT2

Result:
Respiratory parameters in cases and controls

<table>
<thead>
<tr>
<th>PARA METERS</th>
<th>CONTROL^ (n=50)</th>
<th>CASES^ (n=50)</th>
<th>T value</th>
<th>p-value</th>
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</thead>
<tbody>
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<td>HbA1c</td>
<td>5.16±0.46</td>
<td>10.03±1.10</td>
<td>-2.949</td>
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</tr>
<tr>
<td>FVC</td>
<td>90.51±14.3</td>
<td>83.36±17.5</td>
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<tr>
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<tr>
<td>FEV_1/FVC</td>
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<td>105.54±28.9</td>
<td>-2.80</td>
<td>0.006*</td>
</tr>
<tr>
<td>PEFR</td>
<td>85.12±17.4</td>
<td>64.24±19.4</td>
<td>5.60</td>
<td>0.000</td>
</tr>
</tbody>
</table>

* p<0.05

Correlation between FEV_1/FVC & blood sugar level in Case subjects

<table>
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<tr>
<th>SUGAR (mg/dl)</th>
<th>FEV_1/FVC</th>
<th>TOTAL</th>
<th>Correlation coefficient (r)</th>
</tr>
</thead>
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<tr>
<td>&lt; 200</td>
<td>0</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>≥ 200</td>
<td>1</td>
<td>8</td>
<td>23</td>
</tr>
</tbody>
</table>

* significant

Conclusion: All the respiratory parameters are lesser in subjects with diabetes than non-diabetics, Statistically significant negative correlation exist between FVC, FEV_1 (P<0.05) & PEFR (P<0.000) and blood sugar level in cases subjects.

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FPP-RS-54

To Establish Relationship between Duration of Exposure to Vehicular Pollution and “Lung Age”, Among B.R.T.S. Traffic Wardens of Indore City

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Background: Air pollution due to vehicular emission impairs lung function in people exposed to it for long duration. This impairment leads to discrepancy between chronological and actual lung age. Effect of prolonged exposure to vehicular exhaust on lung age needs to be studied.

Objective: This study aims to establish relationship between length of exposure to vehicular pollution on “lung age” of BRTS wardens of Indore city.

Materials And Methods: 87 adult males aged between 18-50 years, working as BRTS wardens, and 87 controls matched for same parameters are, assessed for their lung age through lung function measurement by computerized spirometer RMS Helios 401.

Result: Lung age increases significantly among the cases who are exposed to vehicular pollution for long duration (in years and in hours), compared to controls.

Conclusion: Prolonged exposure to vehicular pollution cause early lung ageing.

Keywords: Vehicular Emission, Lung age, BRTS wardens

CARDIOVASCULAR PHYSIOLOGY

FPP-CVS-55

Physiological, Noninvasive Intervention of Periodic, Short Term Elevation of Legs Benefits The Cases of Varicose Veins.

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Dr. D Y Patil Medical College, Hospital & Research Centre, Pimpri, Pune

Background: Varicose veins occur in 10 to 25 percent adults in India. Cosmesis, varicose ulcers & and occasional complication of deep vein thrombosis are major concerns. Treatment available is compression stockings & surgery.

Objectives: This study aimed to examine the effects of assisting venous drainage by periodic elevation of legs in cases of varicose veins.

Material and methods: Old adults (70 ± 10 years) with varicose veins, clinical score C4 in CEAP classification (test group) and age, sex matched old adults (control group) free of varicose veins were taught and advised to elevate legs for five minutes thrice a day for six weeks & benefits were recorded.

Results: Elevating legs induced subjective relief of symptoms, decrease in density of telangiectasia, relief of skin changes and reversal of pedal edema.

Conclusion: These findings suggest that the simple physiological, noninvasive intervention of assisting venous drainage by periodic short term elevation of legs is helpful symptomatically and is also likely to prevent varicose ulcers by relieving pedal edema.

Keywords: Varicose vein, CEAP classification, Leg elevation, Physiological intervention, Pedal edema, varicose ulcer.
Comparison of Low Flow Mediated Constriction (LFMC) of Radial Artery between Dominant and Non-Dominant Arms of Healthy Human Adults

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Background: LFMC has been used to assess resting endothelial function in peripheral conduit arteries. However, comparison of LFMC has not been done previously between arteries of dominant and non-dominant arm.

Objective: To measure and compare percentage LFMC of radial artery between dominant and non-dominant arms of healthy human adults.

Material & Methods/Procedure: 10 healthy young adults of age range (18-27) participated in the study. Edinburgh inventory was used to identify the dominant arm. Radial artery was imaged by ultrasonography 10 cms proximal to the wrist joint using a high resolution linear array probe. Distal circulatory arrest was produced using an occluding cuff placed over the wrist joint inflated to 250 mm Hg for 5 minutes after the baseline measurements were done. Diameter and velocity measurements were performed using B mode and Pulsed wave Doppler modes respectively at baseline and 30 seconds before the release of occlusion. Percentage change in radial artery diameter during occlusion was also corrected for the accompanying shear rate changes.

Results: Significant reduction in radial artery diameter was observed in response to distal circulatory arrest in both dominant (0.23 ± 0.04 mm at baseline vs 0.20 ± 0.05 mm during occlusion; p = 0.008) and non-dominant (0.23 ± 0.05 mm vs 0.19 ± 0.05 mm; p < 0.0001). Radial artery of dominant arm showed a statistically insignificant trend of higher %LFMC corrected for shear rate in comparison to non-dominant arm [0.47 (0.13 – 2.22) vs 0.45 (0.28 – 1.05)].

Conclusion: Radial arteries of both dominant and non-dominant arms show LFMC in healthy human adults.

Keywords: Low Flow Mediated Constriction, shear rate, endothelial function, radial artery, ultrasonography

Comparison of Cardiovascular Responses to Valsalva Maneuver and Lower Body Negative Pressure in Healthy Subjects

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Background: Valsalva maneuver (VM) and Lower Body Negative Pressure (LBNP) are used for autonomic assessment. Preload reduction is the common underlying mechanism to both maneuvers. We compared cardiovascular responses to VM and LBNP in healthy subjects.

Material and Methods: Twenty two healthy males (age = 26 ±6.29 years) participated in the study. Continuous beat-to-beat blood pressure and Lead II ECG were recorded throughout the study. Both VM and LBNP were performed in supine position for 15 seconds at 40mm Hg and -40 mm Hg respectively. Supine rest of 5 minutes was given between maneuvers. The difference between maximum SBP
post maneuver and minimum SBP during maneuver and maximum heart rate during maneuver and minimum heart rate post maneuver were calculated as Delta SBP and Delta HR respectively. Valsalva ratio (VR) and Negative Pressure ratio (NPR) were calculated as described previously. Unpaired t test was used for statistical comparison.

Results: Delta SBP was significantly higher in VM than LBNP (56.5 ±30.67 versus 29.19 ±10.86 mm Hg, \( p = 0.002 \)). Delta HR was significantly higher in VM than LBNP (40.8 ±16.62 versus 12.94 ±11.63 beats per min, \( p < 0.0001 \)). VR was significantly higher than NPR (1.73 ±0.36 versus 1.3 ±0.19, \( p = 0.001 \)). Seven subjects did not show a fall in SBP on LBNP while all showed a typical response to VM.

Conclusion: VM entails higher engagement of the autonomic system as compared to LBNP as evident by our data. The active effort underlying VM along with engagement of stretch receptors may be responsible for the observations. Further investigation into this aspect may provide information about operant mechanisms.

Keywords: Valsalva maneuver, Lower body negative pressure, Valsalva Ratio

FPP-CVS-58

Short-Term Effects of Isotonic Handgrip Exercise on Blood Pressure in Normalweight and Pre-Obese Young Adolescents


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Background: The adverse health consequences of overweight and obesity in India leads to higher prevalence of diabetes mellitus and cardiovascular diseases. Also the compliance of people for routine form of exercise for BP control has not been very encouraging due to time, place etc constrains.

Aim: Therefore we conducted a non-randomised clinical study to determine the short-term effects of isotonic handgrip exercise by using smiley balls on blood pressure in healthy normal weight and overweight adolescents with the objective to find a user friendly exercise which help in reducing blood pressure.

Method: A non-randomized clinical study was conducted on 100 young normal weight and pre-obese adults (50 Boys and 50 Girls) in the age group of 18–25 years. Isotonic handgrip exercise was performed at the rate 20 contractions/minute (2 sec contraction/1 sec relaxation) at maximal intensity for 10 minutes using *smiley ball*. Pulse rate and blood pressure parameters were tested at baseline and immediately after exercise in post-exercise recovery period.

Result: Statistically significant difference was observed in systolic blood pressure and mean arterial pressure in both pre-obese boys and girls groups while mean arterial pressure in normal weight girls after exercise.

Conclusion: We conclude that the exercise regime under consideration can produce some short-term beneficial effects with respect to blood pressure in especially pre-obese group of adults.

Key Words: Isotonic Handgrip Exercise, Normal weight and pre-obese adults, Blood Pressure
FPP-CVS-59

Correlation of Stress and Blood Pressure (BP) Levels in Medical Students

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Background: Hypertension is a global problem which can lead to cardiovascular and cerebrovascular complications. Medical education can impose significant psychological stress on undergraduates. Considerable degree of psychological morbidity has been reported among medical students ranging from stress, interpersonal problems and suicidal ideation to psychiatric disorders and they tend to have greater psychological distress than general population. Stress is one of the factors known to cause variation in BP. Maintaining normal BP is essential for well being of an individual.

Objective: To find out the correlation between stress domains and BP levels.

Material and Method: BP was recorded using Sphygmomanometer, in the sitting posture after 5 minutes of rest (n=92). Three readings were taken and the average was considered. The Medical Student Stressor Questionnaire (MSSQ) is a validated instrument used to identify sources of stress in medical students. The items in MSSQ represent 20 possible sources of stress in medical students identified from the literature grouped into six main domains: Academic Related Stressor (ARS), Intrapersonal and Interpersonal Related Stressor (IRS), Teaching and Learning Related Stressor (TLRS), Social Related Stressor (SRS), Drive and Desire Related Stressor (DRS), and Group Activities Related Stressor (GARS).

Data collected was analyzed using SPSS version 23. Pearson correlation was done to find the correlation between stress domains and BP levels.

Results: There was a significant correlation between Diastolic Blood Pressure (DBP), ARS and GARS (p < 0.05)

Conclusions: Among the six domains of MSSQ, ARS and GARS have shown significant correlation with DBP, same has to be addressed in medical education for the wellbeing of medical students.

Keywords: MSSQ, Stress, BP

FPP-CVS-60

Temporal Relationship between Cerebral Blood Flow Velocity and Arterial Blood Pressure during Spontaneous and Induced Oscillations in Arterial Blood Pressure.

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Background: Spontaneous and induced oscillations in arterial blood pressure (ABP) are used to study dynamic cerebral autoregulation. However, temporal relationship between middle cerebral artery blood flow velocity (mCBFV) and ABP have been scarcely studied.

Objective: To investigate the temporal relationship between middle cerebral artery blood flow velocity (mCBFV) and ABP.

Material and Methods: Fourteen healthy subjects (age 28 ± 4 years) underwent recording of mCBFV by transcranial
Doppler (TCD) and non-invasive continuous blood pressure (Portapres) during supine restand during oscillatory lower body negative pressure (OLBNP) at six different frequencies (0.03Hz, 0.05Hz, 0.07Hz, 0.1Hz, 0.16Hz and 0.25Hz). Temporal relationship between mean mCBFV and mean ABP was analyzed by transfer function analysis for time lags between two signals (at rest and OLBNP) at each frequency.

**Results:** The time lag between mCBFV and ABP at 0.03Hz, 0.05Hz, 0.07Hz, 0.1Hz, 0.16Hz and 0.25Hz during spontaneous oscillations in ABP (at rest) was (mean ± SD) -4.63± 4.01, -3.26 ± 1.86, -2.47±1.12, -1.64±0.62, -0.66±0.23, and -0.22±0.18sec respectively and during induced ABP oscillations was 4.32±5.37, -2.09±1.39, -2.11±1.398, -1.56±1.44, -0.73±0.21 and -0.20±0.21sec respectively. There was significant reduction in the time lag between mCBFV and ABP at higher frequencies (0.16Hz and 0.25Hz) compared to lower frequencies (0.03Hz, 0.05Hz and 0.07Hz) during both spontaneous and induced ABP fluctuations. Further no significant difference was observed between spontaneous and induced oscillations.

**Conclusion:** The results suggest that changes in mCBFV fluctuations precede those in ABP. This appears to be the result of a feed-forward mechanism from central autonomic network. Additionally, the decreasing lag at higher oscillations in blood pressure might be useful to determine the cerebrovascular insults. The feed forward adjustment of cerebrovascular resistance appears a safety mechanism in the face of fast changing blood pressure.

**Key words:** Cerebral blood flow velocity, arterial blood pressure, Lower body negative pressure

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**FPP-CVS-61**

**Comparison of Intraabdominal Fat Thickness and Serum Lipid profile in Hypertensives with Normotensives**

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**Back Ground:** Arterial Blood pressure is one of the vital sign which is an important predictor of health. It is a marker for hypertension, which is a major risk factor for many vascular diseases. Hypertension is defined as elevated BP, that is a pressure that exceeds an arbitrarily set level of normalcy. Obesity has become an alarming health problem because it accelerates atherosclerosis leading to increased mortality. Central obesity has been shown to be a important predictor for metabolic disturbances including hyperinsulinemia, dyslipidemia, hypertension and cardiovascular diseases.

**Objectives:** This study aims to compare the intra-abdominal fat thickness and lipid profile of hypertensive and normotensive individuals.

**Materials and Methods/Procedure:** This is a cross sectional study has been conducted in CMCH&RC with approval from IRB and patients consent. It include sample size of 45 hypertensive patients and control group of normotensive individuals (men and women were included with mean age group of 40. Mean BMI of 30 were included. Blood pressure, fasting lipid profile by standard enzymatic method and Intra-abdominal fat thickness like SAT and VAT measured using Ultrasound technique for both study and control group. The parameters of lipid profile like serum total cholesterol, HDL, LDL, VLDL and serum Triglyceride and Intra-abdominal fat thickness were
comparing between Hypertensives and normotensives.

**Results:** Independent t tests using SPSS latest version showed that both abdominal fat thickness and lipid profile values showed significant difference (<.0001) between hypertensives and normotensives.

**Conclusions:** Abdominal fat thickness and lipid profile can be early markers of Hypertension.

**Keywords:** Hypertension, Intra-abdominal fat thickness, Lipid profile.

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**FPP-CVS-62**

**Association of Prehypertension with Stress and Anxiety among Medical Students.**

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**Background:** Wide prevalence of prehypertension among medical students is gaining lot of attention. It is considered as one of the attributive factors for stress and anxiety. The task of identifying such vulnerable students and giving them sufficient support is a major responsibility of a medical teacher.

**Objectives:** The objective of the study was to assess the prevalence of prehypertension among first year medical students and to know the association of stress and anxiety to prehypertension.

**Materials and Methods:** Blood pressure was recorded from all student participants along with details of family history of hypertension and diabetes. Students were given questionnaires for stress (Cohens stress scale) and anxiety (GAD-7).

Statistical analysis was done using SPSS software.

**Results:** Wide prevalence of stress and anxiety was found with female students being more prone to stress. (p=0.017). 11% of students had measured blood pressure in pre hypertensive range, but no significant association was seen between prehypertension and prevalence of stress and anxiety (p= 0.463). Analysis show that family history of parents having either diabetes or hypertension also did not have any association (p =0.284) with stress and anxiety of children.

**Conclusion:** Results show that females are more prone for stress and anxiety. Factors that induce stress are not related significantly to either prehypertension or family history. Proper counseling should be done to assess the factors that induce stress and anxiety and remedial measures be taken.

**Key Words:** Prehypertension, blood pressure, stress, anxiety

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**FPP-CVS-63**

**Long Term Effect of Angiotensin Converting Enzyme Inhibitor on Vascular and Endothelial Function in Type 2 Diabetes with Newly Diagnosed Hypertension**

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**Background:** Diabetes is associated with increased risk of cardiovascular diseases and this risk is augmented with concurrent hypertension. Vascular endothelial dysfunction is known to be associated with diabetes and hypertension. Angiotensin Converting Enzyme (ACE) inhibitors are
commonly used as first line therapy for the treatment of hypertension and shown to have effects on cardiovascular mortality.

**Objective:** To study the long-term effect of ACE inhibitor on vascular and endothelial function in type 2 diabetes with newly diagnosed hypertension.

**Material and Methods:** Sixty-five diabetic patients with newly diagnosed hypertension (mean age 48 ± 6.5 years) were recruited for the study. Arterial stiffness was assessed using Augmentation index (AIx@75) and Pulse Wave Velocity (PWV) [carotid-radial (cr), carotid-distal (cd) and carotid-femoral (cf)] by applanation tonometry using Sphygmocor®. Endothelial function was assessed by flow mediated dilatation (FMD) using vascular ultrasound. All recordings were done at baseline and after 3 Months of ACE inhibition.

**Results:** There is a significant reduction in both systolic and diastolic blood pressure after ACE inhibition (p<0.0001). AIx@75 was significantly lower at 3 months as compared to baseline (25.7 ±10 Vs 21.2 ± 8.9 %, p= 0.0004). cr and cf PWV decreased significantly [8.7 (8-10) Vs 8.1 (7.1-9.2) m/s, p=0.002 and 11.4 (9-19.9) Vs 9.3 (8.4-11.6)m/s (p=0.01), respectively] after 3 months of ACE inhibitor treatment. cd PWV also reduced from baseline to 3 months (10 ± 1.1Vs 9.1 ± 1.2 m/s, p<0.0001). Additionally, FMD increased significantly at 3 months of ACE inhibition as compared to baseline (6.1±3.2 Vs 9.8±3.2 %, p<0.0001).

**Conclusion:** ACE inhibition improves both structural and functional property of peripheral and central vessels in diabetic patients with newly diagnosed hypertension. This could be because of the vasorelaxation and vascular remodeling induced by ACE inhibitors.

**Key Words:** Diabetes, Hypertension, ACE inhibitor, Arterial stiffness, Flow Mediated Dilatation, Pulse Wave Velocity.

**FPP-CVS-64**

**Heart Rate Variability in MI Patients: Comparison of Single and Multivessel Disease**

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**Background:** Heart rate variability (HRV) is an independent non-invasive marker of autonomic control of heart. Lower HRV predicts mortality in patients with Myocardial Infarction (MI). Multi-vessel involvement represents a more serious facet of MI, having a higher mortality than that of single-vessel disease. There is limitation of information on the relationship between the two.

**Objective:** The aim of the present study was to evaluate the relationship between HRV indices and severity of coronary artery vessel involvement in MI patients from the ongoing Yoga CaRe trial.

**Material and methods:** Patients with MI were grouped into those with single vessel disease (n=43, age = 49.33 ± 9.84) and multi-vessel disease (n=27, age = 51.15 ± 9.01). HRV was measured in all participants with lead II ECG signals recorded using standard techniques with the participant supine. LF power, HF power and total power were calculated by using frequency-domain analysis of HRV. SDNN, SDSD, RMSSD, NN50 and pNN50 were calculated using time domain analysis of HRV. All recordings were done in the Autonomic & Vascular function lab,
**Department of Physiology at AIIMS, New Delhi at 3rd week post MI.**

**Results:** Compared to multi-vessel disease patients, patients with single vessel disease have significantly higher parasympathetic activity as seen by higher SDD (39.42±34.33 vs 25.11±20.52), pNN50 (7.25±9.72 vs 3.10±5.59), HF power (766.5±1243 vs 295.4±432.1), total power (2336±2228 vs 1140±1164) and higher sympathetic activity as seen by higher LF power (633±737.7 vs 322.2±366.2). However, Single vessel disease group also have significantly lower LF/HF ratio (1.60±1.68 vs 2.63±2.34) as compared to multi-vessel disease group.

**Conclusion:** The differential pattern of HRV patterns following acute myocardial infarction in patients with single and multi-vessel disease involvement exists. This needs to be further correlated with other autonomic function measures and neural pathways of autonomic nervous system. This will help to identify the subtler neural mechanisms involved in the coronary artery disease progression.

**Keywords:** Heart rate variability, Myocardial Infarction, single vessel disease, multi-vessel disease

**FPP-CVS-65**

**Comparative Study of Electrocardiographic Parameters among Tobacco Smokers and Tobacco Chewers**

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**Background:** Tobacco smoking is the single most cause of the preventable death globally. Nicotine and other components of cigarette can produce profound changes in the heart, which can be assessed by doing electrocardiogram (ECG).

**Objectives:** To compare the ECG parameters among tobacco chewers, tobacco smokers and non-smokers.

**Material and methods:** One hundred fifty healthy male volunteers who were the age group of 18-25 years from outpatient department were included for the study. The subjects were divided into group 1 (control, n=50), group 2 (tobacco smokers, n=50) and group 3 (tobacco chewers, n=50).

Subjects were asked to abstain tobacco and beverages consumption 2 hours prior to recording ECG. The subject’s vital: blood pressure and ECG parameter: heart rate, QT interval, QTc (corrected QT interval) were recorded in physiology lab of Nobel Medical College & Teaching Hospital. The data analysis was done by independent student “t” test.

**Results:** The data analysis showed significant increase in blood pressure on comparison of group 1 with group 2 (p=0.001) and group 3 (p=0.001) respectively. The data analysis of ECG parameters also showed decrease in QT and QTc (corrected QT) comparing group 1 with group 2 (p=0.001) and group 3 (p=0.001) separately which was highly significant. There was significantly increase in heart rate on comparison of group 1 with group 2 and group 3.

**Conclusion:** The study concluded that consumption of either smoked or chewed form of tobacco affects cardiovascular system.
**Keywords:** Electrocardiogram, Abstain, Blood pressure, QTc

**FPP-CVS-66**

**Prevalence of Obesity & Hypertension in School Going Children in Urban Area.**

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**Introduction:** Increased arterial blood pressure is a major risk factor for cardiovascular, cerebrovascular & renal disease with obesity. Prevalence of hypertension in children has shown rising trend ranging between <1% to 16.2% in different studies.

**Objectives:**

1. To find prevalence of hypertension among school going children in the age range of 13-15 Yrs.
2. To study obesity & its correlation with hypertension

**Methodology:** Measurement of BP was with mercury sphygmomanometer in urban schools. Systolic blood pressure & Diastolic blood pressure above 95<sup>th</sup> percentile for the age, sex & height was taken as hypertension, between 90<sup>th</sup> and 95<sup>th</sup> percentile is high normal. BMI>95<sup>th</sup> percentile of age & sex taken as obese, .85<sup>th</sup> -95<sup>th</sup> percentile taken as overweight & less than 85<sup>th</sup> percentile as normal.

**Results:** Among 248 students 138 were girls &110 were boys. Hypertensive were 4.1 %. Obese were 1.8%. Average systolic BP was 115.7 mmHg, average diastolic BP was 82 mmHg, average mean BP was 93.2 mmHg and average BMI was 21.

**Conclusion:** Prevalence of hypertension is 4.1% & obesity among students was 1.8%.

Obesity was significantly associated with hypertension among students in urban schools.

**FPP-CVS-67**

**Measuring Postural Changes in Blood Pressure Associated with Ageing**

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**Objectives:** To estimate the prevalence and symptom characteristics of orthostatic hypotension in apparently healthy people aged 60 years and above

**Design:** Cross-sectional prospective study

**Setting:** Residential population near Nellimarla, Vizianagaram District of Andhra.

**Participants:** The study group comprised of non-hypertensive, non-diabetic healthy elderly individuals of age 60 years and above (n=60, mean age 65.4±5.7) and another group, healthy aged 30 to 59 years age (n=60, mean age 37.4±6.6).

**Results:** Orthostatic hypotension was defined as 20 mm Hg or greater decrease in systolic blood pressure (SBP) and/or 10 mm Hg or greater decrease in diastolic blood pressure (DBP) within 3 minutes of standing from supine position. Two groups as OH positive group and OH negative group were made of the available subjects. 7 out of 60 (11.7%) among the elderly group reported OH, at either 0 or 3 minutes after standing. Symptoms were independent of OH recorded. BMI was noted as 67% well nourished; 5% under-nourished and 19% overweight, based on nutrition status.
Conclusions: Elderly population had orthostatic hypotension as a common finding. Symptoms do not correlate with the physical recording of OH by mercury sphygmomanometer. The results indicate underlying disease process and usage of medications are major causes for orthostatic hypotension in the elderly and middle aged groups.

Keywords: Blood pressure, postural hypotension, orthostasis, elderly, young adults, symptoms.

FPP-CVS-68

Study of Electrocardiographic Changes in Patients of Diabetic Nephropathy of Type 2 Diabetes Mellitus with Background Hypertension.

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Background: Type 2 Diabetes patients with diabetic nephropathy and background hypertension have excessive cardiovascular mortality. It is important to know the electrocardiographic changes occurring in patients of Diabetic nephropathy especially of Type 2 Diabetes mellitus.

Objectives: This study aims to study the prevalence of cardiovascular ailments in Type 2 Diabetes patients with nephropathy and background hypertension and to help clinicians with screening, diagnosis and timely decision making and also in future and ongoing research.

Materials and Methods: A resting standard 12 lead ECG was done and data collected over 100 patients attending outpatient and inpatient services in RIMS, Ranchi. The study was approved by the ethical committee of the institute.

Results:

1. In the study conducted over 100 patients with diabetic nephropathy and background hypertension in Type 2 Diabetes, 74% showed ECG changes.
2. Amongst these most common was LAD(37%), followed by Strain pattern(21%), Old MI(12%) and Blocks(4%). 9% showed QTc prolongation which overlapped with the above findings.
3. 26% showed normal ECG tracings.

Conclusion: These findings suggest that cardiac assessment is must for evaluation of patients with Diabetic nephropathy in Type 2 Diabetes mellitus.

Keywords: Electrocardiography, Diabetic nephropathy, Type 2 Diabetes, Background hypertension.

FPP-CVS-69

Study of Some Cardiovascular Risk Factors among Tribal and Non-Tribal Population of 1st Year Students of Rims, Jharkhand

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Background: The study of the risk factors for cardiovascular diseases have always been a fascinating topic for researches. The fascination may be attributed to the incidence of the diseases among affluent populations. Some of the preventable factors have been recognized and established with only occasional note of dissent from some workers.

Objectives: To evaluate the prevalence of some cardiovascular risk factors including different anthropometric parameters,
serum lipid profile and random blood sugar among tribal and non-tribal population of 1st year students of RIMS, Jharkhand.

Materials and methods: 101 students were randomly selected and recruited. Anthropometric measurements i.e. Height (Ht), Weight (Wt), Waist circumference (Wc) and Hip Circumference (Hc) were taken. Body mass index (BMI) and Waist-Hip ratio (WHR) was calculated. Fasting blood sugar and Fasting lipid were estimated.

Results: 65.57% female students have HDL value lower than 40mg/dl which is statistically significant (p<.001). Prehypertension is significantly higher in male students. More than 20% of both male and female students have WHR above the WHO cutoff points in which tribal male students (50%) have the highest risk.

Conclusion: Prehypertension is more common in males though females have lower protective HDL cholesterol level. Both male and female students have deranged WC and WHR in which the risk of cardiovascular/metabolic complication is high.

Keywords: Cardiovascular risk, medical students, tribal, lipid profile, anthropometric measurement

FPP-CVS-70

Role of Gender on Cardiovascular Reactivity to Mental Stress

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Background: Magnitude of cardiovascular reactivity to mental stress has been positively linked to various disorders of heart and vasculature. Sex hormones have been implicated to have an impact on the cardiovascular system.

Objectives: This study aimed to study the reactivity pattern of cardiovascular parameters to mental stress in males and females.

Material and methods: 42 males and 35 females in the age group of 18-25, satisfying the inclusion and exclusion criteria formed the study group. Blood pressure and heart rate recordings were obtained from the subjects under two different settings i.e. Basal and during mental stress test (MST) task. The results were subjected to statistical analysis using unpaired t test, with significance at P < 0.05.

Results: Resting Systolic blood pressure (SBP) was significantly higher in males (M = 116.81, F =106.06 mm of Hg), whereas heart rate was significantly higher in females (M = 77.77, F = 92.62 bpm) and Diastolic blood pressure (DBP) being similar (M = 68.97, F = 69.14 mm of Hg). MST produced increases in SBP, DBP and heart rate in both the sexes, but the quantum of increase in these parameters (i.e. Stress values – resting values) were not statistically different between the groups.

Conclusion: Gender differences were noted in resting cardiovascular parameters, but their response to mental stress were similar.

Keywords: Stress reactivity, Blood pressure, Heart rate, Gender
FPP-CVS-71

Prehypertension among Medical Students and Its Correlation with BMI.

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Introduction: Hypertension is an iceberg disease with high morbidity and mortality and is a silent threat to the health of the people both in developed and developing countries. The root cause of hypertension may present since childhood. Excess adiposity is the single most powerful risk factor for higher BP and contributes to more than half of the risk for developing hypertension. Hence early detection and intervention may prevent long term co-morbidities

Aim and Objectives:

1. To find prevalence of prehypertension in medical students.

2. To find correlation of prehypertension with the BMI.

Materials and Methods: A total of 208 medical students were selected randomly for this study. Mercury sphygmomanometer was used to measure BP, Stadiometer for height & Excell Simplified Digital weighing machine for weight. Data was analyzed by SPSS ver. 23. P < 0.05 was considered statistically significant.

Results: Out of 208 students, 96 were male and 112 were female. Overall, the prevalence of prehypertension was 50.96% out of which males contribute (56.25%) and females (46.43%). We have also found a significant correlation between BMI and raised BP.

Conclusion: The prevalence of prehypertension among the medical students of Indira Gandhi Medical College and Hospital is 50.96%(male>female) & there is a significant correlation between BMI and raised BP. Hence early detection and intervention may prevent long term co-morbidities

Keyword: Medical student, prehypertension, BP.

FPP-CVS-72

Cardiovascular Response to Transient Hypotension Induced By Thigh Cuff Maneuver

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Background: Transient hypotension activates the cardiovascular autonomic response to maintain equilibrium. Various reactivity tests are employed to artificially create hypotension and assess the integrity of the autonomic response of cardiovascular system like lying to standing and tilt table test. We assessed thigh cuff maneuver as a potent tool to induce transient hypotension.

Objective: To assess cardiovascular response to transient hypotension induced by thigh cuff maneuver.

Material and methods: Beat to beat Non-invasive blood pressure measurement were done in 26 healthy (27.6±2.87 years, BMI 23.82±3.16) subjects. Large size thigh cuff was wrapped around middle portion of the both thighs and inflated to and maintained between 180 – 200 mmHg pressure manually for 3 minutes. Lead II ECG were done to record heart rate
changes during thigh cuff maneuver. 10 seconds’ window were averaged before thigh cuff inflation, immediately before release, after release and 1 minute after release.

Results: No significant changes were seen from baseline (85.5±12 mmHg) to pre-release (85.5±13.3 mmHg) blood pressure even after 3 minutes of thigh cuff inflation. Release of thigh cuff leads to significant (11.8±4.69 mmHg, p<0.0001) drop in blood pressure which was accompanied by significant increase (15.4±8.98, p<0.001) in heart rate. Blood pressure dropped from prerelease to release. Both the parameters could recover within 15 – 20 seconds. There was no significant difference between prerelease and recovery blood pressure.

Conclusion: Thigh cuff maneuver can be used to effectively induce transient hypotension accompanied by baroreflex mediated increase in heart rate. Results were consistent among the subjects and can be used as a standard physiological test to assess autoregulatory processes during cardiovascular autonomic response.

Keywords: Hypotension, Thigh Cuff maneuver, Baroreflex, Cardiovascular autonomic function

EXERCISE PHYSIOLOGY

FPP-Ex.P-73

Impact of Exercise Training on Airway Trachea Indexes (FVC, FEV₁, FEF₂₅₋₇₅) in Relation to Body Mass Index- An Indian Perspective

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Background: Overweight has a considerable impact on spirometry variables, which are improvised by isotonic exercise and diet regime – though the combined effects have not been investigated and precisely proved as yet. We hypothesized that programmed exercise training improves the airway trachea indexes (FVC, FEV₁, FEF₂₅₋₇₅), more so if there is associated weight loss.

Objective: The objective was to evaluate the effect of dynamic exercise and dietary weight-loss program of 12 weeks on the BMI and spirometric variables in OW adolescent boys.

Materials and Methods: In this pilot study 20 OW participants trained on stationary treadmills five times per week for minimum 30 minutes per session at 60-80% of MHR, and all were enrolled into a calorie restriction program with1500 - 1700 kcal /day, that continued for 12 weeks. FVC, FEV₁, FEF₂₅₋₇₅, FEV₁/FVC, FEF₂₅₋₇₅/FVC were measured using computerized spirometer (BPL APREMIS 3.1) and compared with equal number of age and gender matched NW controls who did not participate in any sport or exercise.

Statistical analysis: Descriptive and inferential statistics, collected data were statistically treated using SPSS.

Results: BMI and all pre training baseline parameters except FEF₂₅₋₇₅/FVC revealed very significant difference (P< 0.001) between the two groups. Following 12 weeks of intervention, the experimental group showed improved pulmonary endurance of 16.2% and the pre- (24.85±1.17) and post-training (24.015±1.23) BMI were statistically significant (P = 0.0350).
**Conclusion:** Aligning diet with exercise regimen may serve as a promising tool to reinforce pulmonary compliance, but further studies in larger population are needed to confirm these results.

**Abbreviations used:** FVC – Forced vital capacity, FEV₁ – Forced expiratory volume first second, FEF<sub>25-75</sub> – Forced expiratory flow 25-75%, BMI – Body mass index, OW – Overweight, MHR – Maximum heart rate, NW – Normal weight

**Keywords:** Body Mass Index, Overweight, Exercise, Diet, FVC, FEV₁, FEF<sub>25-75</sub>, Spirometry.

**FPP-Ex.P-74**

**Profile of Muscle Strength and Muscle Endurance in Sportswomen**

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**Background:** Regular exercise helps us to build up the muscular fitness i.e. muscle strength and muscular endurance. The final common determinant of success in athletic event is what muscle can do for the athlete. Various research studies have been conducted exclusively in sportsmen however, very few research studies are available in sportswomen, especially in India. With this background the present study was conducted in sports women who are swimmers and runners.

**Objectives:** To assess and compare handgrip strength (HGS) and handgrip endurance (HGE) in control group, runners and swimmers.

**Material and Methods:** 30 runners, 30 swimmers, and height-weight matched 30 healthy female subjects of same age group were studied. HGS and HGE were measured by using handgrip dynamometer. Parameters were compared among three groups using ANOVA and post hoc Bonferroni’s test.

**Results:** HGS was highly significant in sportswomen than in controls (p<0.001). HGS was significantly higher in swimmers than in runners (p<0.05). HGE was highly significant in swimmers than in controls and runners (p<0.05).

**Conclusion:** Muscles of upper extremity were conditioned more in swimmers than runners. However, overall muscular fitness was better in sportswomen than control group, because of regular exercise and training in sport women. Our study strongly recommends regular physical exercise for the control group females, to improve their muscular fitness which will help them to lead a better quality of life.

**Keywords:** Muscle strength, muscle endurance, swimmers, runners.

**FPP-Ex.P-74**

**Effect of Physical Activity on Blood Pressure, Carotid Pulse and Reaction Time in University Students**

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**Background:** Regular exercise has been an important part of a healthy lifestyle. Researchers have been studying exercise and its differing effects on the human body for several years. It has been reported that exercise is associated with enhancement in cognitive performance in younger as well as elderly population. Regular exercise not only helps in
maintaining weight and physical fitness, it can also improve mental efficiency.

**OBJECTIVE:** The objective of the present study was to observe the effects of regular exercise (4 weeks training) on blood pressure, carotid pulse and reaction time in university students.

**MATERIALS AND METHODS:** A planned exercise protocol was followed for 4 weeks by 25 participants whose age (years) 19.9 ±1.2, height (cm) 165.2 ±7.7 and weight(kg) 63.8 ±15.8. The blood pressure, carotid pulse and reaction time of the participants was taken before and after the end of exercise. Paired t-test was used to interpret the measurements of blood pressure, carotid pulse and reaction time of participants before and after exercise schedule.

**Results:** There was a significant decrease in the post exercise blood pressure and reaction time when compared between the first and the last day of exercise(p>0.005). Carotid pulse also showed a decreasing trend as a result of regular exercise.

**Conclusion:** This finding of the present study indicates that participating in physical training which includes coordination and balance exercise has a positive effect on the mental reaction time in the participants. With decreased reaction time, there is improvement in performance and improvement in efficient execution of work in daily life.

**Keywords:** Exercise, Blood pressure, Carotid pulse, Reaction time

**FPP-Ex.P-76**

**Skeletal Muscle Function and Its Association with Insulin Sensitivity in Type 2 Diabetic Indians**

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**Background:** Skeletal muscle is a major site for insulin dependent glucose disposal and protein synthesis. Insulin resistant states like type 2 diabetes leads to a loss of skeletal muscle function due to impaired protein synthesis, reduced glucose utilization and increased fat deposition in the skeletal muscle.

**Objective:** To compare lower limb skeletal muscle quality in type 2 diabetic Indians with healthy controls using isokinetic dynamometry and find the association with insulin sensitivity.

**Methods:** 20 diabetics and 20 age - matched controls (between ages 18 and 60 years) participated in this study. Isometric, isokinetic and endurance exercise were performed on lower limb using isokinetic dynamometry and peak torque was obtained. FBS and plasma insulin measures were used to determine insulin resistance. All subjects underwent anthropometry from which appendicular lean soft tissue (ASLT) was derived.

**Results:** There was a greater correlation of isometric peak torque with ASLT among controls (r=0.59, p<0.01) when compared to diabetics (r=0.46, p<0.01). Muscle quality and fatigue index were reduced in the diabetic group when compared to controls (p<0.05) even though both groups had similar mean BMI and ASLT. Both groups showed a negative correlation between muscle quality and insulin sensitivity (p<0.05) but the correlation was greater among diabetics.

**Conclusion:** Skeletal muscle function reduces in type 2 diabetics in comparison with healthy subjects of the same age group. Greater the insulin resistance lesser is the muscle quality, independent of BMI and ASLT.

**Key words:** Insulin sensitivity, Skeletal muscle function, Isokinetic dynamometry, Peak torque
REPRODUCTIVE PHYSIOLOGY

FPP-REP-77

Increased 17βhsd1, NotAromatase, Resultsin Estrogenic Phenotypein Secretory Phase EutopicEndometrium ofPatientswith OvarianEndometriosis

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Background: Endometriosis generally considered as an estrogen dependent disorder, but there exist conflicting reports regarding the involvement of steroidogenic enzymes in estrogen synthesis and metabolism in women with ovarian endometriosis.

Objectives: In the present study, we have examined immunopositive levels of steroidogenic enzymes, e.g., aromatase, 17βHSD1 and 17βHSD2 and quantified steroid substrates and products in endometrium of patients with ovarian endometriosis.

Method: Eutopic endometrial tissues were collected during the secretory phase of menstrual cycles from women affected with ovarian endometriosis. Aromatase, 17βHSD1 and 17βHSD2 were localized using immunohistochemistry and quantified using Western immunoblotting. The data were statistically analyzed using Mann-Whitney U Test. The tissue concentrations of steroids, e.g., progesterone, estradiol, estrone and testosterone were estimated using specific ELISA kits. Steroid data were analyzed using unpaired t-test.

Results: We observed a higher (230-fold, p < 0.0001) immunopositive level of 17βHSD1 enzyme and a higher (p < 0.05) estradiol to estrogen ratio, thus indicating an increased synthesis of estrogenic enzymes in endometriosis patients with ovarian endometriosis as compared to the control endometrium. However, aromatase expression was significantly lower (p < 0.0001) in eutopic endometrium obtained from patients with disease-free endometrium. No significant change was seen in 17βHSD2 enzyme. Other steroid substrates, progesterone (p < 0.001) and testosterone (p < 0.005) were found to be high in eutopic endometrium of patients bearing ovarian endometriosis.

Conclusions: Increased level of 17βHSD1 but not aromatase was widely suggested, putatively resulting in higher 17β-estradiol at the cellular level resulting in an estrogenic phenotype in the secretory phase of endometrium of patients bearing ovarian endometriosis.

FPP-REP-78

Eutopic Endometrial Stromal Cells of Patients with Severe Ovarian Endometriosis Exhibits Dysregulated Developmental Potential In-Vitro

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Background: Endometriosis is considered to be a benign estrogen dependent disease. However, epidemiological studies...
indicated that subjects with long standing endometriosis might develop cancer. Furthermore, previous molecular studies indicated of pathological abnormality suggestive of neoplastic potential in the eutopic endometrium of women with endometriosis. The cellular capacity of the eutopic endometrial stromal cells from patients with endometriosis to turn malignant remains unexplored.

**Objective:** The present study aims at examining the functional characteristics of the eutopic endometrial stromal cells during proliferative and secretory phases of menstrual cycles in patients with severe ovarian endometriosis in terms of their proliferative and replicative potential.

**Method:** Eutopic endometrial tissue samples were collected during proliferative and secretory phases of menstrual cycles of women suffering from severe (stage IV) ovarian endometriosis. Control endometrial tissue samples were collected from women without any detectable endometriosis during proliferative and secretory phases of menstrual cycles. The stromal cells from the eutopic endometrial tissue were isolated and cultured. The culture was terminated after 48 h and the cell proliferation rate using 5-bromo-2-deoxyuridine (BrdU) and replicative potential of the cell in terms of telomerase activity using TRAP assay were determined and compared with the control samples.

**Result:** The stromal cells in the endometrium of women with severe ovarian endometriosis showed significantly (P<0.05) increased proliferative and replicative potential as compared to control subjects. Among the cycle phases compared, proliferative phase endometrium of women with endometriosis exhibited significantly (P<0.05) increased proliferative and replicative capacities, while secretory phase endometrium showed higher (P<0.01) proliferative activity in women with endometriosis.

**Conclusion:** The results obtained from the present study suggests that the eutopic endometrium of women with severe ovarian endometriosis has increased proliferative and replicative capacities and thus suggestive of neoplastic potential.

**Key words:** Endometriosis, endometrium, stromal cells, proliferation, replication.

**FPP-REP-79**

**Comparative Study of Coagulation Profile among Normal Pregnant Women and Pre-Eclamptic Women**

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**Background:** Thrombocytopenia is the most common hematological abnormality found in pre-eclampsia and eclampsia. It is a strong indicator of severity of PIH. This indicates that there is an inverse relationship between severity of PIH and platelet count.

**Objectives:** To detect the severity of hypertensive disorders during pregnancy.

**Materials and methods:** Coagulation indices including platelet count, prothrombin time(PT),activated partial thromboplastin time(aPTT) were measured within 24 hrs of admission for 50 women with symptoms of pre-eclampsia and 50 normal pregnant women. The patients with coagulopathies were excluded. Abnormal coagulation indices were compared between the two groups.

**Results:** Yet to be declared

**Conclusion:** Yet to be declared

**Keywords:** Pre-eclampsia, thrombocytopenia, aPTT
FPP-REP-80

Nitric Oxide Level in Seminal Plasma and Its Relation with Sperm Motility, Viability and Acrosome Intactness Test

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Background: Nitric Oxide (NO) is a free radical molecule, produced by most cells and tissues in the body. The effect of nitric oxide on cells is concentration dependent. Low concentration of nitric oxide is essential in biology and physiology of most of cells, but high amounts of nitric oxide is toxic and has detrimental effects on cells. The role of NO in biology of male and female genital systems is under investigation.

Objectives: The aim of this study was to evaluate the relationship of seminal plasma levels of nitric oxide (NO) with sperm motility, viability and acrosome intactness of spermatozoa.

Material and method: In the present study, semen analysis was done as per WHO criteria. Seminal NO activity was measured by Cortas and Winkind method by using spectrophotometer in infertile men.

Results: Mean NO concentrations in µMole/L were 30.42±8.99, 33.69±11.85 and 35.72±13.09 (p<0.001) respectively in high motility, normal viability and normal AI % groups, whereas it was 45.65±12.74, 41.24±13.66 and 47.75±10.79 respectively in low motility, abnormal viability and abnormal AI % groups.

Conclusion: Data from current study suggest a possible role of NO in pathophysiology of male infertility.

Key words: male infertility, nitric oxide (NO), sperm motility, sperm viability, acrosome intactness.

FPP-REP-81

A Cross Sectional Study to Assess Quality of Life in Infertile Woman Attending a Quaternary Care Centre

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Background: Infertility is a severely distressing experience for many women. Health related quality of life is very important measure in clinical settings, therefore studying quality of life in this group of woman is very decisive.

Objectives: This study aimed to assess quality of life in infertile woman with depression and without depression attending a quaternary care centre.

Material And Methods: The study was conducted at assisted reproductive center of Dr Prabhakar Kore Hospital, Belagavi in a time period of one year. Ethical clearance was obtained from institutional ethics committee. Mini International Neuropsychiatric Interview and FertiQoL questionnaire was administered in 100 women in the age group of 18-47 years who were diagnosed with infertility after obtaining a written informed consent.

Results: Depression of different severities was found in 25% of woman, 23% of women with other psychiatric disorders and 52% of women with no psychiatric illness. The quality of life of women suffering from depression has been affected significantly (p <0.001) when compared with women without depression.
Conclusion: The psychological implications of infertility are easily underestimated and have been largely ignored. Updating knowledge has become increasingly important for health professionals, aiming for the improvement of the quality of life of women confronted with a diagnosis of infertility.

Keywords: infertility / quality of life / women / depression.

FPP-REP-82


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Background: The size of the thyroid gland is increased by 10% during pregnancy in iodine sufficient and deficient countries. The range of Indian prevalence of hypothyroidism in pregnancy is 4.8-11%. The serum TSH levels > 4.5 μIU/ml are labelled as hypothyroidism. The adverse pregnancy outcomes of hypothyroidism in pregnancy are increased risk of abortion, gestational hypertension, megaloblastic anaemia, abruptio placentae, postpartum haemorrhage.

Objective: To detect rates of hypothyroidism in pregnant women in 12-16 weeks of gestation and hence avoiding complications arising from hypothyroidism in pregnancy.

Materials and methods: After obtaining institutional ethical clearance and patient consent, this study was conducted during the period of January 2017 to July 2017. All Pregnant women of 12-16 weeks gestation confirmed by USG were included. The information regarding the age, gestational age, gravida, parity, previous abortions, anthropometric measurements were collected from the participants.

The blood investigations were conducted on pregnant women by collecting venous blood sample in morning hours-8 to 11 AM. The parameter measured in the study is Serum TSH. If there is derangement in the reports of Serum TSH then complete thyroid profile was done. Data was analyzed using chi square test.

Results: Out of 100 pregnant women, 13 women were Hypothyroid (13%) and 87 were euthyroid (87%). During the study period, there was no case of hyperthyroidism during pregnancy.

Conclusion: Early diagnosis of hypothyroidism can prevent the foetal brain damage and neuro-intellecutual development of the foetus. In Indian scenario, universal screening for thyroid disorder is essential as there is significant increase of thyroid dysfunction in iodine deficient areas.

Key words: Pregnancy, hypothyroidism, TSH

FPP-REP-83

Ocular Manifestation in Pre-Eclampsia and Eclampsia – A Review

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Background: Pre-eclampsia and Eclampsia is a multiorgan disorder that complicates 6-8% of all pregnancies. It is one of the important cause for maternal & fetal complications. Ocular disturbance occurs in 25% of patient with Severe Pre-eclampsia and 50% of patient with Eclampsia.
Aims & Objective: The aim of the study is to review the literature for the various Ocular manifestation in Pre-eclampsia/Eclampsia and to identify the incidence in these patients.

Methods and Methodology: includes scientific review of literature- Journals and e-Publications both national & international, focusing on Ocular manifestation in Pre-eclampsia & Eclampsia. The retinal changes were classified according to Keith Wagener classification.

Result: Pre-eclampsia & Eclampsia is associated with retinal vascular changes. Spasm of Retinal arteriole, haemorrhages, cotton wool exudates, retinal edema, serous retinal detachment, severe macular edema were the common changes observed. The glaring feature is the vast variation in the retinal changes in different geographical area studied.

Conclusion: Visual disturbances are very common in pregnant women with Pre-eclampsia/Eclampsia. Any pregnant women with visual complaints should be promptly evaluated. Governmental health programme should be targeted to high risk area. Immediate transfer to tertiary care help in saving the life of mother and the baby.

Keywords: Pre-eclampsia, Eclampsia, Ocular manifestation, spasm of retinal arteriole, retinal haemorrhage, retinal edema.

FPP-REP-84

To Estimate Levels of Zinc and Fructose in Oligospermic Male and Their Correlation with Sperm Motility and Count.

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Introduction: Human semen contains high concentrations of fructose and zinc. The presence of abnormal levels of fructose and those trace elements may affect spermatogenesis with regard to production, maturation, motility and fertilizing capacity of the spermatozoa.

Aims and Objective: To evaluate the levels of fructose and Zn in seminal plasma in different groups of male infertility and to correlate them with count and motility.

Methods: The concentrations of fructose and Zn and were measured in 100 semen samples from normozoospermic and oligozoospermic men using the atomic absorption spectrometry for Zn. The concentration of fructose in seminal plasma was determined with a spectrophotometric method.

Results: The mean value of seminal plasma fructose concentrations was significantly increased (p ≤ 0.001) in infertile male subjects (oligozoospermia) than in fertile males. There was an inverse relationship between fructose levels and sperm motility and count. The mean value of seminal plasma Zn concentrations was significantly decreased (p ≤ 0.001) in the infertile groups of male subjects (oligozoospermia). A good correlation in a positive direction was noted between the sperm count and seminal plasma Zn concentration. There is no significant correlation between motility and zinc concentration in oligospermic men.

Conclusions: On the basis of the observations of the present study, seminal fructose, zinc and may contribute to fertility through their effects on various semen parameters.

Key words: oligozoospermia, fructose, zinc.
Correlation of Body Composition Parameters with Menopausal Symptoms and Depression in Postmenopausal Women: A Pilot Study

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Background: There is an increasing trend of depression in postmenopausal women. Recently changes in body composition and depression in post-menopausal women has gained importance in the research field.

Objectives: The aim of the study was to correlate the body fat percentage with menopausal symptoms and with depression in premenopausal and post-menopausal women.

Methods: Thirty postmenopausal women of age 45 to 60 years and thirty premenopausal women of age 35 to 45 years were selected for the study. Body composition parameters recorded by using bioelectrical impedance analysis. Hamilton depression rating scale (HAMD Score) used to assess depression whereas Menopause rating scale (MRS Score) used to assess postmenopausal symptoms.

Results: In postmenopausal women, body fat percentage and HAMD score was found to be positively correlated to the significant extent (r=0.384, p=0.036). Correlation between body fat percentage and MRS score was not significant. (r=0.192, p=0.309). In premenopausal women body fat percentage and HAMD score was not significantly correlated. (r=0.146, p=0.440) and that between body fat percentage and MRS score was not significant. (r=0.126, p= 0.506).

Conclusion: The findings of our study suggest that the increase in body fat percentage is associated with depression in post-menopausal but not in premenopausal women.

Keywords: Premenopausal, Postmenopausal, Body fat percentage, Depression.

Study of Reaction Time and Sleep Quality in Premenstrual Syndrome

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Background: Women with Premenstrual syndrome (PMS) suffer from insomnia and sleep deprivation thereby reporting difficulties pertaining to cognitive and psychomotor skill performance. Reaction time being the objective tool measurement of their performance is assessed in our study.

Objective: To determine the Reaction time and Sleep quality in PMS.

Methodology: The study was conducted on 60 female nursing students aged 18-20 years. The reaction time (visual and auditory) was done using PC1000Hz Reaction timer and the sleep quality was assessed using Pittsburgh Sleep Quality Index (PSQI) and Insomnia severity index (ISI). The parameters were then compared in different grades of PMS, which was assessed using Moos questionnaire.

Results: Among the 60 females, 20 each belonged to moderate, mild and absent PMS (control) category. ANOVA was used to compare the reaction time, sleep score and insomnia severity index (ISI) in different severity of PMS. There was a
statistically significant difference between the groups with a \textit{p value} of \textbf{0.001 each}. This suggests that, the reaction time, sleep score and ISI was higher in moderate PMS when compared to mild and control group.

**Conclusion:** As the severity of PMS increased, the reaction time also increased, implying poor cognition and psychomotor skill. Also individuals with increased severity of PMS reported a poor quality of sleep and insomnia which could be the probable reason for poor reaction time. Thus education on enhancing the sleep quality may improve the quality of life in PMS.

**Key words:** premenstrual syndrome, reaction time, sleep quality, insomnia

### FPP-REP-87

**Assessment of Primary Postpartum Haemorrhage by Haematological Parameters**

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**Background:** Postpartum haemorrhage is one of the leading cause of maternal deaths in the developing countries and yet is poorly diagnosed due to inaccurate measurement of blood loss following delivery. Lab investigations of haematological parameters being simpler and more accurate will help in optimal assessment and early diagnosis of Postpartum haemorrhage.

**Objectives:** To study the haematological parameters at the time of admission for delivery and on 1\textsuperscript{st} postpartum day (12-24 hours of delivery). To assess the incidence of primary PPH by analysing the results obtained.

**Materials and Methods:** 500 pregnant women aged between 18-35 years, undergoing vaginal delivery at Mc Gann teaching district hospital, Shivamogga were evaluated for hematological parameters (Hb, Hct, RBC, Platelet count, PT, APTT, BT and CT) during their admission for delivery and on first postpartum day.

**Results:** There was reduction in the mean values of Hb, Hct, RBC, Platelet count, PT, APTT and the results were statistically highly significant (\textit{p < 0.001}). There was rise in the mean values of BT and CT and the results were statistically highly significant (\textit{p < 0.001}). The incidence of primary PPH was 14.8\% as determined by 10\% decrease in hematocrit level.

**Conclusion:** Laboratory analysis of haematological parameters, being simple and accurate method, has to be followed, even during postpartum period, to assess, to take necessary measures and to prevent primary PPH and thereby decreasing the maternal morbidity and mortality.

**Keywords:** Postpartum haemorrhage, visual estimation, hematocrit.

### FPP-REP-88

**Thyroid Profile and Electrocardiographic Changes in Pre-Eclampsia**

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**Background:** Preeclampsia is a leading cause of maternal and neonatal mortality worldwide. Abnormalities in both thyroid profile and electrocardiographic changes
in pre-eclampsia have been documented in various epidemiologic studies. The present study is therefore undertaken to find out the association of thyroid function and electrocardiographic changes in pre-eclamptic women visiting Regional Institute of Medical Sciences, Manipur.

**Objectives:** To determine the thyroid profile (FT₃, FT₄ & TSH) and electrocardiographic changes in both pre-eclampsia and age matched normotensive pregnant women.

**Material and methods:** In this study, 15 pregnant women (gestational age >20 weeks) with pre-eclampsia in the range of 18 to 45 years of age were recruited and compared with the equal number of age matched normotensive pregnant women. TSH, FT₃, FT₄ and ECG parameters of pre-eclamptic women were compared with those of normotensive pregnant women. The data were then analysed using SPSS software.

**Results:** Mean ± SD of TSH, FT₃, FT₄ of pre-eclamptic women have 2.156±0.907, 2.676±0.560, 1.574±0.423 whereas that of normotensive pregnant women have 1.276±0.616, 3.592±0.509, 1.968±0.362 respectively. ECG changes includes normal QT interval in both the groups but prolonged QTc (corrected QT interval) were found in pre-eclamptic group.

**Conclusion:** The study shows lower FT₃, FT₄ and higher TSH level in pre-eclamptic women than normotensive pregnant women and prolonged QTc in pre-eclampsia.

**Key Words:** Pre-eclampsia, thyroid profile and ECG.

**AUTONOMIC NERVOUS SYSTEM**

FPP-ANS-89

Assessment of Heart Rate Variability in Parkinson’s Disease: Relation to Disease Severity

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**Background:** Parkinson’s disease is a progressive neurodegenerative disorder. Cardiovascular involvement is the most common complication. Measurement of heart rate variability is an important tool in assessing cardiac autonomic dysfunction.

**Objectives:** To assess the heart rate variability in patients with Parkinson’s disease.

**Materials and methods:** The study was conducted on 25 patients diagnosed with Parkinson’s disease and 30 healthy controls. The heart rate variability was calculated from 5 min recorded ECG with the help of Labchart Pro 7 and neurokard software. RR intervals were computed and analyzed in time domain (SDSD, RMSSD, SDNN, pNN50) and frequency domain (LF, HF, TP, LF: HF) parameters. Patients were further divided into group A (n=7) and group B (n=7) according to severity based on Hoen-yahr scale.

**Results:** The mean age of patient and control was 59.88±9.57 and 57.53±7.80 respectively. There is significant decrease in time domain parameters – SDSD (10.49(13.91-6.39) vs. 25.42(95.60-20.23); p= 0.0001), RMSSD (10.48(13.89-6.38) vs. 21.99(30.14-16.52); p=0.0001), SDNN...
(8.77(14.76-5.87) vs. 24.86(33.04-19.82); p= 0.0001) and frequency domain parameters- TP (501.8(778.4-271.4) vs. 1048(1750-549.5); p=0.0005), LF (83.4(162.9-53.02) vs. 277.2(473.3-152.4); p=0.0006), HF (50.53(97.91-16.15) vs. 217.3(464.3-116.1); p=0.0001) in patients as compared to controls. SDSD (12.22(13.95-11.30) vs. 6.60(10.18-6.01); p=0.0468), RMSSD (12.20(13.93-11.28) vs. 6.59(10.17-5.50); p=0.0454) and Total power (771.3(799.0-643.6) vs. 315.8(506.3-120.7); p=0.0447) were observed to decrease significantly with increase in disease severity.

Conclusion: There is significant decrease in overall cardiac autonomic tone in patients with Parkinson's disease as compared to controls. Further, there is decrease in both sympathetic and parasympathetic activity in group with higher H-Y stage than in group with lower H-Y stage.

Keywords: Parkinson's disease, heart rate variability, cardiac autonomic tone, time domain, frequency domain.

FPP-ANS-90

Study of Qtc Interval and Heart Rate Variability in Rheumatoid Arthritis

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Background: The risk of sudden cardiac death is significantly increased in Rheumatoid arthritis (RA). Indeed, QT interval abnormalities and cardiovascular autonomic nervous system dysfunction, are commonly observed in rheumatoid arthritis. QTc prolongation has been already well studied in RA, but there are few studies regarding the status of cardiac autonomic function. Hence, we planned to study the cardiac autonomic function in RA patients and correlate it with the severity of RA, if any.

Objective: To study the QTc interval and HRV in RA patients and to correlate the severity of symptoms of RA with Heart rate variability (HRV).

Materials And Methods: The study was conducted on 33 subjects aged 18-60, 19 cases of RA, fulfilling the 1987 revised ACR criteria and 14 controls. The cardiac autonomic functions were assessed by measuring short term heart rate variability. QTc was measured by Bazett’s formula. DAS28 and CDAI scores were used to assess the severity of RA.

Result: QTc interval (p=0.0013) and LF (p=0.0139) were significantly increased in RA patients. Both CDAI and DAS28 were found to be significantly correlated with low HRV parameters [HF (p=0.0183), TP (p= 0.0176), RMSSD (p= 0.0064)].

Conclusion: RA patients exhibited low HRV (increased sympathetic tone), prolongation of QTc interval and positive correlation of severity of disease with changes in HRV. Hence, our results suggest that HRV is an accurate tool to screen RA patients for early signs of autonomic disturbance, which can greatly help to reduce future morbidity and mortality.

Keywords: QTc interval, Heart rate variability, Rheumatoid arthritis.
Gender Variation Effect of Parasynaptic Function Tests amongst Healthy Young Adults

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Background: Our cardiovascular system is governed by autonomic nervous system. Since females have a lower cardiovascular risk and this is believed to be because of the regulatory influence of oestrogen on autonomic nervous system.

Objectives: To study the variation of Parasympathetic function tests in young healthy males and females.

Material and methods: The present study was carried out on 50 healthy female subjects with normal menstrual cycles and 50 healthy male subjects between the ages of 18 to 25 years. Various non-invasive parasympathetic function tests were performed in males and during different phases of menstrual cycle in females that include Heart rate variation during deep breathing (E:I Ratio), heart rate response to standing (30:15 Ratio), Heart rate response to Valsalva maneuver (Valsalva Ratio). The results were analysed using student-t-test.

Results: Our results shows that resting heart rate was higher in females than males but not significant (P>0.05). Significant sex differences (P <0.05) were observed in valsalva ratio, E:I ratio and 30:15 ratio comparing males with different phases of menstrual cycle in females.

Conclusion: This study suggests that gender significantly influence the cardiovascular responses to various Parasympathetic function tests. On comparison of various Parasympathetic function tests amongst males and females shows that females have lower parasympathetic activity as compared to males of the same age group.

Keywords: Parasympathetic function tests, Heart rate, Gender difference.

Association of Sympathovagal Balance and Biochemical Markers in High BMI Postmenopausal Women

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Background: Menopause refers to a point in time that follows 1 year after the cessation of menstruation. These include changes in cardiovascular system, autonomic dysfunctions like change in blood pressure, giddiness, increased sweating etc. Sympathovagal balance is a non invasive and useful tools to assess the health status of postmenopausal women. Increased body mass index (BMI) can alter the balance between sympathetic and parasympathetic activity.

Aim: To study the association of sympathovagal balance and biochemical markers in high BMI postmenopausal women.

Methods: Postmenopausal women with high BMI aged between 40-55 years were recruited. Sympathovagal balance was assessed by doing resting HRV for 5 mins, BRS for 10 mins, in supine position and...
biochemical parameters were analysed using SPSS 20 version.

**Result:** Significant alteration was found in sympathovagal balance in association with biochemical markers in high BMI postmenopausal women.

**Conclusion:** There was an sympathovagal imbalance with increase in sympathetic activity and metabolic biomarker level was found to be elevated in high BMI postmenopausal women. Probable mechanism could be due to increased level of adipose tissue innervated by sympathetic neurons shifted the balance towards sympathetic dominance.

**FPP-ANS-93**

**Lateralization of Heart Rate Variability Parameters in Spinocerebellar Ataxia Patients**

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**Background:** Spinocerebellar ataxias (SCAs) are heterogeneous group of progressive neurodegenerative disorders with autonomic failure. Neuroimaging studies revealed that heart rate variability (HRV) is associated with different brain areas. But the lateralization in brain areas concerned with HRV has not been addressed in literature.

**Objective:** We have correlated HRV parameters with the degree of atrophy in brain areas modulating autonomic functions in SCA patients.

**Material and Methods:** Time and frequency domain parameters of HRV were analyzed for 5 min beat-to-beat series of consecutive R-R intervals in SCA (n = 49, age = 34.2 ± 9.5 years) patients. Volumetric analysis (by FreeSurfer software) was performed using 3T MRI in SCA patients to determine the atrophy of brain areas. Spearman's rank correlation analysis was done between the HRV parameters and volume of brain areas.

**Result:** Depressed HRV and atrophy of brain areas were found in SCA patients as compared to healthy controls. The mean value of SDNN was correlated with the volume of the brain areas of left hemispheres like cuneus (p = 0.040, r = 0.295), lingual (p = 0.035, r = 0.301), medial temporal lobe (p = 0.027, r = 0.317) and few areas in the right like pars triangularis (p = 0.043, r = 0.291) and isthmus cingulate (p = 0.042, r = 0.291). The mean value of RMSSD was correlated with left cuneus (p = 0.031, r = 0.309) and pons (p = 0.026, r = 0.318). While, the frequency domain parameters of HRV like low frequency (nu), high frequency (nu) and total power (nu) were correlated primarily with the brain areas of left hemispheres like accumbens (p = 0.014, r = 0.348), hippocampus (p = 0.031, r = -0.309) and caudate (p = 0.038, r = 0.298) respectively.

**Conclusion:** In our study, HRV parameters were found to be correlated with the volume of atrophic brain areas of left hemisphere. It seems probably left hemisphere of brain may have higher association with the modulation of autonomic tone in SCA patients.

**Key words:** Spinocerebellar ataxias, neuroimaging, heart rate variability, lateralization, atrophy of brain
Heart Rate Variability in Beta Thalassemia Major Patients

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Background: Beta thalassemia is a hereditary haemolytic anaemia having overall prevalence of 3-4% in India. Appropriate therapy for this disease includes a regular monthly blood transfusion. Cardiac complications are the leading cause of death in these patients due to iron overload resulting in cardiomyopathy and hence cardiac failure & cardiogenic death. This study is designed to detect relationship between heart rate variability (HRV) and beta thalassemia major patients receiving regular blood transfusion.

Aims and Objectives:

a) To study Heart Rate Variability in Beta thalassemia major patients
b) To compare the mean values of time domain and frequency domain parameters of heart rate variability in study and control group

Materials and Methods: Present study was a cross sectional type of study and consisted of 50 normal subjects (control group) and 50 patients of beta thalassemia (study group). HRV was recorded in both the groups with Medicaid Physiopac and HRV analysis was done using Kubois software version 2.1.

Results: High frequency (HF) power in normalized units was reduced whereas Low frequency (LF) power in normalized units and LF/HF ratio were increased in beta thalassemia major patients as compared to control group and difference was found to be statistically significant (by unpaired T test). Also time domain parameters such as RMSSD, NN50, PNN50 and TINN were also found to be decreased in beta thalassemia major patients as compared to control group and difference was found to be statistically significant (by unpaired T test).

Conclusion: The present study shows that there is reduced HRV in beta thalassemia major patients as compared to control group. This suggests that there is cardiac autonomic dysfunction in beta thalassemia major patients. Thus analysis of HRV may be useful for early detection of cardiac complications in beta Thalassemia especially in the preclinical stage of cardiac involvement.

Key words: Beta thalassemia major, Low frequency, High frequency, LF/HF ratio, Heart rate variability.

Cardiac Autonomic Neuropathy in Women during Menopausal Transition Period and Its Association with Psychological Stress Levels: An Observational Study.

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Background: Peri-menopause is a transitional stage which occurs before menopause in which women experience myriad symptoms like hot flushes, anxiety & depression with increasing, psychological stress levels leading to autonomic dysfunction.

Objectives: Evaluate cardiac autonomic neuropathy (CAN) in women during menopausal transition period and its
association with psychological stress levels.

Material and methods: Study includes three groups of women, group I: premenopausal in the age group of 25-40 years, group II: perimenopausal women without symptoms and group III: perimenopausal women with symptoms in the age group of 40-50 years of 30 in each (total n=90). CAN was evaluated in terms of presence of resting tachycardia, loss of sinus arrhythmia (DBD) and heart rate response to Valsalva maneuver (VR) by electrocardiogram (ECG). R-R variation with respiration of >15 beats /minute was taken as normal, 10-15 beats as borderline and <10 beats /minute as definitive CAN. Valsalva ratio of ≥1.2 taken as normal; 1 - 1.2 as borderline & ≤ 1 as definitive CAN. If any two of them found positive, then presence of CAN was confirmed. Psychological stress levels were evaluated using standard women's health questionnaire. Correlation between Psychological stress levels with incidence of CAN was assessed.

Results: CAN is found in 27% of perimenopausal women with symptoms. There exists a statistically significant positive correlation between DBD and VR with anxiety depressed mood, well being, vasomotor symptoms, somatic symptoms, and memory. (p=0.000**)

Conclusion: This study indicates that CAN have a strong association with psychological stress levels in perimenopausal women.

Keywords: Perimenopausal, Autonomic functions, Valsalva ratio, Sinus arrhythmia, CAN.

FPP-ANS-96

A Comparative Study of Cardiovascular Responses to Autonomic Function Tests in Young Obese Men and Women

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Background and Objectives: The ANS helps maintain homeostasis. Cardiac autonomic activity is influenced not only by gender but also obesity which is increasingly prevalent among children and adolescents.

This study was undertaken to assess the Heart rate, QT and QTc intervals in response to cardiac autonomic function tests in obese and normal BMI medical students and to know the gender differences.

Materials and methods: 100 medical students of J S S Medical College, Mysore formed the study group. Heart rate, BP, QT and QTc intervals were measured immediately after and five minutes after stopping isometric exercise as well as cold pressor test.

Results: QT and QTc intervals are in the higher range in a population of obese subjects when compared with healthy normal BMI subjects. There was significant gender difference in QTc at baseline, immediately after the tests of autonomic function and after recovery in both the groups. Hence, there is a positive association between the BP, QT interval and obesity.

Conclusion: Regular health checkups in clinically asymptomatic young obese adults will help detect changes in ECG that indicate potentially dangerous
derangement of left ventricular activity and thereby aid in early intervention so as to minimise the long term pathological consequences.

Keywords: ANS, Heart rate, Obesity, QT interval, QTc interval

FPP-ANS-97

Comparative Study of Heart Rate Variability at Rest between Sedentary and Non-Sedentary Males between 20-40 Years of Age.

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Background: Heart rate variability is a non-invasive measure that reflects the balance of sympathetic and parasympathetic influences on heart rate. It is defined as the changes in the interval between heartbeats (R-R intervals) over time. The adaptive responses of the cardiovascular system to regular physical activity appear to include a reduction in sympathetic activity and an increase in parasympathetic activity during rest in non-sedentary males.

Objectives: This study aimed to clarify that regular physical activity is associated with beneficial effects on the cardiovascular system using short term heart rate variability testing.

Materials and methods: In a cross-sectional design, 30 individuals who exercised at least 5 days/week for 45 min/day or more were compared with age and gender matched sedentary controls. Medicaid Physiopac was used for studying 5min HRV. HRV analysis was done using KUBOIS software VERSION 2.1.Data was analyzed using Student’s T-test. Significance of p value was taken as 0.05.

Result: There was a relative bradycardia in the non-sedentary group (66.76+/−7.01) at rest as compared to the sedentary group (84.06+/−5.31) (p<0.001). Time domain indices of HRV, meanRRI, SDNN, and RMSSD were significantly enhanced in the non-sedentary group (p<.001). Frequency domain indices of HRV, LFnu, HFnu, LF/HF ratio were higher in the non-sedentary group than sedentary group but the difference was not significant (p>0.05).

Conclusion: Regular exercise increases parasympathetic tone at rest, which may contribute to the reduction in mortality associated with it.

Keywords: Heart rate variability, exercise, sympathetic & parasympathetic system

FPP-ANS-98

Effect of Dialysis on Parasympathetic Autonomic Function in Chronic Renal Failure

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Key Words: Dialysis, Parasympathetic autonomic function, Chronic renal failure

Introduction: Chronic renal failure affects around 10–13% of the general population, with a sizeable proportion in end stage renal disease on dialysis. It is well documented that such patients have an extremely high risk of developing cardiovascular autonomic dysfunction as compared to the general population. Studies in the past have revealed autonomic dysfunction in chronic renal failure. However there is scarce evidence to suggest the beneficial role of dialysis on the cardiac autonomic functions. Moreover parasympathetic innervations of heart takes upper hand.
**Aims And Objectives:** The present study was therefore taken up to look into the post dialysis improvement in parasympathetic cardiac autonomic functions taking slow deep breathing, Valsalva ratio and 30:15 ratios as tools.

**Materials And Methods:** Autonomic functions were evaluated in 15 patients undergoing dialysis twice a week. Subjects were assessed before and after one hour of hemodialysis. Autonomic function tests like heart rate response to slow deep breathing (SDB), Valsalva Ratio (VR), and 30:15 ratios were studied by using the CANWIN analyzer of genesis medical systems. Results were statistically analyzed.

**Results:** There was a significant difference in heart rate response to SDB and VR with improvement in the mean values post dialysis as compared to predialysis mean values. P<0.05) whereas 30:15 ratio did not show statistically significant difference after dialysis.

**FPP-ANS-99**

**Effect of Indian Classical Instrumental Music on Autonomic Function Tests in Young Healthy Adults**

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**Background:** The stress in young adults is associated with concerns about mastering knowledge, personal endurance and lack of time for other activities. This study had been designed to assess the effect of music on heart rate variability (HRV) as markers of autonomic functions in young adults.

**Objective:** To study the effect of listening to Indian classical instrumental music on autonomic function tests in young healthy adults.

**Materials and method:** 60 young adults of either sex aged between 17-22 years were randomly divided into two equal groups, Cases (Musical) and Controls (nonmusic). The participants in cases were made to listen, a preselected Indian classical instrumental music for 30 minutes in morning for 4 days in a week for six weeks. The parameters assessed were basal heart rate, systolic and diastolic blood pressure and frequency domain parameters of HRV in both the groups. Parameters were analysed before and after 6 weeks of study. Data was analysed by SPSS version 23. P<0.05 was considered statistically significant.

**Results:** Mean value of LF/HF ratio at baseline and after six weeks was 0.67± 0.377 & 1.10±1.00 respectively whereas of controls 0.97± 0.78 & 1.21±1.19. P value for cases was 0.010 and for controls was 0.336.

**Conclusion:** The LF/HF ratio was significant in cases and not in controls which shows that listening to Indian classical music has effect towards sympathetic activity. Thus study shows the possibility that classical music may have a sympathetic effect, as on LF/HF ratio, the autonomic balance shifts towards the sympathetic tone.

**Key words:** Autonomic balance, heart rate variability, music
Association between Cardiac Autonomic Tone and Baroreflex Sensitivity in Patients with Recent Myocardial Infarction

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Background: Baroreflex is known to buffer low frequency (LF) oscillations in blood pressure by inducing changes in the heart rate. Both cardiac autonomic tone and Baroreflex Sensitivity (BRS) decrease after myocardial infarction (MI) and are independently associated with increased morbidity and mortality after MI. However, the association between BRS, Blood Pressure Variability (BPV) and Heart Rate Variability (HRV) is not established in patients with recent MI.

Objective: The aim of this study was to identify the associations between BRS, BPV and Heart Rate Variability (HRV) in patients with recent MI.

Material and methods: Forty-five patients with recent (≤6 months) MI (mean age 54.7 ± 9.5) were recruited for the study. Beat-to-best blood pressure using Portapres® with simultaneous recording of Lead II ECG was done to calculate the BRS, HRV and BPV.

Results: A significant positive correlation was observed between HF HRV and alpha HF of BRS (r = 0.32, p = 0.04). Additionally, HRV SDSD and pNN50 significantly correlated with alpha HF (r = 0.73 and 0.67 respectively, p <0.0001 and systolic all-BRS (r = 0.70 and 0.69 respectively, p <0.0001). Alpha HF and all BRS showed a negative correlation with HF systolic BPV (r = -0.49 and -0.57 respectively, p < 0.001). HF systolic BPV showed a significant positive correlation with HFHRV (r = 0.52, p < 0.001).

Conclusion: The results suggest that high frequency oscillations in BPV might be modulated both by feed-forward coupling through heart rate and feedback control through baroreflex in patients with MI.

Keywords: Myocardial Infarction, Heart rate variability, blood pressure variability, baroreflex sensitivity

Reliability of Peak Baroreflex Response Latency as a Novel Method for Cardiac Autonomic Function Assessment.

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Background: The arterial baroreflex mechanism is a physiological control system which maintains the mean arterial blood pressure within a normal limit. The effectiveness of any control system depends upon 2 variables: magnitude and latency. Present day, cardiovascular autonomic testing is mainly based on magnitude of peak heart rate / blood pressure changes to certain physiological stimuli; but little or no attention is given to the latency. Bradycardia & tachycardia latency is the minimum time required to achieve peak response. We had studied latency of peak baroreflex response for early diagnosis of diabetic autonomic neuropathy and results are promising; but it’s reliability needs to be tested.

Objective: We sought to study the reliability of latency parameter as a novel
method for cardiovascular autonomic function assessment.

**Material and method:** Study was conducted on 30 healthy subjects in the age group 25-35 years in the Autonomic function laboratory, AIIMS, Jodhpur. Using a standard protocol, baseline HRV was assessed, followed by Lying to standing the test (LST) and Valsalva maneuver (VM). The bradycardia and tachycardia latencies were measured for LST and VM. Then the HRV, LST and VM were repeated in each individual after 30 minutes and 3 days.

**Result:** The mean values of tachycardia and bradycardia latencies after LST and VM at baseline, after 30 minutes and on the 3rd day did not show a significant difference. The percent change in these 3 readings was less than 20% of baseline.

**Conclusion:** Peak bradycardia and tachycardia latencies after acute baroreflex response shows good reliability. Further, large population studies are required to prove its diagnostic applicability.

**Keywords:** Tachycardia latency, Bradycardia latency, Cardiac autonomic function assessment, Valsalva maneuver, lying to standing test.

**FPP-ANS-102**

**Assessment of Cardiovascular Autonomic Function Tests in Patients with Psoriasis Vulgaris**

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**Background:** Psoriasis is a chronic immune-inflammatory-mediated hyperproliferative skin disorder with a prevalence of 1–3%. The chronic inflammatory nature of psoriasis is also thought to predispose patients to other comorbidities, the most notable being cardiovascular disease. Recently, psoriasis is considered to an independent risk factor for cardiovascular disease. The cardiovascular disease is associated with autonomic dysfunction. Cardiovascular autonomic function assessment serves in risk stratification.

**Objective:** The study was conducted to assess the cardiovascular autonomic reactivity in the patients with psoriasis vulgaris.

**Methods:** It was an analytical cross-sectional study conducted in the Autonomic lab, Department of Physiology, JIPMER. Forty male psoriasis vulgaris patients in the age group of 18 – 45 years were recruited from the Out Patient Department of Dermatology, JIPMER and 40 healthy age, gender and BMI matched volunteers were recruited as controls. Body mass index (BMI), cardiovascular parameters such as basal heart rate (BHR), systolic blood pressure (SBP), diastolic blood pressure (DBP) were measured. Cardiovascular autonomic reactivity tests were done and heart rate and blood response to standing (30:15 ratio), deep breathing (E:I ratio) and isometric handgrip (ΔDBP$_{hg}$) were assessed.

**Results:** Both the groups were of comparable age group and BMI. SBP and DBP was significantly high (P<0.001, P<0.01 respectively) in psoriasis patients compared to controls. 30:15 ratio and E:I ratio were significantly decreased (P<0.001, P<0.01 respectively) and ΔDBP$_{hg}$ was increased significantly (P<0.001) in psoriasis patients.

**Conclusion:** We conclude that psoriasis patients have altered cardiovascular autonomic modulation in the form of
increased sympathetic reactivity and decreased parasympathetic reactivity.

**Key words:** Psoriasis vulgaris, autonomic dysfunction, sympathetic reactivity, parasympathetic reactivity, Cardiovascular risk

**FPP-ANS-103**

**Effect of Preferential Relaxing Music on Exercise Induced Changes in Heart Rate Variability- An Experimental Study on Healthy Young Adults.**

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**Background:** Auditory stimulation with music has been investigated as a therapy to prevent cardiovascular disorders and/or improve cardiac function. The autonomic nervous system may serve as one path by which music exerts its therapeutic effect, which can be explored by the assessment of heart rate variability-a non-invasive method for investigation of the ANS that describes the fluctuations in the intervals between consecutive heartbeats (RR intervals), which are indicated to influence the sinus node. Characterization of the cardiac autonomic responses to musical auditory stimulus during stress (exercise) would contribute to the design of future therapies in order to prevent the development of cardiovascular disorders.

**Objectives:** The present study would aim to gauge the effects of preferential music on exercise induced changes in HRV.

**Material and methods:** HRV was done in 30 young healthy adults (Mean Age in years = 19.97 ± 2.56) without music and after listening to their preferred relaxing music with exercise as an intervention.

**Results:**

<table>
<thead>
<tr>
<th>HRV frequency parameters</th>
<th>After doing moderate exercise without music (Mean ± SD)</th>
<th>After doing moderate exercise while listening to preferential relaxing music track (Mean ± SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LF*</td>
<td>86.85 ± 1.71</td>
<td>86.76 ± 4.26</td>
</tr>
<tr>
<td>HF*</td>
<td>13.15 ± 1.71</td>
<td>13.24 ± 4.26</td>
</tr>
<tr>
<td>LF/HF*</td>
<td>7.77 ± 1.10</td>
<td>6.74 ± 4.39</td>
</tr>
</tbody>
</table>

*(p value > 0.05).

**Conclusion:** Thus, preferential relaxing music improves post exercise (stress) cardiovascular activity. Statistically not significant results may be due to less sample size.

**Keywords:** Music therapy, Heart Rate Variability, Exercise, Stress, Autonomic Function Test, ECG

**FPP-ANS-104**

**Comparison of Heart Rate Variability between Athletes and Non-Athletes Using Poincare Plot**

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**Background:** Linear measurements of heart rate variability is highly dependent on the basal heart rate. Further, heart rate dynamics is nonlinear and non-linear analysis of Heart rate variability is sparse.
Objective: The objective of the study is to analyse Heart rate variability in athletes and non-athletes using nonlinear method.

Materials and methods: The subjects were volunteer school students in the age group of 12-17 years from a residential school Jawahar Navodya Vidyalaya, kalapet, Puducherry. 5 min ECG was recorded using wireless heart rate monitor – Bioharness 3 after 5 minutes of supine rest. RR intervals were retrieved and ectopics were removed manually.

The Poincare plot was plotted using the software from Biomedical signal analysis group, version 1.1 (Kuopio, Finland). Poincare plot is a visual presentation of time series signal.

It is a two-dimensional graphic representation of the correlation between consecutive RR intervals, in which each interval is plotted against the following interval. The quantitative analysis is done by fitting an ellipse to the shape formed by the plot and measure the dispersion along the major and minor axis of the ellipse.

Results: Both SD 1 which denotes short term variability was significantly more in the athletes than in non-athletes in males (boys (n=30): athletes -59.13±25.57, non-athletes -45.48±24.82, p value = 0.037). and in females it was non-significantly higher (Female (n=30): athletes -64.04±24.25, non-athletes -53.04±20.19, p value = 0.061). SD 2 which denotes long term variability was significantly more in the athletes than in non-athletes of either gender (. (Female (n=30): athletes 102.39±33.76, non-athletes -85.34±31.82, p value = 0.049; (Male (n=30): athletes -99.91±35.76, non-athletes -80.34±34.82, p value = 0.036))

Conclusion: Athletes have higher heart rate variability analysed using a nonlinear Poincare plot method irrespective of gender.

Key words: athletes, non-athletes, HRV, Poincare plot

FPP-ANS-105

The Study of Autonomic Dysfunction in Parkinson’s Disease by Head Up Tilt Test: A Cross Sectional Study

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Background: Autonomic failure is an integral component of Parkinson’s disease (PD), and symptoms of autonomic dysfunction affect the quality of life. Most of the previous studies used methodologies that focused on the cardiac autonomic profile and were unable to evaluate both the sympathetic vasomotor and cardiac control during dynamic conditions.

This study is designed to evaluate autonomic cardiovascular disturbances in patients with PD by comparing the spectral profile of heart rate variability (HRV) and blood pressure to orthostatic challenges using head up-tilt test (HUTT).

Methods: In this cross-sectional study, we have compared the cardiovascular parameters during orthostatic challenge of 31 patients with PD and age and gender-matched healthy individuals using HUTT. Continuous lead II ECG along with BP recorded every 2 min in patients with PD and control group during HUTT for 10 min in supine, 45 min in 70° tilt and again 10 min in supine position which were later analyzed using Biopac software for
HRV. Data were expressed as mean± standard deviation (SD).

**Results:** All patients with PD had symptoms of autonomic dysfunction. There was no significant difference in the supine cardiovascular and HRV parameters between patients with PD and control group. Patients with PD showed a blunted response for the cardiovascular and HRV parameters after 5 min of 70° tilt as compared to healthy individuals.

**Conclusions:** Patients with PD show autonomic symptoms; and cardiovascular autonomic dysfunction, which becomes obvious only during stress.

**FPP-ANS-106**

**Assessment of Heart Rate Variability of Different Somatotype Category amongst Scholar Adolescents**

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**Background:** A somatotype is a quantified expression of the present morphological conformation of a person. Adolescence is a crucial period in which growth speeds up, and the body composition begins to differ between boys and girls. Cardiovascular risk varies with the somatotype category.

**Objectives:** Assess and compare short-term heart rate variability for each somatotype category in adolescents.

**Material & Methods:** The study was conducted in Department of Physiology, JIPMER, Puducherry in collaboration with Jawahar Navodaya Vidyalaya (JNV), a rural residential school in Puducherry after getting approval from JIPMER ethics committee for human studies. Volunteer adolescents in the age group of 12-17 years (n=220; 129 boys and 91 girls) were classified into a different somatotyping category based on Heath Carter somatotyping method. Short term HRV was recorded using wireless BioHarness 3.0.3.

**Results:** Based on time domain and frequency domain parameters, parasympathetic activity showed decreasing order as follows central> ectomorphy > mesomorphy > endomorphy, while sympathetic activity showed increasing order as follows central< ectomorphy< mesomorphy < endomorphy in both boys and girls. Girls have higher parasympathetic activity and lesser sympathetic activity than boys in Ectomorphy and mesomorphy. In central somatotype and Endomorphy category, genders were comparable.

**Conclusion:** Our study gives normative short-term HRV data for different categories of healthy adolescents.

**Keywords:** Somatotype, Heart rate variability, Adolescents.
**METABOLIC PHYSIOLOGY**

**FPP-MEP-107**

**Effect of Ramadan Fasting on Insulin Resistance and Lipid Profile**

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**Background:** Fasting during Ramadan is a religious rituals of all adult Muslims, during which they abstain from food and fluid intake during the period from dawn to sunset as well as reduction in meal frequency and alteration in sleep-wakefulness cycle.

**Objectives:** The aim of this study is to investigate the effect of intermittent fasting (during Ramadan) on insulin resistance and lipid profile in healthy individuals.

**Method:** five healthy volunteers underwent anthropometric and biochemical evaluation before the day of Ramadan and after completing the Ramadan month of fasting. Biochemical markers were measured by standard laboratory methods and statistical analysis was done by student t-test.

**Result:** After the completion of Ramadan fasting, subjects experienced decrease in their body weight and BMI. There was slight decrease in LDL and increase in HDL levels and not much significant changes in insulin resistance.

**Conclusion:** This study showed that Ramadan fasting resulted in reduced body weight but no significant effect on fasting/post-prandial glucose levels and lipid profile.

**Keywords:** Ramadan, Intermittent fasting, Insulin resistance, Lipid profile, fasting/post prandial glucose level, Body weight.

**FPP-MEP-108**

**Hypothyroidism and Altered Lipid Profile**

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**Background:** Hypothyroidism is known to be associated with alteration in biochemical parameters and one among them is lipid profile. Altered thyroid function, indicated by altered TSH has its effect on composition and transport of lipoproteins.

**Aims And Objectives:** To find correlation between TSH and different parameters of lipid profile i.e., total cholesterol, triglycerides, HDL, LDL, VLDL.

**Materials And Methods:** Study was done in outpatient department of KIMS Hospital, Hubli. Study included 25 newly diagnosed hypothyroid patients irrespective of subclinical or overt hypothyroidism. Data obtained from interview, clinical examination, thyroid function tests and lipid profile. Correlation and linear regression was done between TSH and different parameters of lipid profile using alcula software.

**Results:** Positive Correlation was found between TSH and total cholesterol \( r=0.86 \), TSH and triglycerides \( r=0.98 \), TSH and LDL \( 0.86 \), TSH and VLDL \( r=0.98 \) but there was negative correlation between TSH and HDL \( r=-0.79 \).

**Conclusion:** There appears to be positive correlation between TSH and total cholesterol, triglycerides, LDL and VLDL. But negative correlation between TSH and HDL.
Key Words: hypothyroidism, TSH, Total cholesterol, Triglycerides, HDL, LDL, VLDL.

FPP-MEP-109

A Comparative Study of Metabolic Syndrome in Diabetic and Non Diabetic Individuals.

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Background: Metabolic syndrome is a cluster of metabolic abnormalities that increases the risk of Coronary Artery Disease, Stroke, Diabetes in an individual. This study examined the risk of metabolic syndrome in diabetic and non-diabetic Indian men and women.

Objectives: To estimate the risk of metabolic syndrome in diabetic and non-diabetic patients and to identify and quantify the risk factors associated with metabolic syndrome.

Materials And Methods: Randomly selected 50 diabetic patients and 50 matched controls (non-diabetes) were taken from a population in a small township of Hyderabad. They were subjected to analysis for components of metabolic syndrome. (BMI, Waist Circumference, Serum Triglyceride Levels, Serum HDL Level, Fasting Plasma Glucose, Hypertension). Student t test and Chi square has been used for statistical analysis. P value of <0.1 was found to be significant.

Results: Metabolic syndrome was significantly associated with subjects having increased waist circumference, elevated triglyceride levels, lower HDL levels, elevated LDL levels, B.P >130/85mm of Hg, HOMA >2.5. Prevalence of metabolic syndrome was not statistically associated with BMI and gender.

Conclusions: In this study, metabolic syndrome in diabetes was found to be higher when compared to non-diabetes. Incidence of metabolic syndrome increases as the duration of diabetes increases and with worsening glucose tolerance. In high risk population, reducing the waist circumference, BMI and intensive lifestyle modifications can prevent the progression to diabetes and atherosclerotic cardiovascular diseases.

Keywords: Metabolic Syndrome, Diabetic Patients, HOMA, Waist Circumference, Blood Pressure, LDL levels.

FPP-MEP-110

Correlation of Serum Mg$^{2+}$ Levels with Duration of T2DM

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Introduction: Diabetes is the most common serious metabolic disease. The hallmark of diabetes is elevated blood glucose concentration, just one of many biochemical & physiological alterations that occur in the disease. In diabetics there is a direct association between serum magnesium level & cellular glucose disposal independent of insulin secretion. This change in glucose disposal is found to be associated with increased sensitivity of the tissues to insulin in the presence of sufficient magnesium levels. Magnesium deficiency has been found to be related with diabetic Microvascular disease. Hence the present study is conducted to find any correlation with duration of T2DM & Serum Mg$^{2+}$. 

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63rd Annual National Conference of Physiologists and Pharmacologists of India, APPICON2017, Organized by Department of Physiology, JIPMER, Puducherry.
Materials & Methods:

INCLUSION: T2DM 50 Subjects

EXCLUSION: T2DM with Hypothyroid, Hypertension, Nephropathy, Retinopathy, Neuropathy, CHF & Renal diseases.

Control: 50 Healthy subjects

Statistical Analysis: Student t test

Results: Serum Mg²⁺ > 20yrs, T2DM: 1.42mg/dl compared to 2.51mg/dl control with p Value significant < 0.0001.

2-5Yrs & 10-15yrs showed no statistical significance.

Conclusion:

1. Serum Mg²⁺ levels decreased with increased duration T2DM
2. Hypomagnesemia causes insulin resistance which further reduces serum mg²⁺ levels in t2dm creating a vicious cycle¹.

Keywords: T2DM, Serum Mg²⁺, T2DM Duration

FPP-MEP-111

Thyroid Hormone Profile in Chronic Kidney Disease

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Introduction: CKD is increasing from 13.2% currently to 14.4% in 2020 to 16.7% in 2030. Thyroid dysfunction in CKD include hypothyroidism, Hyperthyroidism and Non-thyro illness. Prevalence of hypothyroidism in CKD population is 10.84%.

Aims & Objectives: To determine the thyroid hormone profile in CKD patients.


Primary parameters assessed- TSH; total thyroxine (T₄); Total triiodothyronine (T₃); Free triiodothyronine (FT₃) and free Thyroxine (FT₄) were estimated using enzyme immunoassay.

Results: Total participants: 406. DM & HTN were the main primary disease process leading to CKD. Incidence based on CKD stage: CKD stage 0 & 1: none. CKD stage 2: 6 (1.5%). CKD stage 3: 121 (29.9%). CKD stage 4: 66 (13.8%). CKD stage 5 on Medical Management: 47 (11.5%). CKD stage 5 on MHD: 166 (40.9%).

Conclusion: Abnormalities in the thyroid profile were found in 42% of the participants. The most common thyroid derangement was hypothyroidism followed by isolated low T3 values.

Keywords: Thyroid hormone, Ckd, free T₃, free T₄, TSH, HD, Hypothyroidism, Euthroid
A Comparative Study of Pulmonary Function Test in Type-2 Diabetic & Non Diabetic Subjects

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Background: Type-2 diabetes mellitus affects organs by causing micro & macrovascular dysfunction. Lung involvement is due to glycosylation of collagen and elastin, which causes thickening alveolar basement membrane & alveolar-capillary endothelial damage. Microangiopathy in the alveoli causes restriction of the lung volumes & capacities. Significance of early respiratory screening to avoid further complication of respiratory system in Type 2 Diabetic patient is addressed in this study.

Objectives: To evaluate pulmonary functions in Type-2 Diabetic subjects & to compare the pulmonary functions of Diabetic subjects with non-Diabetic subjects

Material and methods: This cross sectional study was done in the department of Physiology, CMCHRC, Trichy after obtaining IEC approval and consent from the participants with sample size of 45 Type 2 Diabetic patients (both male & female). This study group was compared with age & sex matched 45 control subjects. Type 2 Diabetic patients with complications were excluded from this study. The parameters like FVC, FEV1 & FEV1/FVC were measured using electronic spirometer (“Easy one pro”) to assess the mechanical function & for the early detection of obstructive & restrictive airway disease in diabetic patient

Results: Unpaired t-test was done using SPSS Software version 21. The parameters of PFT like FVC, FEV1 & FEV1/FVC values were significantly reduced (P value<0.05) in Type 2 Diabetic patients than control subjects.

Conclusion: Significant reduction in PFT of Type 2 Diabetic patients is an early indicator of lung damage. So pulmonary function test can be used as a reliable screening marker in Type 2 Diabetic patients to prevent respiratory complication.

Key words: Diabetes, FVC, FEV1, Pulmonary.

Evaluation of Cardiovascular Response to Exercise in Hypothyroid Patients

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Background: Thyroid disorders adversely affect cardiovascular system. Hypothyroid patients are at greater risk of developing cardiovascular diseases. Cardiovascular response to exercise in such patients may add in early assessment of cardiovascular risk.

Objectives: To study and compare the cardiovascular changes during exercise and recovery in newly diagnosed hypothyroid patients and euthyroid controls.

Materials and methods: 26 cases of newly diagnosed hypothyroidism and 30 healthy controls were taken for the study. Following recording of Basal Heart rate (HR) and blood pressure (BP), the subjects underwent exercise challenge test. Heart
rate and BP were compared at peak of exercise and post exercise at 1min, 5min, 10min and 20 min. Heart rate recovery (HRR) and chronotropic response (CR) were calculated.

**Results:** Both groups had similar HR and BP at rest, and showed an increasing trend during exercise and post exercise recovery. However, the systolic blood pressure at 1min post exercise was higher in controls.

HRR showed a slow recovery in the hypothyroid group\(p = 0.061\) although it didn't achieve statistical significance. CR \(p = 0.07\) was comparable in both the groups.

**Conclusion:** The HRR is an important index of cardiovascular risk. Although the slower HRR in the hypothyroid group did not attain statistical significance, it is a substantial finding of this study. Stratification of patients into clinical and subclinical hypothyroidism would have yielded better results.

**Keywords:** Blood pressure, exercise, heart rate recovery, chronotropic response, newly diagnosed hypothyroidism

**FPP-MEP-114**

**Mean Platelet Volume (Mpv) in Patients with Type 2 Diabetes Mellitus at Cmch&Rc**

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**Background:** Diabetes is a global health burden which leads to microvascular and macrovascular complications that are associated with long-term damage to various organ systems. Vascular disease in diabetes is due to the effects various factors like advanced glycation product, increased production of endothelial growth factors, chronic inflammation, increased platelet aggregation. Mean platelet volume (MPV) is one of the markers of platelet function and activation which can be measured easily in the laboratory.

**Objectives:** To study the difference in MPV between the healthy subjects, diabetics without complication and the diabetics with vascular complication.

**Materials And Methods:** This Cross sectional study was conducted by including 120 participants with the approval of IRB and patient’s consent at CMCH&RC within the period of one month. Participants who were above 18years old were included in the study and were categorized into three groups

**GROUP A:** Non-diabetic controls

**GROUP B:** Type 2 Diabetes Mellitus without any diabetes related complications.

**GROUP C:** Type 2 Diabetes Mellitus with complication

Patients with anemia, bone marrow disorders, Chronic systemic inflammatory disorders, Liver disease, any infectious diseases, Cancer chemotherapy, Smoking, Alcoholism, pregnancy were excluded.

MPV was measured by an automatic blood counter.

**Statistical Analysis:** SPSS 21 was used. Unpaired t test was used.

**RESULTS:** Mean values of mpv was higher in diabetics (mean=8.5fl) when compared to the non-diabetic (mean=7.5fl) control & the difference was statistically significant. Mean value of MPV was more in diabetics with complication (mean=9.1fl) than the
diabetics without complication (mean=8.5fl) and it was statistically significant.

Conclusion: MPV can be used as a prognostic marker of vascular complications in diabetes.

Keywords: Mean platelet volume, Type II diabetes mellitus.

FPP-MEP-115

Correlation of Urine Albumin Creatinine Ratio with Hearing Disability in Diabetes Mellitus

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Introduction: Diabetes is a metabolic disorder characterized by hyperglycemia which leads to micro vascular and macro vascular complications. Glomerular involvement in diabetes leads to increased excretion of urine albumin. Micro albuminuria is an indicator of vascular dysfunction and kidney injury. The diabetic sensorineural hearing loss is due to micro angiopathic changes in the endolymphatic sac and basilar membrane vessels. The correlation between kidney injury and hearing impairment in diabetes mellitus has been added in this study.

Aim and objectives: To find out the correlation of urine albumin creatinine ratio with hearing impairment in type 2 diabetes mellitus.

Methodology: This was a cross sectional study conducted during August 2017 at CMCH& RC, Trichy. Sixty adult participants with Type 2 diabetes were included and other systemic diseases were excluded from the study. With consent, spot urine sample was collected and audiometry test was performed. The urine albumin creatinine ratio was correlated with hearing impairment (PTA average). IEC approved this study.

Statistical Analysis: Pearson correlation test were used. Data was analyzed using SPSS Version 23

Results and Conclusion: Urine albumin creatinine ratio in subjects with type 2 diabetes mellitus were found to be negatively correlated with hearing ability. Hence urine albumin creatinine ratio may be done as a screening to rule out cochlear dysfunction due to uremia in patients with type 2 diabetes mellitus.

Keywords: Diabetes mellitus, Hearing impairment, Urine albumin creatinine ratio.

FPP-MEP-116

Comparative Study of Serum Iron Indices among Euglycemic Offsprings of Diabetic and Non Diabetic Patients.

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Background: Diabetes is a metabolic disorder predisposed by both genetic and environmental factors. Excess iron within physiological limit is a potential risk factor for T2DM along with other risk factors like obesity, age and family history. Effect of iron on development of T2DM has gained importance on research especially among the offsprings of diabetic patients.
OBJECTIVE:

1. To compare serum iron indices (serum ferritin, serum iron and serum TIBC) among offsprings of diabetic and non-diabetic parents

Material and Methods: This is a comparative study having total 88 subjects – 44 with family history with at least one parent being of T2DM and 44 without family history of T2DM. Subjects include both males and females in the age group 30-40 years. Body mass index, fasting blood sugar, serum iron indices and lipid profile were compared.

Results: Age and BMI was matched. The present study showed a significant increase in serum iron (P < 0.001), TIBC (P < 0.001) and serum ferritin (P < 0.001) among offsprings of diabetic patients compared to non-diabetics.

Conclusion: Offspring of type 2 diabetics have iron overload load even before the change in glucose metabolism become apparent which is an additional risk factor for developing T2DM.

Key Words: diabetic patients, offsprings, serum iron indices

FPP-MEP-117

A Comparison of Salivary and Blood Glucose in Type II Diabetics in Different Age Groups

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Background: To examine effects of age on salivary and blood glucose in type II diabetics and healthy adults.

Objectives: To estimate and study the effect of age on salivary and blood glucose levels in type II diabetics.

Material and methods: 80 adults in age group of 30-50 years were included in the study and divided into 2 groups - diabetics and healthy adults. Both groups were further divided into 4 groups based on age (30-35, 36-40, 41-45, 46-50 years). Blood and saliva samples were obtained from subjects after overnight fast and 2 hours postprandial. Blood samples were analysed with hexokinase enzyme (automated analyser) and saliva samples with glucose oxidase enzyme (colorimeter). Salivary glucose levels were compared between diabetics and healthy adults by t-test. Relationship between salivary and blood glucose was assessed by correlation test. Difference in salivary and blood glucose levels between age groups was determined by Kruskal-Wallis test.

Results: Salivary glucose is significantly higher in diabetics (P < 0.001). No correlation was observed between blood and salivary glucose. Blood glucose is highest in 36-40 years and salivary glucose in 46-50 years age group.

Conclusion: Salivary glucose levels are significantly higher in diabetics. There is a temporal shift in the age of diagnosis of diabetes.

Keywords: salivary glucose, non-invasive, diagnosis, type II diabetics

FPP-MEP-118

Effect of Vitamin D Supplementation on Glycated Hemoglobin in Prediabetes with Hypovitaminosis D Subjects

Background: Role of vitamin D has been a topic of recent interest in pathophysiology of Diabetes & several studies have shown
association between vitamin D deficiency & impaired glucose homeostasis.

**Objective:** To evaluate effect of correction of vitamin D deficiency on HbA1c in Prediabetes

**Methods:** Double blind randomized placebo controlled trial. Sample size calculated as 46/group. Eligible participants were adults aged 25 yrs and above with prediabetes and Hypovitaminosis D. They were randomly assigned in 1:1 ratio to receive vitamin D [60000 IU vitamin D3/week] or placebo. HbA1c was measured by BIORAD D-10 before and after the supplementation.

**Results:** Mean age was 40.44 ± 9 years (vitamin D group) and 40.89 ± 9.13 years (placebo group). After supplementation with weekly 60000 IU, the vitamin D level got corrected from Hypovitaminosis to vitamin D sufficient levels. In placebo group, there was no significant change in vitamin D levels. Mean HbA1c changed from 5.79 ± 0.35 to 5.73 ±0.37 in vitamin D group and 5.79 ± 0.35 to 5.84 ± 0.36 in placebo group. There was no significant difference found before and after supplementation in both groups. The between group comparison showed a change of -0.061 ± 0.35 in vitamin D group and change of 0.04 ± 0.32 in placebo group. The difference was statistically not significant with p value 0.136.

**Conclusion:** There was no significant change in glycated haemoglobin levels in prediabetes subjects with Hypovitaminosis D after correction of vitamin D levels.

**Keywords:** Hypovitaminosis D, Prediabetes, HbA1c, vitamin D supplementation.

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**FPP-MEP-119**

**Role of Thyroid Hormones on Glucose Homeostasis in Pre and Post-Menopausal Diabetic Women.**

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**Background:** Thyroid and Diabetes are the two most common endocrinopathies usually seen in women. Excess or Deficiency of either insulin or thyroid hormones results in functional abnormalities of one another which may leads to Hypo or hyperthyroidism usually affects diabetes.

**Objectives:** Our study aimed to evaluate the effect of thyroid hormones on glucose homeostasis in Pre and Post-menopausal Diabetic women.

**Materials and Methods:** Total seventy women, among them 35 pre-menopausal diabetics aged between 25-45 years & 35 post-menopausal diabetics aged between 46-65 years were assigned for our study. Anthropometric & Physiological parameters were taken and complete blood count, Fasting blood glucose (FBS), Glycosylated hemoglobin (HbA1C), Thyroid hormone profile (T3, T4, TSH) levels were analyzed.

**Results:** In our study we found, there is no significant change in BSA of both the groups but, there is non-significant decrease (p<0.05) in BMI, Waist to Hip ratio of Pre-menopausal diabetics compared to Post-menopausal diabetics where as significant decrease in SBP & non-significant decrease in DBP & significant decrease in HbA1C levels of premenopausal diabetics compared to
Post-menopausal diabetics. There is significant decrease in T3 and non-significant decrease in T4 and non-significant increase in TSH levels of Pre-menopausal Diabetics compared to Post-menopausal diabetics.

**Conclusion:** These finding suggests there is more prevalence of “Hyperthyroidism” in Post-menopausal diabetics and “Hypothyroidism” in Premenopausal diabetics. So prompt recognition of thyroid dysfunction in diabetics of Pre & Post-menopausal women, routine thyroid screening should be recommended to detect abnormalities of thyroid in Diabetic women.

**Keywords:** Thyroid Hormones, Glucose homeostasis, Pre-menopausal Diabetic, Post-menopausal Diabetic.

FPP-MEP-120

**Study of Anthropometric Parameters in Children (18-25 Yrs) of Diabetic Parents in Medical Students, Agra**

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**Introduction:** Known as the diabetic capital of the world, India has been witnessing an alarming rise in incidence of diabetes. In India about 69 million people are living with diabetes. Overweight, physically inactive and a family history of diabetes all contribute to the risk of developing type-2 Diabetes. Positive family history contributes to two- to fourfold increase in cases of diabetes.

**Objective:** To study the anthropometric parameter in the childrens whose parents are diabetic and non-diabetic.

**Material and methods:** This Cross-sectional study was done on 250 medical students of SN Medical College, Agra, of age group 18–25 years from 2015-2017. On the basis of their parental history of diabetes, subjects were divided into 2 groups .Children of diabetics parents (Group-1), non-diabetic parents (Group-2). BMI were recorded from the two groups.

**Results:** Out of total 250 students, 15.2% students are overweight and 2.4% are obese. In group1, 4.8% were found to be overweight and 0.8% were obese. In group2, 10.4% were overweight and 1.6% were obese. The mean BMI of Group-1 and Group-2 is 22.21 ± 3.50 and 22.15 ± 3.19 respectively.

**Conclusions:** Higher percentage of overweight and obese are found in the children of diabetic parents as compare to non-diabetic parents.

**Key words:** Type 2 diabetes, Family history, diabetic and nondiabetic parents, BMI.

FPP-MEP-121

**Vitamin D Status of Apparently Healthy Female Adolescents of Manipur, India**

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**Background:** Although vitamin D deficiency has been documented as a frequent problem in studies of young adults, elderly persons and children in other countries and also in our country, there are limited data on the prevalence of this nutritional deficiency among healthy female adolescents in the North Eastern part of our country particularly in the state of Manipur.

**Objectives:** To determine the prevalence of vitamin D deficiency in healthy female
adolescents of Manipur aged 11 to 19 years.

**Material and Methods:** A Cross sectional study conducted in the department of Physiology, RIMS, Imphal and from selected schools of urban and rural districts of Manipur. Serum vitamin D was analyzed by using Automated Microplate ELISA Reader and data collected was analyzed by using SPSS version 21(IBM).

**Results:** Out of 108 students, 24 (22.2%) were vitamin D insufficient, 35 (32.4%) were Vitamin D deficient and 49 (45.4%) were having normal vitamin D level. Overall 59(54.6%) of study participants were either vitamin D deficient or insufficient. Mean ± SD of vitamin D levels in urban and rural adolescent girls were 28.58 ± 12.72 and 21.49 ± 9.15 respectively and was found to be statistically significant (p= .000).

**Conclusion:** In this study 59.6% adolescent girls were having either deficient or insufficient 25-OH (D) level. There is significant difference in 25-OH (D) level between urban and rural areas.

**Keywords:** Vitamin D sufficiency, insufficiency and deficiency.

**FPP-MEP-122**

**Vitamin D Deficiency Correlates with Pancreatic Exocrine Function in Chronic Pancreatitis Patients**

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**Background:** Chronic pancreatitis adversely affects fat digestion and may cause deficiency of fat soluble vitamins.

**Objectives:** To examine degree of pancreatic insufficiency and its relation with vitamin D levels in chronic pancreatitis (CP) patients.

**Materials and methods:** A cross sectional study was conducted in 40 CP patients and 40 healthy controls between January 2016 and December 2016. Disease characteristics and imaging features were recorded. Plasma vitamin D and fecal elastase1 as a marker of pancreatic exocrine function was measured using ELISA kits.

**Results:** The mean vitamin D level was significantly lower in CP patients than controls (16.91 ± 7.17 vs 26.43 ± 6.09 ng/ml, p < 0.001). Percentage of low vitamin D level (≤30 ng/ml) was significantly higher in CP patients as compared to controls. Seventy percent of CP patients had severe exocrine insufficiency (fecal elastase1 < 100 µg/g) and 20% had moderate insufficiency (101-200 µg/g). Plasma vitamin D level and fecal elastase1 had significant positive correlation (r = 0.456, p < 0.001). Receiver operating characteristic curve (ROC) analysis was performed to predict the development of vitamin D deficiency at various fecal elastase1 level and it indicated an area under curve (AUC) of 0.755 ± 0.101 (95% CI: 0.557-0.954). The optimal cutoff value was 112.5 µg/g (sensitivity 92.3%, specificity 71.4 %).

**Conclusion:** Vitamin D deficiency correlates with pancreatic exocrine insufficiency in CP patients.

**Keywords:** chronic pancreatitis, vitamin D, fecal elastase1, exocrine insufficiency.
A Study of Overweight and Obesity among Housewives of Different Socioeconomic Status in Bengaluru City

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Background: Prevalence of obesity and overweight has increased from past few decades worldwide, including India. Obesity is considered to be a predisposing factor for chronic diseases - such as heart disease, cancer, diabetes, stroke, and arthritis - are the leading causes of disability and death.

Objectives: This study aimed to see relation of obesity and overweight, with socioeconomic status and household activity among housewives (HW) in Bengaluru city.

Materials and methods: HW were assigned to either Upper class (UC), Upper Middle Class (UMC), Lower Middle Class (LMC) and Upper Lower Class (ULC) groups. Obesity and overweight were assessed in each group and they were inquired about their daily household activity and physical activity.

Results: The prevalence of overweight and obesity among HW were found higher in UC group compared with UMC, LMC and ULC groups. Involvements of HW in daily household activities were observed to be higher in ULC and LMC than in UMC and UC.

Conclusion: These findings suggest that prevalence of overweight and obesity is higher in HW belonging to UC families, which may be due low household activities.

Key words: Housewives, Body Mass Index, Upper class, Upper middle class, lower middle class, Upper lower class.

Influence of Body Fat Percentage on Blood Pressure Responses to Isometric Hand Grip Test among Young Individuals

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Background: Sedentary lifestyle promote weight gain, increase body fat, loss of lean muscle mass leading to metabolic syndrome, which can be managed by proper exercise. In the present study, we investigated the influence of body fat percentage on blood pressure responses to isometric hand grip test in young adults.

Materials and Methods: Fortysubjects having general obesity among staff and student community, between the age group of 18 to 40 years of either sex was recruited and their fat percentage was measured based on the Deurenberg’s equation. The muscular strength was assessed by Hand grip exercise using Hand dynamometer.

Statistical Analysis: The data was analysed using independent samples t-test and Pearson correlation test and P value less than 0.05 will be considered the level of significance.

Result: There was a significant correlation between hand grip performance at different interval of time and fat percentage in both right hand (p<0.05)
and left hand (p<0.005). The association between Body Mass Index and fat percentage was found to be significant (r=0.349, P=0.027).

**Conclusion:** The association between Body Mass Index and fat percentage was significant whereas, the correlation between fat percentage and blood pressure response was insignificant.

**Keywords:** Fat percentage, Body Mass Index, Muscle strength, Isometric hand grip test

**FPP-MEP-125**

**Correlation between Levels of Hba1c and IOP in Patients of Type II Diabetes Mellitus**

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**Background:** IOP is affected by various systemic and local factors. Diabetes mellitus is an important risk factor for raised IOP. Raised IOP is associated with a potentially blinding condition known as glaucoma.

**Aim and objective:** To investigate the association between levels of HBA1C and IOP in patients of Type II diabetes mellitus

**Material and method:** Total 150 subjects were included in the study. The subjects were divided into two groups. Group I included 50 age and sex matched normal healthy subjects constituting the control group. Group II consisted of 100 diabetic subjects. Group II was further subdivided into 3 subgroups: Group II A consisted of 34 subjects diagnosed with Type II diabetes mellitus with HbA1C levels <7%, Group IIB consisted of 35 subjects diagnosed with Type II diabetes mellitus with HbA1C levels between 7%-8% and Group IIC consisted of 31 subjects diagnosed with Type II diabetes mellitus with HbA1C levels >8%. The subjects were investigated for HbA1C, fasting, postprandial blood sugar levels and IOP measurement was done by Goldmann Applanation tonometer.

**Result:** The mean IOP of subjects of Group II was higher than Group I (P<0.005). The mean IOP of IIA ,IIB and IIC were 16.58±0.34 mm of Hg ,17.16±0.78 mm of Hg and 18.72±0.85 mm of Hg. The difference of IOP was found to be statistically significant (p<0.005)

**Conclusion:** The diabetic subjects are prone to higher IOP and especially the subjects with poor glycemic control were more prone to raised IOP. Diabetic subjects should be regularly screened for IOP so that burden ocular morbidity due to glaucoma can be reduced

**Key words:** HBA1C and IOP

**FPP-MEP-126**

**Correlation of BMI with Glycemic Control in Type2 Diabetes Mellitus Patients.**

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**Background:** Obesity is highly prevalent in the modern world and it is associated with the development of a number of serious medical complications, like type 2 diabetes and cardiovascular diseases. Indians have a genetic phenotype characterized by low BMI, but with high upper body adiposity, high body fat percentage and high level of
insulin resistance. With this low BMI, but with high body fat percentage, there is increased prevalence rate of metabolic perturbations and DM, which is one of the cardiovascular risk factor.

Objective: This study was undertaken to find out the correlation or association between body mass index and glycemic control in diabetic patients and thus benefits of maintaining BMI in diabetic patients.

Materials and Methods: This study was conducted at Basaveshwara Medical College & Research Institute, Chitradurga, after getting the approval of the Institutional Human Research Ethics Committee.

Sample size was 90, previously diagnosed diabetic patients between 26–45 years. Inclusion and exclusion criteria were laid down, informed consent was taken, thorough clinical examination was done. Estimation of glycated hemoglobin and anthropometric measurements were done.

Body Mass Index (BMI) was calculated based on the WHO formula-BMI = Weight in kg/Height in mt².

Observations and results: Descriptive statistics and Pearson’s correlation was applied.

When we compared BMI and glycated Hb values there was no significant correlation found.

Conclusion: BMI has no correlation with glycemic control in our study, however maintenance of BMI in diabetic patients with change in lifestyle like yoga, walking and diet may delay the complications of diabetes.

Key words: glycemic control, anthropometric measurements, obesity, BMI

AYUSH

FPP-AAY-127

Effect of Rajyoga Meditation on Vo₂ Max- A Pilot Study in Central India.

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Background: Relaxation of body, mind with positive approach has been successfully achieved by Rajyoga meditation. It is the science and art of harmonizing spiritual mental and physical energy. Meditation has a number of positive effects on the physiology of human body. Physical fitness depends mainly on cardio-respiratory endurance of an individual. VO₂ max (maximal oxygen uptake/ maximal aerobic power) is widely accepted as the best measure of cardio-respiratory endurance.

Objectives: To find out the effect of Rajyoga meditation on VO₂ max.

Methodology: 40 healthy male volunteers in the age group of 18–20 years were included in the study. They were randomly allocated into two groups by blind-cheat technique with 20 subjects in each group. Group-A subjects were given intervention in the form of Rajyoga meditation under the guidance of Rajyoga trainer for duration of 4 months while Group-B subjects acted as control. VO₂ max was assessed in both the groups using metabolic analyser (AD-Instrument) before and after completion of study.

Results: Student’s paired ‘t’ test was used to compare pre and post interventional
results. Increased VO2 max was seen in group-A as compared to group-B. *P* < 0.05 was considered statistically significant.

**Conclusion:** VO2 max indicates physical fitness of an individual. Increased VO2 max after Rajyoga meditation ensures good cardio-respiratory endurance.

**Keywords:** Rajyoga meditation, VO2 max, Physical fitness.

**FPP-Ay-128**

**Influence of Short Term Practice of Yoga on Cognition among Pre-University Students**

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**Background:** Yoga is one of the six orthodox systems of Indian philosophy which is viewed as a physical, mental and spiritual discipline that confers a sound body and sound mind. One of the main aims of practice of yoga is to have good cognitive control. Pre-University education is a very important stage in the educational ladder of students. At this stage students are in need of good cognitive abilities.

**Objectives:** To examine the effect of practice of yoga on cognitive skills of Pre-university students.

**Methodology:** 80 Pre-university students were recruited based on inclusion and exclusion criteria. Out of which 37 were practicing yoga regularly for minimum 30min per day since 2 months. After taking written informed consent, Cognition test for two domains – attention and executive functions were performed with Digit vigilance test and Category fluency respectively. Results were statistically analyzed using student’s t test.

**Results:** Time taken for Digit vigilance test by students practicing yoga and controls were 513±13.9 and 525±12.86 with *P* value 0.00048. Number of names in Category fluency by students practicing yoga and controls were 11.27±1.25 and 9.97±1.31 with *P* value 0.0005. *P* value <0.05 was taken as significant. Students who were practicing yoga had performed better in tests for both attention and executive functions than the control group.

**Conclusion:** Short term practice of yoga has a beneficial effect on cognition in the Pre-university students attributing to its neuro-modulatory effect. Including yoga in the curriculum of Pre University education might help the students have better cognitive abilities.

**Key Words:** Cognition, Yoga, Attention, Executive function, BDNF

**FPP-Ay-129**

**Effect of Pranayama on Pulmonary Function of Healthy Older Adults**

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**Background:** Pranayama is gaining importance in the present day world and is known to be an excellent rejuvenator of the respiratory system. It helps to reduce sympathetic overactivity and improves parasympathetic functioning, leading to a sense of feeling good. The effect of Pranayama on pulmonary function is being increasingly looked upon in the research field.
**Objectives:** To assess the change in pulmonary function of healthy older adults after 1 month of Pranayama.

**Materials and Methods:** Institutional Ethics and Research Committee clearance has been obtained. The study was conducted on 32 volunteers including healthy males and females between 50-65 years of age. The parameters analyzed are Forced Vital Capacity (FVC), Forced Expiratory Volume in 1 sec (FEV₁), Forced Expiratory Flow at 25-75% (FEV₂₋₅₋₇₅%) and Peak Expiratory Flow Rate (PEFR) and have been assessed after one month of practice using a portable standardized Spirometer with built in printer- Spirolab III.

**Result:** Pranayama has improved the lung parameters: FVC (p< 0.0001), FEV₁ (p< 0.0001), FEV₂₋₅₋₇₅% (p< 0.0001) and PEFR (p< 0.0001) of the healthy older adults.

**Conclusion:** The findings suggest that Pranayama has got beneficial effects on the pulmonary function of healthy older adults and hence can be advised as a lifestyle modification aid.

**Keywords:** Pranayama, Pulmonary Function, Spirometer-Spirolab III, Healthy Older Adults

**FPP-AY-130**

**Role of Abhyana, Katibasti on Nerve Conduction Studies in Sciatica**

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**Background:** Sciatica is a clinical condition characterized by severe pain started from the low back region and radiating down along the course of the leg. This is a common entity encountered in clinical practice. Most often this is due to lumbar disc prolapse.

**Aim:** Effect of Abhyanga, Katibasti on Nerve conduction studies in Sciatica

**Objective:**

1. To observe the effect of nerve conduction velocity in the patients of sciatica.
2. To find out the effect of Abhyanga, Katibasti on Nerve conduction studies in Sciatica

**Method and materials:**

This study has been carried out in the department of Panchakarma, while working in the OPD and IPD in the Department many patients has been found suffering from Sciatica. NCV were carried out before & after the Abhyanga, Katibasti.

**Result:** The result observed in the patient of sciatica was decreased conductional velocities. This also shows the positive effect on the Nerve conduction studies after the treatment of Abhyanga, Katibasti in the sciatica.

**Conclusion:** Conductional velocity shows significant changes after the abhyanga and katibasti in the patients of sciatica, it should be one of the best line of treatment in the sciatica.

**Keywords:** NCV- Nerve conduction velocity, Sciatica, LBP - Low back pain.
FPP-AY-131

A Pilot Study to Assess the Effects of Yoga Bellows Type Breathing on Attention

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Background: Yoga bellows type breathing has been shown to improve attention measured with tasks other than P300 Event Related Potential.

Objectives: The present study aims to see the immediate role of yoga bellows type breathing (bhastrika pranayama) on attention as assessed with the P300 latency and amplitude in healthy individuals examined at frontal, central and occipital sites.

Material and methods: Ten normal healthy male volunteers aged between 20 and 30 years, (Mean= 25.8, SD=2.9), with at least 6 months of experience in yoga practice were recruited to this self as control study. Each participant was assessed on two consecutive days for two randomized sessions i.e, yoga bellows type breathing and quiet sitting. The study was approved by the ethics committee.

Trends and inferences: Considering that this was a pilot study with a sample size of ten subjects, no statistics were attempted. The trends show that amplitude increase in Cz site and latency decrease in Fz site of P300 ERP in yoga bellows type breathing bhastrika pranayama.

Conclusions: The results suggest that bhastrika pranayama can improve attention.

Keywords: Event Related Potential, bhastrika pranayama, P300, attention

FPP-AY-132

A Pilot Study to Assess the Effects of Kapalabhati Pranayama on Attention and Arousal

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Patanjali Research foundation, Haridwar, India

Background: Previous studies showed that the practice of Kapalabhati can increase attention and sympathetic activity with reduced vagal activity. Increased sympathetic activity was seen in earlier studies during an attention task.

Objectives: We aimed to assess immediate effects of Kapalabhati pranayama on attention and arousal assessed using the P300 Event Related Potential and heart rate variability.

Material and methods: Participants were 10 normal healthy males (age M±SD, 25.8 ±2.9 years). This was a self as control study where each participant was assessed on two consecutive days for two randomized sessions i.e., Kapalabhati (intervention session) and sitting quietly (control session) for 15 minutes each. Attention was measured by the P300 ERP at Fz, Cz, and Pz scalp sites with linked earlobes as reference and heart rate variability was measured to assess autonomic modulation before and after the practice of pranayama/quiet sitting. The study had ethical clearance from the institution’s ethics committee.

Trends and inferences: Considering that this was a pilot study with a sample size of ten subjects no statistics was attempted. The trends are presented. A trend of increased amplitude of P300 ERP and
decrease in power of Frequency domain analysis of HRV was seen.

**Conclusion:** The results indicate that Kapalabhati can increase sympathetic activity and improve attention which is in line with previous literature.

**Keywords:** Kapalabhati, attention, autonomic balance, P300, HRV

FPP-AY-133

**A Pilot Study to Assess the Effects of Bhramari Pranayama on Attention**

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Patanjali Research foundation, Haridwar, India

**Background:** The practice of bhramari pranayama has been reported to enhance response inhibition and cognitive control, however, there were no studies assessing the effects of this pranayama on attention particularly assessed with the P300 ERP.

**Objectives:** The present study aimed to assess the immediate effects of bhramari pranayama on attention assessed using the P300 ERP.

**Material and methods:** 10 normal healthy male volunteers (age M±SD, 25.8±2.9 years) were recruited for study. This was a self as control study where each participant was assessed on two consecutive days for two randomized sessions i.e., bhramari pranayama (intervention session) and sitting quietly (control session) for 15 minutes each. The P300 ERP component was elicited by the oddball paradigm at Fz, Cz, and Pz scalp sites with linked earlobes as reference before and after the practice of pranayama/ quiet sitting.

**Trends and Inferences:** Considering that this was a pilot study with a sample size of ten subjects no statistics was attempted. The trends are presented. The trends indicated that the P300 amplitude was increased and latency was decreased after the practice of bhramari pranayama.

**Conclusion:** The results suggested increased attention after bhramari pranayama, Future studies with an increased sample size may confirm our findings.

**Keywords:** bhramari, attention, P300, ERP.

FPP-AY-134

**A Pilot Study to Access the Effect of Breath Awareness on Heart Rate Variability**

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Patanjali Research Foundation, Patanjali Yogpeeth, Haridwar, India

**Background:** Previous studies have shown that breath awareness can immediately decrease systolic blood Pressure.

**Objective:** With this background, the present pilot study was designed to assess the immediate effect of (15 minutes) breath awareness on heart rate variability.

**Methods:** Ten healthy male volunteers were recruited with ages ranged between 20 and 30 years (group mean age±SD, 25.8±2.98 years) for the study who have at least 6 months of experience in yoga practice. The design of the study was self as control where each participant was assessed on two consecutive days for two interventions i.e, breath awareness and quiet sitting whereas HRV was assessed before and after each session by using a
two channel ECG (MP 45 Biopac Student Lab, BIOPAC System Inc, U.S.A.). The sessions were assigned randomly using an online randomizer (www.randomizer.org). The study had ethical clearance from the ethics committee of the Patanjali Research Foundation which was formed based on the guidelines of the Indian Council of Medical Research.

**Trends and inferences:** Considering that this was a pilot study with a sample size of 10 subjects no statistics were attempted. Trends indicate decrease in PNN50, increase in NN50 of time domain analysis and increase in HF Power and decrease in LF Power of frequency domain analysis was seen after *breath awareness*.

**Conclusion:** A non-significant change in heart rate variability is attributed to small sample size. Future studies with a larger sample size may come out with significant changes.

**Key words:** *Breath awareness*, HRV, autonomic modulation, arousal.

**FPP-AY-135**

**A Pilot Study to Assess the Effects of Bhastrika Pranayama on Heart Rate Variability**

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**Background:** A previous study showed that *bhashrika* pranayama can increase parasympathetic activity. But there is no study which investigated the effect of *bhashrika* pranayama on the autonomic function assessed with heart rate variability.

**Objective:** The present pilot study aimed to evaluate the changes in heart rate variability after *bhashrika* pranayama.

**Methods:** Ten normal healthy male volunteers ages between 20 and 30 years (group mean age±SD, 25.8±2.98 years) having at least 6 months of experience in yoga practice took part in the study. The design of the study was self as control. Participants were assessed on two separate days for two different sessions, each of 15 minutes i.e, *bhashrika* pranayama and quiet sitting. HRV was assessed before and after each session by using a two channel ECG (MP 45 Biopac Student Lab, BIOPAC System Inc, U.S.A.). The sessions were assigned randomly using an online randomizer (www.randomizer.org). The study had ethical clearance from the ethics committee of the Patanjali Research Foundation which was formed based on the guidelines of the Indian Council of Medical Research.

**Trends and inferences:** Considering that this was a pilot study with a sample size of 10 subjects no statistics were attempted. Trends indicate increase in pNN50, decrease in NN50 of time domain analysis and increase in LF power and decrease in HF power of frequency domain analysis was seen after *bhashrika* pranayama.

**Conclusion:** The trend suggest an increase in vagal activity of the HRV after *Bhashrika* pranayama

**Keywords:** *Bhashrika*, HRV, autonomic modulation, arousal.
Rajayoga Meditation Practice Alters Grey Matter Volume and Functional Connectivity in Specific Brain Areas for Attention and Internalization: An Observational Study Using Smri and Fmri

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Background: Cortical gray matter (GM) and resting state functional connectivity (RSFC) variations are observed in various types of meditation practice. Variations in GM regions depend upon the types of meditation technique practiced. But there are no studies showing variations in specific areas of brain associated with attention and internalization particularly in Brahmakumaris Rajayoga Meditation (BKRM) practitioners.

Objective: The aim of this study was to analyze GM volume and RSFC changes in specific brain regions of BKRM practitioners and compare the same with non-meditators (NM).

Material and Methods: This study was carried out after obtaining ethical committee permission and informed consent from age, gender, handedness matched BKRM practitioners (n=40) and NM (n=40). BKRM technique consists of meditation practice by focusing on a point of light and simultaneously listening to meditation commentaries. During rsfMRI scanning participants were instructed to close their eyes, and not to sleep, move or meditate. Voxel based morphometric analysis was performed on sMRI scans and independent component analysis was performed for rsfMRI.

Results: sMRI scan analysis of BKRM practitioners showed significant GM volume increase specifically in right medial prefrontal gyrus, bilateral temporal gyrus, bilateral precuneus and right middle & left inferior occipital gyrus. Additionally rsfMRI analysis showed significant increase (p<0.05) in RSFC in left prefrontal, precuneus, angular and superior marginal cortices of BKRM when compared with the same in NM.

Conclusion: This study provides observational evidence that BKRM practice enhances GM volume as well as RSFC in specific brain regions known to improve attention and internalization. BKRM technique may thus help to enhance attention and emotional regulation as well as self-realization.

Keywords: MRI, Rajayoga meditation, VBM. ICA.

Effect of Yoga on Insulin Resistance in PCOS Patients

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Background: The phenotype of PCOS is strongly influenced by the presence of insulin resistance, which is present in the majority of women diagnosed with PCOS. Effects of Yoga on insulin resistance in PCOS patients is not well studied.

Objective: We aimed at studying the effects of yoga on insulin resistance by measuring Homeostasis Model of...
Assessment - Insulin Resistance (HOMA-IR) in PCOS patients both pre and post yoga.

**Material And Method:** The study was carried out in Department of Physiology in collaboration with Department of Obstetrics and Gynecology and Department of Biochemistry at Lady Hardinge Medical College, New Delhi. Blood samples of newly diagnosed cases (n=30) were collected after an overnight fast for measuring fasting insulin and fasting blood sugar (FBS) level for calculating HOMA-IR. These patients were then advised yoga practices for a period of 12 weeks. After 12 weeks they were again called for biochemical analysis. Results were compared using paired ‘t’ test pre and post yoga.

**Results:** The FBS levels (mg/dl) of these PCOS patients was 95.73±3.23 and Fasting Insulin levels (µU/ml) was 14.89±1.47. The HOMA-IR calculated was 3.76±0.5 (Normal value <2) depicting insulin resistance in PCOS patients. With practice of yoga, there was a significant decrease in values of FBS (91.83±2.17) (p< 0.01) and highly significant decrease in fasting serum insulin (11.47±1.06) (p< 0.001) and HOMA-IR (2.72±0.32) (p< 0.001), depicting an improvement in insulin resistance after yoga practice.

**Conclusion:** Yoga is effective in reversal of Insulin resistance in patients of PCOS.

**FPP-AY-138**

**Effect of 12 Weeks Practice of Chandranadi Pranayama on Cardiac Autonomic Functions & Perceived Stress Score in Young Adult Male Prehypertensive Subjects**

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**Background:** Pre-hypertensives are more prone to develop overt hypertension and other cardiovascular complications. Decreased cardiovagal modulation is strongly implicated in the genesis of prehypertension and pranayama practice is known to optimize the cardiac autonomic functions.

**Objective:** The present study was conducted to determine the effect of 12 weeks practice of chandranadi pranayama (CNP), the left nostril breathing on cardiac autonomic functions and perceived stress score in young male pre-hypertensive adults.

**Methodology:** Thirty young adult male pre-hypertensive subjects (systolic BP 120–139 mm Hg and/or diastolic BP 80–89 mm Hg) were recruited for the study. Among the thirty, 15 were designated as study group. They underwent CNP practice for a period of 12 weeks daily, twice for 20 minutes. The other 15 pre-hypertensive subjects served as control group and they did not undergo any intervention. Basal Heart Rate (BHR), Systolic blood pressure (SBP), Diastolic blood pressure (DBP), Perceived stress score (PSS) and cardiac autonomic reactivity test (30:15 ratio, E:I ratio, ∆ DBD<sub>inh</sub>) were recorded at baseline and after 12 week period in the Autonomic function testing lab of Department of Physiology, JIPMER.

**Results:** BHR, SBP, DBP and PSS were significantly reduced (P<0.05). 30:15 ratio and E:I ratio were significantly increased (P=0.002 and P=0.003) in the study group after 12 weeks practice of CNP. There was no statistical significant change observed in the measured parameters in the control group.
Conclusion: Our findings reveal that 12 weeks practice of single slow pranayama (CNP) by pre-hypertensive adults, showed a significant improvement in vagal tone.

Key words: Prehypertension, Cardiac Autonomic Reactivity Test, Pranayama practice

FPP-AY-139

Immediate Effect of Savitri Pranayama on Anxiety and Stress Levels in Young Medical Undergraduates.

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Background: Yoga is an ancient culture as well as an art of our Indian heritage. Regular practice of various yogic techniques leads to ideal physical, mental, intellectual, and spiritual health. Pranayama is one such yogic practice which has a number of physiological effects on various systems in our body.

Aim: The aim of the present study was to see the immediate effect of savitri pranayama on anxiety and stress levels in young population.

Materials and methods: The present study was conducted in department of physiology in MGMCR in order to prove the beneficial effects of savitri pranayama on anxiety and stress levels amongst 250 (age > 18 years) undergraduate medical students during their lecture hours. Items for assessing anxiety and stress were picked up from DASS 21, a self-report questionnaire designed to measure the severity of a range of symptoms common for depression, anxiety and stress. Questionnaire was administered to all the participants before and after pranayama sessions. The students were asked to perform the savitri pranayama for 4 cycles (each cycle for 5 minutes) during the 2 hours session.

Results: There was decrease in anxiety and stress levels after pranayama session. However, statistically significant difference was found only in stress score (p= 0.011) and not in anxiety score (p=0.102) of the subjects before and immediately after performing savitri pranayama.

Conclusion: Yogic relaxation techniques such as savitri pranayama can be used to reduce anxiety and stress levels in young individuals.

Key words: Anxiety, Stress, Savitri pranayama, Medical students, Relaxation

FPP-AY-140

Effect of Yoga on Cardiovascular Autonomic Activity and Reactivity in Essential Hypertensive Patients

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Background: Despite, long-term normalization of blood pressure by anti-hypertensive drugs in essential hypertensive (EH) patients, there exist autonomic dysfunction. Yoga is known to decrease BP in EH patients, however, it is not much clear whether combined yogic practices improve cardiovascular autonomic regulation in EH patients.

Objectives: To study the effect of yoga on cardiovascular activity and reactivity in EH patients.

Methods: The study included 40 essential hypertensive patients. They were
randomized into yoga (n=20, age 46.71±8.79 years) and control (n=20, age 44.8±7.47 years) groups. Yoga group practiced meditation, pranayama and few easy asanas for 40 min/day for one month. Control group did not practice yoga or any relaxation procedures. Cardiac autonomic activity was assessed using short-term heart rate variability (HRV) and reactivity using deep breathing (DBT), Valsalva Maneuver (VM), Handgrip (HGT) and Lying to standing (LST) tests in both groups at zero and after one month. Institutional Ethical Committee approved the study.

**Results:** Both groups had comparable age, height, weight, BMI, SBP, DBP, HR, and respiratory rate. SBP, DBP, HR, and BMI decreased in yoga group, time domain measures of HRV, which are markers of cardiac parasympathetic activity [SDNN: 29.8.9(18-33.9) vs 35.2(26.87-38.8) ms, p=0.013; rMSSD: 13.5(11.5-21.86) vs 37.4(30.9-43.3) ms, p=0.001] increased in yoga group as compared to control group after yoga. E:I ratio and Valsalva ratio, which are indicators of parasympathetic reactivity also increased in yoga group.

**Conclusion:** Both parasympathetic activity and reactivity increased in EH patients after a month of yoga practice. It indicates that yoga increases cardiac autonomic modulation by increasing cardiac parasympathetic activity.

**Key words:** Essential hypertension, Autonomic activity, heart rate variability, parasympathetic

**FPP-AY-141**

**Effect of Short-Term Yoga-Based Lifestyle Intervention on Attention Bias to Food Images and Working Memory in Overweight/Obese Subjects**

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**Background:** Obesity may be associated with cardiovascular diseases, diabetes type 2, neurological disorders, sleep apnea, and cognitive impairment. The aim of the study was to investigate whether cognition might be positively modified by short-term yoga-based lifestyle intervention in overweight/obese subjects.

**Objective:** To study the effect of a short-term yoga-based lifestyle intervention on attention bias to food images and working memory in overweight/obese subjects.

**Methods:** Interventional study conducted at Integral Health Clinic (IHC), Dept of Physiology, All India Institute of Medical Sciences (AIIMS), New Delhi. A total of 25 overweight/obese subjects, age: 18-50 years, BMI: ≥ 23 and <35 kg/m², and gender both male and female, were included in the study. Cognition was assessed using an eye-tracking paradigm with a visual probe task. Eye movements were recorded in fasting conditions pre and post yoga intervention. Psychology experiment building language (PEBL) software was used. Working memory was assessed by n-Back test.

**Results:** There was a significant reduction in duration and direction bias to food images especially to high caloric food, post yoga intervention. There was no statistical significant difference in correct responses and reaction time of the subjects in n-Back test.

**Conclusion:** The present observations from our study indicated that direction and duration bias to food images might be positively modified following a short-term yoga-based lifestyle-intervention in overweight/obese subjects.

**Keywords:** Cognition, Eye tracking, Probe task, Yoga-based lifestyle-intervention
FPP-AZ-142

Influence of Short and Long Term Rajyoga Meditation on Cognitive Performance

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Background: Rajyoga meditation (RYM) has demonstrable effects on psychological health and cognitive performance of an individual.

Objectives: The present study was conducted to elucidate the influence of short and long term RYM practice on cognitive performance of an individual and to ascertain gender differences.

Materials and Methods: 60 participants were divided into three equal groups on basis of duration of RYM; non-meditators (Group I), short-term meditators (Group II-6months-5years) and long-term meditators (Group III->5 years). Cognitive performance was assessed using a neuropsychological test battery.

Results: Omnibus analysis revealed significant main effects of gender, F(7,47)=2.88, Wilk’sΛ=0.700, partial η²=0.30, p=0.014 and duration, F(14,94)=4.48, Wilk’sΛ=0.360, partial η²=0.400, p=<0.001. These were superseded by two way interaction effect of gender and duration, F(14,94)=2.63, Wilk’sΛ=0.516, partial η²=0.281, p=0.003. Univariate ANOVA showed significant difference between Trail making test(TMT)A score F(2,53)=6.76, partial η²=0.203, p=0.002; Letter Cancellation Test (LCT) Time F(2,53)=6.17, partial η²=0.189, p=0.004 and LCT omission F(2,53)=4.23, partial η²=0.138, p=0.020. Group II participants took significantly less time to complete TMTB (p=0.002) and LCT(p=<0.001) as compared to group III participants. Males took significantly more time to complete LCT (p= 0.010) but were able to recall more on Forward Digit Span (p= 0.004) as compared to females.

Conclusions: Variability in cognitive performance was seen across the meditators and non-meditators and amongst the two genders, as indexed by neuropsychological tests findings. Short-term meditators had better verbal recall whereas, long-term meditators exhibited better attention and executive functions. Young and middle-aged people can practice RYM to have better cognition as well as, to delay the age related decline in cognitive functions.

Key-words: Attention, cognitive performance, executive function, mental flexibility, Rajyoga meditation, working memory.

FPP-AZ-143

Immediate Effects of Shitali Pranayama on Reaction Time in Young Medical Professionals at a Tertiary Care Institute

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Background: Reaction time is an indirect index of the processing of the CNS & a simple method of determining sensory motor association & performance. This is essential in split-second decision making as may be required in various job profiles like Pilots, Surgeons etc. Whereas regular long term (weeks-months) practice of Pranayamic breathing techniques has shown to bring about reduction in reaction time, which is a favourable outcome, the study of immediate effects of Pranayama on reaction time has not received proportionate attention.
Objectives: To study and compare the pre and post Shitali Pranayama Auditory & Visual Reaction times.

Materials & Methods: Participants consisted of 30 normal subjects (resident doctors & teaching staff in a tertiary care institute) in the age group of 25 - 30 years. Their Auditory & Visual reaction times were measured before and after Shitali Pranayama.

Results: The paired t-test was applied & the post Shitali Pranayama Auditory & Visual Reaction times showed statistically significant decline as compared to pre Shitali Pranayama Auditory & Visual Reaction times (p<0.01).

Conclusion: These findings suggest that Shitali Pranayama can reduce reaction time as an immediate effect, which is beneficial to individuals in time-critical professions.

Keywords: Auditory Reaction time, Visual Reaction time, Shitali pranayama.

Poincare Plot Descriptors in HRV of Healthy Individuals – Ayurvedic Prakriti Based Understanding

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Background: HRV is beat to beat variation of RR intervals in ECG. Poincare plot is a graphical representation of successive RR interval. The standard descriptors SD1 &SD2 represent short-term and long-term variation in HRV. The healthy individual responds differently to autonomic stimulus and Ayurvedic concept “Prakriti” explains classification of humans based on observable phenotypic variation. We hypothesized Poincare plot descriptors varies in Prakriti classified healthy individual.

Objectives: The aim of the study is to determine and compare Poincare plot descriptors in 5 min HRV in Prakriti classified healthy individuals.

Material and methods: The Prakriti were identified using CSIR-IGIB Prakritiques onnaire. Totally 225 healthy individuals screened for predominant Prakriti identification and 6 Kapha (age = 20.83 ± 0.75), 7 Pitta (age = 20.43 ± 0.53) & 7 Vata (age = 21.29 ± 1.49) predominant Prakriti individuals identified. The 5 min HRV recorded in the supine resting state in lead II configuration using Biopac MP-150. The raw data analyzed by software HRVanalysis v.1.1.

Results: The Vata prakriti has lower SD1(ms) than Pitta, Vata vs Pitta; Median (IQR) 21.82 (18.94-32.56) vs 48.31(33.71-67.80) with p-value = 0.039 and SD1 nu (%), Vata vs Pitta; 3.08 (2.59–4.48) vs 5.73 (4.56 - 6.91) with p-value = 0.030. The SD1/ SD2 ratio is also lower in Vata Prakriti than Pitta, Vata vs Pitta; 0.47(0.32-0.53) vs 0.68 (0.68-0.83) with p-value = 0.044.

Conclusion: The Vata Prakriti has lower parasympathetic activity determined by lower SD1(ms) & SD1 nu (%). Poincare plot descriptors vary on the basis of Prakriti, further study needed to establish the relation of Prakriti with other HRV parameters and its autonomic neural relation.

Key words: Heart rate variability, Poincare plot, Prakriti
**PHARMACOLOGY**

**FPP-PH-145**

Computer Assisted Learning as a Teaching Method in Experimental Pharmacology: Boon or Loss?


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**Background:** Over the recent years there has been a progressive reduction in the use of animals for teaching purpose due to ethical consideration. CAL (Computer assisted learning) is one of the non-animal alternatives in experimental pharmacology to simulate the live experiment using animals. It offers benefits of being reproducible, time saving and having minimum errors.

**Objectives:** To study the effectiveness of CAL by comparing pre-test and post-test among second year M.B.B.S students.

**Methods:** A total of 71 students participated in the study. They were given a set of multiple choice questions on a selected topic (Effect of Diazepam on mice using rota-rod apparatus) after demonstration of traditional method using animals. Later, CAL was performed by all the students followed by the same set of multiple choice questions. A student feedback questionnaire based on 5 point Likert scale was also given to all the students to get their opinion about the simulation experiments.

**Results:** The students had better average score in post-CAL test as compared to pre-CAL test (82.4% Vs. 44.6%). Based on feedback majority of students (70%) agreed in favour of CAL.

**Conclusion:** The study demonstrates the effectiveness of CAL in teaching experimental pharmacology and students felt that CAL helped them in better understanding of the topic as the effects were clearly visualized on the screen. Thereby such simulations need to be a part of the standard curriculum.

**Keywords:** Computer assisted learning, Experimental pharmacology, Feedback questionnaire, Medical students.

**FPP-PH-146**

A Community Level Study on Prescribing Pattern of Antimicrobial Agents

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**Background:** Antibiotic resistance is closely linked to inappropriate antimicrobial use. It is considered to be the most serious threat. To combat the problem of ineffective management of infections and their complications, it is imperative to identify such problems and generate national data at all levels of healthcare settings leading to better tracking and monitoring system in the country.

**Objectives:** To study antimicrobial use to

1. identify antimicrobial prescribing practices 2. to identify most commonly prescribed antibiotic, 3. to enhance quality use of antibiotics, 4. to reduce drug resistance

**Method:** Descriptive study for 5 months. Prescriptions from patients attending OPD of hospitals and clinics of all specialities were collected in Kilpauk locality. Patient demographics, antimicrobial name, dosage, route of administration, condition,
and other drugs prescribed were recorded and analysed.

**Results:** Most commonly prescribed antibiotic was Amoxicillin (24.5%) followed by Cefixime (23.5%). Most common indication was URI which accounted 39.5%. Polypharmacy - Antibiotics were prescribed along with Antacids-14%, Antihistaminics-22%, Multivitamins-64%. More than 1 antibiotic was prescribed in 11 prescriptions. Only 50% of prescriptions followed Standard treatment guidelines.

**Conclusion:** Inappropriate use of antibiotics is related to patients, healthcare persons and society which lead to resistance. Antibiotics are over used for minor infections, misused for viral infections and underused due to financial concerns.

**Key words:** Antibiotic resistance, standard treatment guidelines, polypharmacy, antibiotics, antimicrobial prescribing practices, descriptive study, inappropriate use

**FPP-PH-147**

**Perception of Second-Year Medical Undergraduates towards Problem-Based Learning (PBL) in Pharmacology**

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**Background:** Medical education is continuously upgrading and newer teaching-learning methods like problem-based learning (PBL) and integrated teaching are being introduced to partly replace the didactic lectures. These innovative methods need to be evaluated at the institutional level to identify the feasibility, benefits, and areas of improvement.

**Objective:** To assess perception of second-year medical undergraduates towards PBL in Pharmacology.

**Materials and Methods:** Study was conducted after approval by the institutional ethics committee. Fifth-semester students were given study questionnaire after conducting PBL sessions. The questionnaire contained 7 items answered on a five point Likert Scale. Students chose the options whichever they found to be most appropriate.

**Results:** Total of 178 students participated in the study, of which 74.1% students agreed that PBL improved their ability to correlate basic concepts with clinical practice. Most of them felt that PBL reinforced the information taught in other classes, it increased their involvement in the learning process and improved self-directed learning skills. Majority of them found that learning of facts, diagnostic and therapeutic skills, as well as clinical reasoning, were significantly enhanced by PBL sessions. PBL is helpful in developing skills for identification of potential drug related difficulties of the patient was reported by 66.3 % students.

**Conclusion:** PBL was overall found to be useful to our students and hence can be continued as a useful method for curriculum delivery. However, we need to take further steps in improving the delivery of PBL sessions and enhancing its effectiveness in achieving the desired outcomes so that it becomes an enjoyable learning experience for both students as well as the faculty.

**Keywords:** Problem based learning, Medical education, Pharmacology.
Nephroprotective Effect of *Anethum Graveolens* in a Murine Model of Gentamicin Induced Nephrotoxicity

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**Background:** Antioxidant rich herbs possess significant activity against various disease condition induced by oxidative stress. *Anethum graveolens*, has a rich source of bioactive compounds that possess varying pharmacological activities including antioxidant.

**Objective:** To evaluate the nephroprotective effect of aqueous extract of *Anethum graveolens* seeds in a murine model of gentamicin induced renal damage.

**Materials and Methods:** Wistar albino rats of either sex, weighing 150-200g were divided into 5 groups; normal saline, gentamicin 80 mg/kg, i.p., aqueous extract of Anethum graveolens seeds at 0.5, 1 and 2g/kg body wt, p.o, for 8 days, the extract being administered 3 days prior and concurrently with gentamicin for 5 days. Serum urea, creatinine, uric acid, blood urea nitrogen (BUN) analyses and histopathological examination of kidney were performed.

**Results:** Gentamicin treatment caused nephrotoxicity as evidenced by marked elevation in biochemical parameters. Serum urea, creatinine, uric acid and BUN were increased with gentamicin compared to saline-treated animals (107.5±16.92 mg/dl, 0.88±0.09 mg/dl, 3.05±0.29 mg/dl and 47.80±9.07 mg/dl respectively). Co-administration of aqueous extract of *Anethum graveolens* with gentamicin decreased the rise in these parameters in a dose dependent manner, the biochemical values for 2g/kg of the test extract being 43.95±2.11mg/dl, 0.43±0.02 mg/dl, 2.55±0.16 mg/dl and 20.45±0.97 mg/dl for serum urea, creatinine, uric acid and BUN respectively. However, statistical significance was obtained only with 1 and 2g/kg body wt doses employed, when compared to the gentamicin treated group. Histopathological analysis revealed epithelial loss with intense granular degeneration in gentamicin treated rats, whereas the test extract mitigated the severity of gentamicin-induced renal damage.

**Conclusion:** Our data suggest that aqueous extract of *Anethum graveolens* seeds exhibits renoprotective effect in gentamicin induced renal damage probably due to its antioxidant actions.

**Key words:** *Anethum Graveolens*, Gentamicin, Nephroprotective, Drug induced nephrotoxicity.
Upsurge in BCG Vaccine Induced Lymphadenitis: Case Series

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Background: Tuberculosis is one of the serious health care concerns of the world today. The only vaccine available for tuberculosis till date is the BCG vaccine. It is one of the safest vaccines and is less commonly associated with adverse effects. However, recently, we have seen an upsurge in the number of BCG vaccine associated lymphadenitis in our hospital.

Objective: To report the increase in the number of BCG vaccine associated lymphadenitis cases in our hospital.

Materials and methods: Ten cases of BCG associated localized lymphadenitis was seen in our hospital in the past one year (May 2016 to April 2017). Data was collected related to vaccination and the course of lymphadenitis from the parents.

Observations/Results: Out of the ten cases, 3 infants were vaccinated outside while the remaining were vaccinated in our hospital. Three out of the ten patients had supplicative lymphadenitis and required intervention (needle aspiration/excision) and remaining 7 patients were reassured and followed up. During follow up, the swelling had either completely subsided or reduced in size in seven of them. There was no change in the swelling in one infant while the remaining two patients did not come for follow up visit. The most probable cause of the increased incidence in our hospital could be that a particular batch of vaccine contained an altered strain/ change in the number of viable organisms.

Conclusion: We are reporting the cases as it might lead to an awareness among other practitioners and will also provide a scope for further studies. Increased surveillance and appropriate treatment guidelines for BCG vaccine associated lymphadenitis are the need of the hour.

Keywords: BCG, lymphadenitis, tuberculosis

Awareness and Behaviour of Consumers towards the Use of Online Pharmacy: A Cross-Sectional Study

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Background: Online pharmacies offer various advantages like lower medicine costs, easy accessibility, doorstep delivery etc. Online pharmacies also carry with them disadvantages like lack of interaction with pharmacists, dispensing of drugs without prescriptions, selling of substandard medicines etc. At present no study is available in India about consumer’s awareness regarding online pharmacy.

Objective: This study was planned to assess awareness and behaviour of consumers towards the use of online pharmacy in the Delhi, India.
Material and methods: Cross-sectional, questionnaire based study was conducted on 466 consumer to assess awareness and behaviour towards the use of online pharmacy.

Results: In this study 87.1% of consumers were aware about online pharmacy but only 16% preferred online pharmacy to buy medicines. Two third (76.8%) of consumers opined that purchasing medicine from online pharmacy would not be safe because of substandard quality of medicine and supply of counterfeit medicines. Factors like “not asking for uploading of prescription” and “big discounts over market value of the medicines” were marked as a characteristic of doubtful online pharmacies by 80.4% and 72.9% consumers respectively. Convenience of ordering medicines and door step delivery were cited as most attractive features of online pharmacy by 40.1% and 33% consumers respectively.

Conclusion: Purchasing medicines from online pharmacies was not common among the consumers. They need to be educated about the risks and benefits associated with buying drugs on the internet. Educational measures should be coupled with adequate monitoring of online pharmacies by regulatory authorities.

Key words: Online Pharmacy, Consumers, Awareness, Behaviour.

FPP-PH-151

Evaluation of Knowledge, Attitude and Practice of Rational Use of Medicines among Junior Residents in a Tertiary Care Hospital

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Background: Irrational use of prescribing is on the rise due to many factors like following a prescribing pattern of senior doctors, inadequate knowledge, ignorance etc. Junior Residents (JRs) are exposed to variety of prescribing patterns. The objective of present study was to evaluate the knowledge, attitude and practice of JRs about rational use of medicines (RUM).

Methods: This was a Cross sectional, questionnaire based study conducted among JRs in a tertiary care hospital April 2017. Questionnaire was designed to obtain information about the knowledge, attitude and practice of RUM. The data were analyzed using Microsoft Excel (2013 version) and expressed in percentage.

Results: Out of 154 JRs, 147 completed the questionnaire and opined the knowledge of RUM (83.6%), EML (80.2%) and P-drug (63.2%) was vital for medical practice. However, JRs had limited knowledge about the revision of EML list (29.2%), number of fixed dose combinations (FDCs) (6.1%) in EML and criteria for choosing a P-drug (10.2%). The attitude towards EML to be provided in each department (85.7%) & regular training about RUM (87.7%) was positive. However, prescribing essential medicines & trade name were 65.3% & 50% respectively.

Conclusion: JRs had limited knowledge about EML, P drugs, schedule H drugs and number of FDCs in EML. As JRs are the future prescribers & specialists, they need to be aware of all the aspects of RUM. Similar studies should be conducted at regular intervals, which will help in identifying the deficiencies in knowledge about RUM & appropriate measures to be taken.

Keywords: Essential Medicine List, JRs, FDC, P-drugs, Rational use of Medicine.
FPP-PH-152

Safety Profile of Drugs Commonly Prescribed for Gynaecological Disorders

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Background: Female patients have a 1.5- to 1.7-fold greater risk than men of developing an adverse drug reaction (ADR). The focus of present study was to observe prescription pattern of drugs commonly prescribed for gynaecological disorders and monitoring ADRs associated with them.

Material & Methods: A prospective, observational, non-interventional study was done on outpatients and inpatients of gynaecology department and involved spontaneous and solicited ADR monitoring of currently prescribed drugs for gynaecological disorders. Pregnant females, patients with history of drugs abuse or over dose of drug were excluded from the study. Drugs prescribed were classified as per Anatomical Therapeutic Chemical (ATC) classification. ADRs were coded according to Medical Dictionary for Regulatory Activities (MedDRA) in which terms for specific adverse events that are alike or pertain to the same organ system are categorized by System Organ Class (SOC).

Results: A total of 250 patients were observed, out of which 163 patients reported 181 ADRs. The mean age of patients who experienced ADRs was 37.28 ± 12.71 years. Majority of the patients (61.34%) were suffering from non-infective gynaecological diseases. 660 drugs were prescribed to the patients during the study period. As per ATC classification, antibacterial for systemic use (33.2%) were prescribed most commonly. As per SOC, gastrointestinal system disorders comprised the maximum number (49.10%) of ADRs followed by nervous system disorder (28.70%).

Conclusion: Overall, drugs for gynaecological disorders appear to be a safe option with majority of the ADRs being mild. Relatively, high incidences of gastrointestinal and central nervous system ADRs warrant that the patients should be made aware of these ADRs and the need to seek treatment should they occur.

Key words: Gynaecological disorders, ADRs, ATC, MedDRA

FPP-PH-153

Drug Advertisements in Medical Journals: A Critical Assessment

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Background: Drug advertisements form one of the major sources of drug information for clinicians which can influence their prescribing practices. These advertisements are guided by criteria laid down by certain organizations like World Health Organization (WHO) and Organization of Pharmaceutical Producers of India (OPPI).

Objective: This study was planned to assess the compliance of drug advertisements published in medical journals to WHO and OPPI guidelines.

Material & Methods: Hundred drug advertisements pertaining to allopathic medication available in medical journals (print version) in the college library were
randomly selected during July 2016 to July 2017 excluding those of medical devices, surgical appliances, nutritional supplements and ayurvedic drugs. These drug advertisements were then analyzed for compliance to 13 ethical criteria as per WHO and 5 as per OPPI.

**Results:** Only 2 advertisements fulfilled the criteria as per WHO guidelines and none were fully compliant as per OPPI guidelines. Most of the advertisements had mentioned the active contents (96%) and brand name (100%) along with therapeutic indication/s (92%), dosage form (97%) and manufacturers name (97%). The least followed criteria were contraindications (25%), warnings (25%) and major interactions (25%) with other drugs.

**Conclusion:** It was observed that drug advertisements provide incomplete and poor quality of essential information, thus aiming to satisfying commercial motive of pharmaceutical industry rather than fulfilling the educational aspect of promotion. The medical professionals should remain vigilant about these advertisements and seek full information before prescribing them.

**Keywords:** Drug advertisement, Ethical Criteria, WHO, Medical Journals, OPPI

FPP-PH-154

**Vernonia Cinerea Regenerates Proximal Tubules in Cisplatin Induced Damage, in Mice**

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**Background:** Nephrotoxicity is the dose limiting toxicity of one of the effective chemotherapeutic agent, cisplatin. Till date, only amifostin has been approved by the FDA as a prophylactic against this toxicity. Side effects, cost, and concerns that it also diminishes antitumor effect have limited its use in clinical practice. Traditional Siddha Medicine literature suggests the use of *neichitti kashayam* containing *Vernonia cinerea* (VC) to protect body from drug toxicities.

**Objective:** To evaluate whether VC could reverse the renal damage that is caused by cisplatin in male Swiss albino mice.

**Materials and methods:** The crude aqueous extract of VC was fractionated from non-polar to polar fractions. Mice were injected a single dose of cisplatin (15mg/kg) on day 1 to induce renal damage. On day 6, crude aqueous extract and all fractions were orally administered (400mg/kg) for five days. On day 11, blood was collected to estimate urea and creatinine. Right kidney was collected for histological examination.

**Result:** Fractionation of crude aqueous extract lead to butanol (18.6%) and water fractions (81.4%). There was no statistically significant difference in urea and creatinine in treatment groups compared to cisplatin alone group. Cisplatin induced proximal tubular damage was mostly seen in cortico-medullary junction and was associated with
vasodilation, inflammatory infiltration and necrosis. Aqueous fraction did not regenerate tubular cells; whereas, crude extract and butanol fraction showed regeneration.

**Conclusion:** Vernonia cinerea is a potential source of new compounds that could be used to regenerate kidney cells in cisplatin induced damage.

**Key words:** Vernonia cinerea, Cisplatin, nephrotoxicity, butanol fraction, treatment, regenerate

**FPP-PH-155**

**Antibiotic Prescribing Patterns among Paediatric Patients in a Secondary Care Hospital - A Retrospective Study**

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**Background:** Systemic antibiotics account for more than one-third of the prescriptions in children; hence, antibiotic prescriptions in children are a major public health concern. Moreover, data regarding rational antibiotic use in children is very limited. Hence, it is essential that the antibiotic prescribing pattern be evaluated

**Objective:** To study the antibiotic prescribing pattern among pediatric patients.

**Methods:** A retrospective study was carried out for 2 months at medical records department of Dr TMA Pai Hospital, Udupi. A total of 110 paediatric patient files were screened for antibiotic prescription. Out of 110 patient files, 94 patient files contained antibiotic prescription and these files were included in the study. Basic demographic information such as age, sex, dosage form, prescribed antibiotic details and diagnosis of the condition were recorded.

**Results:** Out of 110 paediatric patients, 85.45% received antibiotics. The average number of antibiotics per encounter was 1.13. Amoxicillin (31.13 %) was the most frequently prescribed antibiotic followed by combination of Amoxicillin and Clavulanic acid (28.3 %). The preferred route of administration was oral (92 %) and 94% of the antibiotics prescribed were in the WHO essential drug list. However, with respect to generic prescribing, these drugs were lowest in prescriptions (3.77%)

**Conclusion:** The most common basis for the prescription of antibiotics was respiratory tract infection. Majority of the drugs prescribed were in the WHO essential drug list. The average number of antibiotics prescribed per patient was within the WHO recommendations (< 2). Efforts must be made to encourage prescribing by generic names as it was found to be low.

**Key Words:** Paediatric, Antibiotics, Prescription Pattern, Outpatient

**FPP-PH-156**

**Impact of Topical Genistein on the Expression of Sex Steroid Receptors and Harderian Gland Function in the Models of Dry Eye**

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**Background:** Tear film is pivotal to the health and optics of the eye. Dry eye is a
tear film disorder due to excessive evaporation or tear film deficiency. The harderian gland has been known to moisten the cornea thus may have a role to play in pathogenesis of dry eye disease.

**Objective:** a) To elucidate the role of harderian gland in postmenopausal dry eye animal model. b) To evaluate the efficacy of topical 0.1% genistein formulation in the developed experimental animal models of dry eye.

**Materials and Methods:** Wistar rats of either sex (n=5) were used. Females were Ovariectomised and an oral finasteride challenge was posed to both sexes. Tear film stability was assessed. The animals were sacrificed and harderian gland was isolated. Sex steroid receptor (Estrogen Receptor α, β and Androgen Receptor) and ferrochelatase expression was evaluated. 0.1% Topical Genistein was administered thrice a day for 40 days post the development of dry eye. Tear film stability was monitored.

**Results:** Significant tear film instability and down regulation of sex steroid receptors, ferrochelatase gene confirmed the development of dry eye in animal models. The treatment groups showed restoration in tear flow and tear film stability over the course of 40 day therapy. Sex steroid receptor expression was reinstated.

**Conclusion:** The study establishes role of harderian gland secretions indicating the role of sex steroid deficiency in dry eye. The gene expression studies revealed topical phytoestrogen therapy could be further developed to relieve postmenopausal dry eye.

**Keywords:** Dry eye disease, harderian gland, tear film, genistein, gene expression, LC-MS/MS.

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**FPP-PH-157**

**Profiling of Primary Metabolites Present in Aqueous Humor of Glaucomatous Patients**

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**Background:** Intraocular pressure is primarily maintained by the endogenous metabolites using the targets often utilized for the pharmacological management. Therefore understanding the metabolic profile of aqueous humor is expected to explain pathophysiology involved in glaucoma.

**Objective:** Standardization of the method to detect primary metabolites in the changes in aqueous humor reflecting carbohydrates, protein and lipids metabolism in glaucomatous patients versus control.

**Methods:** Institutional human ethics committee approval was obtained and patients were recruited according to the inclusion & exclusion criteria. 70 to 100 μL of aqueous humor was collected by paracentesis during the cataract (control group) and glaucoma surgery (study group) which was stored at -80°C. Peak assignments were carried out using NMR Shift database library. The concentration (mM) of metabolites was determined using Trimethyl silyl propionic acid (TSP) as reference and their percentage changes were calculated.

**Results:** In this preliminary study, NMR spectrum showed the presence of several important primary metabolites like
leucine, isoleucine, valine, alanine, glucose, tyrosine and phenylalanine. This study further revealed the presence of significant difference in the levels of the metabolites to the extent of different degrees in glaucomatous patients as compared to the control group.

**Conclusion:** Metabolomic study could provide a quick screening tool for determining the primary metabolites of aqueous humor. Further studies are in progress to validate these findings and to correlate with the pathway.

**Key words:** Metabolomics, Amino acids, Biomarkers, Primary metabolites, Aqueous humor, glaucoma

**FPP-PH-158**

**Role of Drug Transporters in the Resistance in Retinoblastoma Chemotherapy**

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**Background:** Drug resistance to chemotherapeutic agents is known to develop in the patients during the treatment of retinoblastoma. This could be attributed to the modulation of drug transporters in the tumor cells.

**Objective:** This study was aimed at analyze the gene expression of various drug transporters on cultured Y-79 cell lines after developing resistance to chemotherapeutic agents used conventionally for the treatment of retinoblastoma.

**Methods:** The Y-79 cell line obtained from NCCS-Pune was cultured in RPMI-1640 media supplemented with FCS. To develop resistance, the cells were cultured in the presence of the chemotherapeutic drugs (Etoposide, Carboplatin and Vincristine) individually, by increasing the dosage from IC10 to IC50 across subsequent passages. Trypan blue assay was performed at each passage. The resistant cells (to each drug) were used further for gene expression analysis of MATE, PePT, OAT, OATP3, OATP4, OCTN1, OCTN2 and PgP transporters using RT-PCR.

**Results:** Resistance was developed in carboplatin treated Y-79 cell line whereas etoposide & vincristine, treated cells went into stationary phase. The cells treated with vincristine showed higher expression of all the transporters studied except OAT group. The carboplatin treated group showed higher expression of OAT, OATP4, OCTs and PgP, whereas etoposide treated group showed unaltered levels of all transporters.

**Conclusion:** Targeting the efflux transporters like PgP by suitable blockers can be useful in exploring the treatment modality in refractory cases of retinoblastoma.

**Key words:** Retinoblastoma, Drug transporters, Carboplatin, Etoposide, Vincristine, Y-79 cell line

**FPP-PH-159**

**Prescribing Patterns of Antihypertensive Medicines among Adult and Geriatric Patients in a Tertiary Care Hospital in Delhi**

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63rd Annual National Conference of Physiologists and Pharmacologists of India, APPICON2017, Organized by Department of Physiology, JIPMER, Puducherry.
**Objective:** There is a well-known, wide variability in prescribing of antihypertensive medicines as multiple drugs are often co-prescribed. In the present study prescribing pattern of antihypertensive medicines in adult and geriatric patients was evaluated at a tertiary centre.

**Materials and Methods:** A cross-sectional, observational study was conducted among patients receiving antihypertensives. Patients were characterized as adult <60 years (group 1) and geriatric ≥60 years (group 2) and their prescriptions were reviewed.

**Results:** Total of 1262 patients were included (group 1: 36.8%, mean age 45.9±9.8 years; group 2: 63.2%, mean age 65.4±5.2 years). In group 1, most frequently prescribed were beta blockers (60.6%; metoprolol 82.2%) followed by ACE inhibitors (28.4%; ramipril 77.7%), whereas in group 2, calcium channel blockers (39.4%; amlodipine 98.2%) were most commonly prescribed followed by beta blockers (32%; metoprolol 82.2%). The average pill count for antihypertensives was 1.8 and 1.6 for group 1 and 2 respectively and the median duration of treatment was 3 years (range 3 months to 30 years) for both groups. In group 1, 30.1% patients were prescribed one class, 46.7% two classes, 23.2% >three classes of antihypertensive medicines. Whereas in group 2, 39.6% were prescribed one class, 42.7% two classes, 15.2% >three classes (0.13% five classes) of antihypertensives.

**Conclusion:** The prescribing trend conforms to JNC7 guidelines but not to the more recent JNC8. Despite similar pill count and treatment duration, geriatric patients may be more prone to adverse drug-drug interactions (DDI). Careful review of prescriptions is essential to identify potential DDIs and preventive measures.

**Keywords:** Antihypertensive medicines, prescribing pattern, geriatrics, JNC7

**FPP-PH-160**

**Evaluation of Antiulcer Activity of Sesamum Indicum Seeds Extract on Stress Induced Gastric Ulcer in Wistar Rats.**

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**Background:** Factors, such as bad dietary habits, excessive intake of nonsteroidal anti-inflammatory agents, stress and H. Pylori infection are reported to account for majority of cases of gastric ulcers. Sesame oil obtained from *Sesamum indicum* is a component of traditional health food in Asia. It has not been so far investigated for its effect on gastric lesions induced by stress.

**Objective:** To evaluate the antiulcer activity of *Sesamum indicum* seed extract on stress induced gastric ulcer in Wistar rats.

**Material and Methods:** Wistar rats were divided into 5 groups of six rats each. Gastric ulcers were induced by stress model in four groups by placing the rats individually in a restricted cage for 8 hours and then in restraint cold ventilated refrigerator at a temperature of 2-3°C for 2 hours for 7 days. The antiulcer activity of alcoholic extract of *Sesamum indicum* seed extract (0.5mg/kg & 1mg/kg) was compared with standard drug, pantoprazole (30mg/kg) each given once daily for 7 days. The parameters studied were ulcer index, gastric juice volume, pH, free acidity and total acidity.

**Results:** The volume of gastric content (3.7±0.10, 4.2±0.29,) total acidity...
(29.7±0.54; 29.2) & freeacidity (7.4±0.13;6.98±0.08) was significantly decreased at p<0.05 and pH of the gastric juice was significantly increased(4.6±0.06) at p<0.05 in treated groups as compared to ulcer control group. Sesamum indicum extract at 1mg/kg showed significant reduction in number and size of ulcers which is comparable to that of pantoprazole.

Conclusion: The present study indicates that Sesamum indicum extract has potential antiulcer activity.

Key Words: antiulcer, stress model, ulcer index, pantoprazole

FPP-PH-161

Adverse Drug Reaction Monitoring and Analysis of Reports from a Southern Based Teaching Tertiary Care Centre and Hospital

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Background: Adverse Drug Reaction [ADR] is defined as, ‘reaction which is noxious & unintended that occurs at dosages normally used in man for prophylaxis, diagnosis or therapy of disease or for the modification of physiological function’. ADRs contribute for the hospital deaths as well as huge economical burden globally. Majority of the ADRs are preventable and it’s monitoring is very essential for better rationalized pharmacotherapy in the future.

Objectives: To monitor adverse drug reactions and analyze the collected ADR reports from a Southern based teaching tertiary care centre and hospital

Materials & Methods: A prospective study was conducted in a Southern based teaching tertiary care centre and hospital for a period of three months. The ADRs were collected from the different medical specialities and recorded in a CDSCO reporting form. The collected ADRs were then subjected for assessment by using different causality scales [WHO, Naranjo Algorithm, Schumock & Thornton and Modified Hartwig and Siegel scales]. The study protocol was approved by the Institutional human ethics committee.

Results: There were total of one hundred and ninety eight ADRs were reported. It was observed that, antimicrobial class of drugs [23.74%] were responsible for maximum causation of ADRs, followed by drugs related to autacoids [20.20%], CVS [12.63%], endocrinal system [8.08%], GIT [6.57%], respiratory system [4.55%], CNS [2.53%], blood [2.53%], ANS [2.53%] and skin [0.5%].

Causality assessment ADRs by Naranjo algorithm scale showed that, majority of ADRs were possible [66.16%], probable [21.72%] and definite in [12.12%]. Again WHO scale showed that, maximum number of ADRs was possible [55.05%] followed by probable/likely [14.14%], unclassifiable [11.62%], conditional/unclassified [10.61%] and unlikely [8.59%]. On severity scale by Modified Hartwig and Siegel, it was observed that, 72.22% of ADRs were mild, 19.70% as moderate and 8.08% as severe in grade. Preventability scale of Schumock & Thornton identified 39.90% of all ADRs were definitely preventable, 33.33% as probably preventable and rest as not preventable.

Conclusion: This study concluded that antimicrobial class of drugs was responsible for maximum number of ADRs. Majority of the ADRs were possible in Naranjo as well as in WHO ADR causality assessment scales. It was also observed that majority of ADRs were definitely preventable on Schumock & Thornton ADR.
assessment scale and mild in severity on Modified Hartwig and Siegel scale.

Key Words: ADR, Causality, Pharmacovigilance, Naranjo scale, Adverse Drug Reaction, Side effects

FPP-PH-162

A Study of Drug Utilisation Pattern in Patients of Chronic Kidney Disease at a Tertiary Care Hospital.

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Background: Chronic kidney disease (CKD) is a major public health issue and a widely prevalent non-communicable disease responsible for increasing morbidity in India. Pharmacotherapy of CKD is complex and inevitably requires poly-pharmacy due to several co-morbidities. CKD patients need to take medicines lifelong, which makes it very important to study the prescribing trends on a regular basis.

Objectives: The main objective of the study was to know whether the prescribing rationality was maintained and to analyse current prescribing trends in the management of CKD patients.

Material and methods: After Institutional Ethics Committee approval, a prospective cross sectional study was carried out at the Nephrology department of a tertiary care hospital for a period of three months from 1st June 2017 to 31st August 2017. Patients diagnosed with CKD by the treating Nephrologist were included and their prescriptions were analysed to study the prescribing patterns.

Results: Out of 60 patients diagnosed with CKD, 81.6% were males. It was found that 45% of the patients belonged to end stage renal disease. The average number of drugs prescribed per patient was 5.3, and percentage of drugs prescribed from essential medicine list was 60.6%. Out of total prescribed drugs (318), most commonly prescribed class of drugs were cardiovascular drugs (44.33%). Considering individual drugs, five most commonly prescribed drugs were antihypertensive drugs (39.3%), hematins (17.6%), calcium salt (12%), multivitamins (8.4%), and antacids (5.3%). Calcium acetate was the commonest potassium binder prescribed.

Conclusion: The given study provides an overview of drug utilisation in a cohort of CKD patients. Drug utilisation studies in CKD patients helps to understand and build evidence for drug use. In this study, principle of rational prescribing was followed. Amlodipine and furosemide were the most commonly used drugs. Hypertension and diabetes were the most common co-morbidities.

Keywords: Chronic kidney disease; Prescribing pattern; Drug utilization; Potassium binders; end stage renal disease; antihypertensives.

FPP-PH-163

Effect of First and Second Generation Anti-Epileptics on Body Mass Index in Adult Patients with Generalized Tonic Clonic Seizures

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Background: Higher prevalence of increased weight and subsequently body mass index (BMI) is seen in patients with epilepsy which can be aggravated further
with antiepileptic therapy. The present study was undertaken to compare the effect of first generation vs second generation antiepileptic drugs on BMI.

**Material & Method:** A prospective, observational, cross sectional study was conducted on adult patients of generalized tonic clonic epilepsy (GTCS) who were stabilized on antiepileptic drugs for at least 3 months. First generation antiepileptics prescribed were Valproic acid (VPA), phenytoin (PHT) and carbamazepine (CBZ) and second generation antiepileptics given were Levetiracetam (LEV), Lamotrigine (LTG) and Oxcarbamazepine (OXC). The patients were evaluated for their BMI. BMI value $>24.9$ was considered as overweight.

**Results:** In the binary logistic regression analysis, the risk of increased BMI with first generation and second generation antiepileptic treated patients was similar (odds ratio [OR] = 2.1053; 95% confidence interval [CI], 0.7823–5.6658; $P = 0.1407$). 51.4% of the patients on first generation antiepileptics had BMI $>24.9$ and were categorized as overweight while 28.6% patients on second generation had BMI $>24.9$, although this difference was not statistically significant.

**Conclusion:** According to our preliminary data antiepileptic therapy increases the risk of weight gain in patients with epilepsy. The overall risk of high BMI though not statistically significant, was clinically more relevant with first generation antiepileptic drugs.

**Keywords:** Epilepsy, GTCS, BMI, Overweight.

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**FPP-PH-164**

**Development of Intravitreal (IVT) Formulations of Antiangiogenic Agents and Cassette Dosing IVT Pharmacokinetics in Rabbits Using LC-MS/MS**

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**Background:** Curcumin, emodin, thalidomide and valdecoxib have been identified and selected as having potent antiangiogenic activity. Therefore, this study has been attempted to develop IVT formulation of these agents and to evaluate IVT pharmacokinetics in rabbits using cassette dosing approach.

**Objectives:** 1) To develop and evaluate the IVT formulations of curcumin, emodin, thalidomide and valdecoxib, 2) To develop and validate LC-MS/MS method for simultaneous quantification of these agents in biological fluids, 3) To perform the newer IVT pharmacokinetics of developed formulations in rabbits.

**Methods:** Under sterile conditions, IVT formulations were prepared and sterilized. LC-MS/MS analytical method was developed and validated for selectivity, accuracy and precision as per USFDA guidelines. For IVT pharmacokinetics, New Zealand albino rabbits of either sex weighing 1.3-2kg were used. Cassette IVT formulations of all 4 drugs were reconstituted with 1mL of normal saline in sterile conditions. An aliquot of 0.1mL at a dose of 10µg each drug was intravitreally injected (n=4). Rabbits were euthanized at 15, 30, 60 and 480min carbon dioxide. Ocular fluids, tissues, and plasma were collected and subjected for analysis using LC-MS/MS.
Results: Sterile IVT formulations for cassette dose for curcumin, emodin, thalidomide and valdecoxib have been successfully developed. IVT cassette dosing pharmacokinetics showed a rapid clearance of curcumin from vitreous cavity. Valdecoxib and thalidomide showed the t1/2 of 2 hrs.

Conclusion: To conclude this study, emodin showed longer median residence time of 6.3 hrs as compared to all others in the vitreous humor indicating the possibility of developing it further for use in ocular angiogenesis.

Key words: Anti-angiogenic agents, intravitreal formulations, mass spectrometry, intraocular pharmacokinetics

FPP-PH-165

A Study on Drug Induced Cutaneous Adverse Drug Reactions at a Tertiary Care Hospital Mysore

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Background: Patient safety has become a leading topic in the national level. An ADR can lead to significant morbidity, mortality and financial costs. People in every country of the world are affected by adverse drug reactions (ADRs) and it is estimated that at least 60% of ADRs are preventable. Cutaneous adverse drug reactions are a common occurrence and need to be differentiated from other causes of similar manifestations. Thus, the active search is essential for evaluating, managing, reporting, ADRs and strengthening the activity of Pharmacovigilance of the country.

Objectives: To obtain information about drug induced cutaneous adverse reactions and to establish the causal relationship.

Materials And Methods: Observational cross sectional study, a total of 76 patients were recruited for the study which was conducted in dermatology outpatient department of K R HOSPITAL MYSORE MEDICAL COLLEGE AND RESEARCH INSTITUTE MYSORE during 6 MONTHS period was evaluated. The details of cutaneous adverse drug reactions were recorded in ADR form of Central Drugs Standard Control Organisation (CDSCO). Causality was assessed using Naranjo algorithm and also World Health Organization- Uppsala monitoring centre (WHO-UMC) criteria.

Results: 76 patients with CADRs were included in the study during the 6 months study period. Results were presented in the form of number and percentage. Most common age group with CADRs was 20-30 years; with 73.32% of females, 26.65% male and the most common suspected drug group causing CADRs was antimicrobial 46.65%, and most common lesion is maculopapular rashes. According to Naranjos scale 67.30% of CADRs were probably caused by drugs.

Conclusions: Wide variety of drugs causes CADRs. Awareness among clinicians is required for active reporting of CADRs. Patients need to be educated for the cautious use of drugs causing ADRs to prevent the same.

Keywords: Cutaneous adverse drug reactions, Pharmacovigilance, causal relationship, Naranjos probability scale.
FPP-PH-166

Association of Depression with Antiepileptic Drugs in Adult Patients of Generalized Epilepsy: A Cross-Sectional Study.

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Background: Depression is a chronic mental disorder characterized by feelings of sadness, loneliness, despair, low self-esteem and self-reproach. Patients taking antiepileptic medications may also become depressed as a result of their treatment.

Objectives: This study aimed to evaluate effects of antiepileptic drugs on Depression using in adult population.

Material and methods: A prospective, observational, cross sectional study was conducted on adults patients of generalized epilepsy on stable antiepileptic drug monotherapy for at least 3 months. Patients were evaluated using Becks depression inventory-II which is a 21-item measure designed to assess depressive symptoms. The score ranges from 0-63. Higher score indicate more depressive symptoms

Results: In the logistic regression analysis, the risk of increased depression antiepileptic treated patients was similar (odds ratio [OR] = 2.2500; 95% confidence interval [CI]; 1.1890–4.2579; P = 0.0127). 35% of the patients on anti-epileptics had BDI-II score >14 indicating depression, this difference was statistically significant.

Conclusion: Antiepileptic drugs increases risk of depression in patients with epilepsy

Keywords: Epilepsy, depression, antiepileptic drugs, BDI-II scale

FPP-PH-167

Mapping the Distinct Time Course of Molecular and Metabolic Paradigms Involved in Pathogenesis of Fructose Induced Hepatic Insulin Resistance in Developing Rats and Establishing Aegle Marmelos(L.(Corr.) As a Preventive Strategy

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Background: The time course of pathogenesis of fructose mediated hepatic insulin resistance is not well-delineated and for the first time we map it here from post-weaning to adulthood stages in terms of distinct molecular and metabolic events.

Material&Method: Hydroalcoholic extracts of leaves of Aegle marmelos(L) Correa (AM-HM) were made, quantification of Rutin (Ru) in both AM-HM and rat plasma using the technique of LC−MS/MS were performed and that was utilized to establish the PK/PD correlation. The analyte was monitored with negative electron spray ionization (ESI), performed on Purospher star C18 Column (50 x4.6mm, 3.5 µm,), using gradient elution mode with a flow rate of 1 mL min⁻¹ and injection volume 20 µL. In vivo oral pharmacokinetic studies done; dose 500mgkg⁻¹ (Ru of AM-HM:1.973±4.932µgml⁻¹ ) on wistar rats.
The $T_{\text{max}}/h$, $C_{\text{max}}/\text{ng}\cdot\text{mL}^{-1}$, $t_{1/2} (h)$, $\text{AUC} (\text{h}\cdot\text{ng}^{-1})$ and $\text{AUC}_{0\rightarrow\alpha} (\text{h}\cdot\text{ng}^{-1})$ were found to be 1.5±0.866, 15.3±8.022, 0.077±0.019, 60.612±16.558 and 74.268 ±18.502, respectively. Further our study compares events over two time periods spanning from weaning to either puberty (4 weeks) or adulthood (8 weeks). Study I&II with normal control (NDR), chow+drinking water, fructose control (FDR, chow+fructose,15%), and treatment (AMR, chow+fructose,15%+ AM-HM 500mg/kg/d, po) for 4/8 week. Both assessed for changes in metabolic milieu.

**Results:** FDR increase in feed, fructose drink, body weight, HOMA IR in both but Study I shown no significant ($p<0.05$) increase in leptin & ghrelin but reverse in Study II. Increased activity of glycolytic enzymes, glycogen, were seen in hepatocytes along with expression of GLUT -2 in FDR, changes in TEM& H&E recorded, this more in Study II as compared to control group that were favourably reversed by AMR. This indicate metabolic cascade initiated even after acute fructose intake, although fairly easy to revert by restore downstream signaling pathways to act on fructose transport system.

**Conclusion:** *A. marmelos* protects against fructose induced hepatic insulin resistance

**Keywords:** Adulthood; *Aegle marmelos*; Fructose; Rutin; Pharmacokinetics, Insulin resistance

**FPP-PH-168**

**Ocular Kinetics and Safety of Intravitreally Injected Angiotensin Converting Enzyme Inhibitor Lisinopril**

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**Background:** Studies from our laboratories has already proved the efficacy of Angiotensin Converting Enzyme Inhibitor (ACEI) in ischemic retinopathy. However, the safety of intravitreal ACEI is of concern in therapeutics.

**Objective:** The present study was carried out to evaluate the toxicity, safety and pharmacokinetics of ACEI (lisinopril) in rabbits.

**Methods:** For the safety study, following the baseline ERG recording and fundus photography, 40µg/50µl of lisinopril sterile injection was injected unilaterally in the rabbit eyes (n=4). The electroretinogram and fundus images were obtained at 24, 48, 72 and 168 hours following the intravitreal injection. For pharmacokinetics evaluation, one eye of each rabbit (n=4) received an intravitreal injection of lisinopril (40µg/50µl). The concentration of lisinopril in the ocular tissues, humours, plasma, lung, kidney and liver were measured through ESI-LC-MS/MS.

**Results:** Upon the electroretinography studies, no significant difference was observed in the ERG pattern in the lisinopril injected eye when compared to the baseline of the respective animals till the 7th day of the study. In the fundus imaging, no morphological changes were observed in the retina of the animal. The concentration of the lisinopril was found to be above to the IC50 in the retina-choroid till 36 hours. The concentration found in the plasma and body tissues were many folds less than the IC50.

**Conclusion:** Intravitreal injection of 40µg/50µl of lisinopril found to be safe in the rabbit eye as evidenced by the electroretinography and fundus imaging studies.
**Key words:** Lisinopril, Intravitreal injection, ocular safety, electroretinography, pharmacokinetics

**MISCELLANEOUS**

**FPP-MISC-169**

**Cationic Antimicrobial Peptide Ala$$^{8,13,18}$$-Magainin II Amide (AMA) Affects Cellular Homeostasis in Cytotrophoblast Cell Line**

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**Background:** Widespread antibiotic resistance poses a huge challenge to the modern medicine in recent times and has brought cationic antimicrobial peptides(CAMPs) on forefront as novel antimicrobial drugs. Substantial evidence suggests that CAMPs like Ala$$^{8,13,18}$$ magainin II amide (AMA) can exert deleterious action on placental cytotrophoblast during the process of syncytialization (Sengupta et al 2011).

**Objective:** The BeWo cell line has been widely used as a model for mimicking cytotrophoblast cell fusion in vitro. In the present study, the effect of a synthetic AMA on the transcriptome during the process of syncytialization in BeWo cells exposed to 1000 ng/ml dose of AMA was examined.

**Methods:** The BeWo cells were cultured in 25-cm$$^2$$ flasks at 37°C and 5% CO$_2$ in F12K media with penicillin (100 U/ml), streptomycin (100 μg/ml), and 10% (v/v) FBS. The BeWo cells were exposed to AMA at 1000 ng/ml and cultures were terminated after 24 hours AMA exposure. Following termination, total RNA was extracted from cultured cells and RNA samples having RIN score > 8.0 were subjected to whole genome expression microarray. The hybridized arrays were scanned with Agilent's G2505B microarray scanner system and the raw data were imported into GeneSpring v14.8 software for further analysis. The differentially expressed genes were inferred statistically (p < 0.01) and by fixed threshold cut-off method at >2-fold change. Differentially (i.e., FC >2.0 at p < 0.01) expressed genes were imported to Thompson Reuter's database using GeneGO MetaCore portal for enrichment, network and pathway analyses.

**Results:** Treatment with AMA for 24 hours resulted in differential (FC >2-fold and P < 0.01) expression of 2601 genes. Post-hoc analysis of differentially expressed genes revealed their involvement in molecular processes, like Apoptosis (BAD, Bax, Bcl-2, JunB, JunD), Inflammation-IL6 signaling (gp130, IKK-beta, JAK3, NF-kB, p21, α1-Globin) and Cell adhesion-Integrin-mediated cell-matrix adhesion (Alpha-actinin 4, Collagen IV, Tubulin alpha 1A, Tubulin alpha-4A, Tubulin beta 1, Tubulin beta 3). The differentially regulated genes were used as input list for the generation of networks and the most relevant network found was WNT signaling network (Dsh, LRP6, p21, p85, WNT) with g-score of 346.93 and with 11 active targets from differentially regulated genes.

**Conclusions:** It appears from the present study that administration of AMA adversely affects cellular behavior and homeostasis during the process of syncytialization by altering the expression of genes involved in process like apoptosis, inflammation, cell adhesion and development. Further studies are required towards better understanding and clarification of the role of AMA during syncytialization in primary cytotrophoblast cells.
FPP-MISC-170

World Health Organization Prescribing Indicators Used to Assess the Medication of Patients in Medicine Department in a Tertiary Care Hospital.

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BACKGROUND: Irrational drug prescription is a common phenomenon which occurs in both developed and developing countries. It leads to different problems such as misuse, overuse, poly pharmacy and drug-interaction. This further leads in the path of ineffective treatment, increased economic burden to society and prolonged duration of illness.

OBJECTIVE: To assess the drug use pattern using World Health Organization (WHO) prescribing indicators in the medication of patients in medicine department in a tertiary care hospital.

METHODOLOGY: A total of 253 in patient prescriptions were analyzed from a tertiary care hospital. WHO core prescribing indicators were used to assess the average number of drugs per prescription, percentage of drugs prescribed by their generic name, percentage of prescriptions with antibiotic prescribed, percentage of prescriptions with injections prescribed and percentage of drugs prescribed from essential drug list.

RESULT: Among the prescriptions analyzed 169(66.8%) were male and 84(33.2%) were female. Age of patients in the range of 41-60 years (36.7%) was highest in number, while patients aged >80(1.5%) years were less in number. Average number of drugs per prescription was 4.7, drugs prescribed by generic name 29.3%, drugs prescribed from essential drug list were 74.8%, encounter with antibiotic 54.94% and encounter with injections 71.93%.

CONCLUSION: Although usage of antibiotics was conforming to WHO recommended standards, there is a need to improve prescription pattern in regard to injectables and usage of generic name.

Key words: WHO core indicators, generic drugs, antibiotics, essential drug list

FPP-MISC-171

Role of Oro- Cecal Transit Time in Irritable Bowel Syndrome

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Background: Irritable Bowel Syndrome is a common problem all around the world. Approximately 20 percent population suffers from this problem. The common symptoms are diarrhea, constipation, bloating and abdominal discomfort. Role of intestinal transit has been suggested in the pathophysiology. Oro-cecal transit time (OCTT) in this study is assessed by hydrogen breath tests.

Objective: To study the oro- cecal transit time in patients with Irritable bowel syndrome (IBS) and correlate with IBS symptoms.

Materials and Methods: The study was done in a tertiary care, teaching hospital in north Andhra Pradesh. IBS patients were studied in two subsets. Patients with normal bowel movements were included in one subset (IBS-N) and constipation predominant patients in the other subset (IBS-C). All subjects were conducted Lactulose Hydrogen Breath Test to assess oro-cecal transit time (OCTT). Incidence of SIBO (Small Intestinal Bacterial
overgrowth) was also noted in all groups which can also be determined by the same breath test.

**Results:** Thirty patients were studied in each group, Average OCTT in IBS-N was 96.6(40-150), average OCTT in IBS-C was 114.4 (100-140). Incidence of SIBO was 60% in IBS-N compared to 30% in IBS-C.

**Conclusions:** Constipation in IBS patients can be due to prolonged OCTT. Small Intestinal Bacterial overgrowth (SIBO) may be the main cause of IBS symptoms in IBS patients with normal bowel movements.

**Keywords:** Irritable bowel syndrome, Constipation, OCTT, Breath test.

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**FPP-MISC-172**

**Self-Medication of Antibiotics among Medical Undergraduates in South India**

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**Background:** Antibiotics are one of the commonly used drugs worldwide. Self-medication with antibiotics (SMA) can be defined as the acquisition of antibiotics and self-administering them with the aim of treating perceived infection. SMA assumes a special importance among medical students as they are the future prescribers and specialists, and have a potential role in educating the patients and general population about self-medication.

**Methods:** This was a cross-sectional, questionnaire based study conducted in March 2015 at a medical college in South India. A pre-tested, self-administered questionnaire was distributed among students after explaining the purpose of the study. The questionnaire was pre-tested in ten intern students and was suitably modified.

**Results:** 88% of the students had taken an antibiotic in the last six months. Most common condition for which antibiotic used was respiratory tract infection followed by fever. The most common self-medicated antibiotic was Ampicillin, Ciprofloxacin and Metronidazole. Most common reason self-medication is less expensive when compared to prescription by a doctor, followed by illness not considered serious. The most common source was previous prescription and from the drug store.

**Conclusion:** The practice of irresponsible self-medication by medical students can have serious implications as they are the future prescribers. Drug-related knowledge and easy access might be the major reasons for SMA practice. The students should be educated about merits and de-merits of self-medication. At the policy-making level, curbing the easy availability of medications across the pharmacies and enforcing strict laws restricting access to antibiotic should be the priority.

**Keywords:** Self-medication, Antibiotics, Resistance, Medical students

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**FPP-MISC-173**

**A Study of Electrolyte Imbalance in Children Suffering from Acute Gastroenteritis**

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**Background:** Dehydration and electrolyte imbalance are the main factors of death in diarrheal diseases. The loss of fluid is associated with loss of many electrolytes.

The most important determinant of ECF volume is the total amount (not the
concentration) of sodium in the body, that reflects the osmolality of body fluids which are always in equilibrium regarding tonicity.

**Objectives:** This study is aimed to observe the electrolyte imbalance in children suffering from acute gastroenteritis in children below 5 years of age.

**Materials & Methods:** 70 children below 5 years suffering from acute gastroenteritis were included in the study. Serum sodium, potassium, urea, creatinine were calculated by blood investigations. Nutritional status and type of dehydration were also assessed before starting the treatment.

**Results:** Isotonic dehydration was 40% in moderately nourished cases. Hyponatremia and hypokalemia were 60% and 22.8% respectively.

**Conclusion:** Hyponatremia is the most common electrolyte imbalance amongst the malnourished while isonatremic dehydration was more common among normal nourished children. The severity of hyponatremia was proportionate to the degree of dehydration and grade of malnourishment. Hypokalemia was more marked among severely dehydrated cases.

Thus isotonic saline could be started in all cases of diarrhea with dehydration without waiting for serum sodium report. In developing countries where hyponatremic dehydration with potassium loss is prevalent, Ringer’s Lactate solution should be proffered for initial therapy.

**Keywords:** Isotonic dehydration, Osmolalilty, Hyponatremia, Hypokalemia.

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**FPP-MISC-174**

**Effect of Hydrogen Sulfide and Nitric Oxide on the membrane potential of Bovine articular chondrocytes.**

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**Background:** Gaseotransmitters Hydrogen Sulfide ($\text{H}_2\text{S}$), Nitric Oxide (NO) play a key role in Bone-Joint pathophysiology. The effect of $\text{H}_2\text{S}$ and NO on the chondrocyte membrane potential has not been studied so far.

**Objectives:** To study the effect of $\text{H}_2\text{S}$ & NO on the membrane potential of bovine chondrocytes.

**Material and methods:** Patch clamp recordings were done using Axopatch 200 B amplifier in whole cell configuration. Membrane potential of the bovine chondrocytes (freshly isolated and cultured) were recorded in current clamp mode. Tetraethylammonium (TEA, a potassium channel blocker), L-Arginine (substrate for nitric oxide synthases), Sodium Hydrosulfide (NaHS, a $\text{H}_2\text{S}$ donor) & N-nitro-L-arginine (LNNA, nitric oxide synthase inhibitor) were used to assess their effect on the membrane potential. Standard extracellular & pipette solutions were used.

**Results:** Results expressed as mean ± SEM. Resting membrane potential of bovine articular chondrocytes was -24.26±3.63 mV (n=14). Chondrocyte membrane potential with the addition of 500uM NaHS changed from -31.10±7.52 to -29.19±8.36 mV (P=0.600, n=6), with 2mM NaHS from -33.55±6.83 to -30.43±7.80 mV (P=0.173, n=6), with 1mM L-Arginine from...
-23.98±6.43 to -27.83±5.01mV (P=0.374,n=9), with 10mM TEA from

-24.99±3.67 to -20.21±3.26mV (P=0.221,n=14), with 2mM LNNA from -30.03±9.80 to 0.53±1.86mV (P=0.109,n=3).

Conclusion: TEA results suggest that potassium channels are involved in chondrocyte membrane potential regulation. LNNA depolarization suggests that NO plays a key role in chondrocyte membrane potential regulation.

Keywords: Chondrocytes, membrane potential, hydrogen sulfide, nitric oxide, LNNA, L-Arginine.

FPP-MISC-175

Parental Perception of Child’s Body Weight in Urban and Rural School Going Indian Children

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Objectives: Parental perception of a child’s body weight is important in the management of underweight and obesity. This study aimed to explore parental perception their child’s body weight, with actual and desired body weight and discordance between parental and child’s perception of body weight.

Methods: The parents of 1579 children consented to participate in this cross-sectional study of school going children aged 8 to 14 years from 7 city and non-city schools in Karnataka, South India. Parental perception of their child’s current and desired/ideal body weight was assessed using questionnaires. Height and weight of children were measured. The concordance/discordance of parental perception with child’s perception of weight was evaluated.

Results: Parents correctly identified their child’s weight status in 75% of normal weight children, but in only a third of underweight and overweight/obese children (60% in underweight, over 50% in overweight). Non-city parents were more likely to identify their children as normal weight compared to city parents (P=0.01). There was moderate agreement (Kappa =0.43; P<0.001) between parent’s perception of body weight and their child’s perception across all weight categories. Parents were 80% more likely to want their children to be fatter if their children were underweight. There was a moderate agreement (Kappa =0.43; P<0.001) between perception of body weight by the parents and the children. Parents (74.5%) and children (62.2%) were likely to perceive ‘overweight’ status as “normal/thin”, while 76.3% of the parents and 65.9% of the children perceived ‘underweight’ as either ‘normal’ or ‘overweight’.

Conclusions: Parent and child perception of body weight was comparable for normal weight, while misperception was greater in parents of underweight or overweight children.

Keywords: body image, overweight, underweight, children

FPP-MISC-176

Comparative Study of Ocular Perfusion Pressure in Normal Tension Glaucoma and Primary Open Angle Glaucoma

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Background: Differences in the risk factors associated with primary open angle glaucoma (POAG) and normal tension
glaucoma (NTG) suggest that these two forms of glaucoma may represent distinct clinical entities, each with their own pathogenesis; however the relationship between them is not clear cut.

**Objectives:** To compare mean ocular perfusion pressure in POAG and NTG with healthy controls.

**Material & methods:** The study was conducted on 20 patients with NTG (group II), 20 patients with POAG (group III) and 20 age and sex matched healthy controls (group I) of age between 45-65 years. The basal intraocular pressure (IOP) and arterial blood pressure were recorded, then mean arterial pressure (MAP) and mean ocular perfusion pressure (MOPP) were calculated at rest and in response to stress tests; handgrip testing (HGT) and passive head up tilt (HUT). Data obtained was statistically analyzed using SPSS 17.

**Results:** Basal MOPP in group III was significantly less (43.52 ± 2.76. p<0.001). In group III the rise in MOPP was significantly less (p < 0.000) in comparison to group I in response to handgrip. On passive head up tilt a highly significant decrease in MOPP in group III , during recovery phase also MAP and MOPP remained significantly less in group III (p<0.000 ) as compared to controls.

**Conclusion:** Basal values of MAP and MOPP and changes observed during stress tests and during recovery period indicated ocular vascular alterations more in POAG than in NTG as compared to normal healthy subjects.

**Keywords:** perfusion pressure, handgrip, head up tilt

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**FPP-MISC-177**

**Assessment of Depression among Patients Undergoing Haemodialysis: A Cross-Sectional Study.**

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**Background:** Chronic Kidney Disease is a disease that is frequently diagnosed in advanced stages when dialysis and renal transplantation are the only options. Depression is common in these patients due to its high prevalence, reduction in quality of life, and potential to increase mortality. Large part of the health risk is associated with depression among the patients undergoing dialysis due to their inability to adhere to the prescribed dialysis regimen, diet, and/or medications.

**Objectives:** This study aims to assess the prevalence & severity of depression among patients on haemodialysis.

**Material and methods:** 100 Patients admitted in haemodialysis centre at Sri Chamarajendra Hospital, HIMS, Hassan were interviewed. Patients were requested to complete Beck Depression Inventory (BDI) &Zung Self -rating Depression Scale (Zung SDS), a self-report questionnaire to assess depression. Informed consent was obtained from all the participants. Descriptive statistics was applied to infer the findings.

**Results & Conclusion:** The data is currently under statistical analysis and the results will be duly presented at the conference.

**Keywords:** Chronic renal failure, depression, dialysis, treatment adherence, Beck Depression Inventory, Zung Self - rating Depression Scale
FPP-MISC-178

Relation between Age of Menarche and Exposure to Mass Media: A Cross Sectional Study

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Background: The timing of menarche is crucial in girl’s life and influenced by multiple factors. One such factor under study is excessive use of mass media which could serve as permissive signal to neuroendocrinal system, which controls onset of puberty.

Objective: To find out relationship between age of menarche and exposure to mass media.

Materials and method: Cross sectional study done on 701 school girls of Mangalore. Systematic random sampling method was used to select study subjects. Data was collected with the help of a validated questionnaire.

Result: Age of menarche was positively associated with age at which participants started viewing mass media (r= 0.228, p=0.0001) and we also found that participants who watched mass media for more than 2 hours had lesser age of menarche compared to those who watched mass media for less than 2 hours (t=11.71, p=0.03). There was a significant association between duration of exposure to mass media and early (<12 years), average(12-13years) and late menarche groups(≥14years). [χ²=10.7732, p=0.004]

Conclusion: These findings suggest that early exposure to mass media and excessive viewing of mass media especially television could hasten menarche. Since early menarche is well correlated with number of detrimental outcomes in girl’s health in the later life restriction of its usage might delay menarche.

Keywords: age of menarche, exposure to mass media

FPP-MISC-179

Colour Quantification of Red Cells Exposed to Synthetic Unconjugated Bilirubin by Computerized Image Analysis

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Background: Erythrocytes are themselves capable of binding unconjugated bilirubin to their membranes, inducing morphological alterations and can also lead to haemolysis. Bilirubin-erythrocyte interaction alters the physical, in addition to the chemical characteristics of the erythrocyte membrane. This study explores the colour intensities of live erythrocytes when exposed to different concentrations of synthetic unconjugated bilirubin.

Objective: To compare the colour intensities of RBCs exposed to synthetic bilirubin with RBCs suspended in phosphate-buffered saline (PBS), using computerized image analysis.

Materials and methods: RBCs from healthy volunteers (n=17) were exposed to PBS and three concentrations of unconjugated bilirubin, 1mg%, 5mg% and 20mg%, in vitro. Photo micrographic
Images of RBCs were acquired under a 100X oil immersion objective at 30 minutes interval of suspension for 2hrs and the images of RBCs were analyzed by a modified version of ‘Tissue Quant 1.0’ software designed for colour quantification at School of Information Sciences, Manipal University.

**Results:** RBCs suspended in all three bilirubin solutions exhibited scores of colour intensities that were significantly different from RBCs suspended in PBS (p<0.05). At the end of 2hrs of suspension, maximum colour score was shown by RBCs in 20mg% bilirubin solution and the least by those suspended in 1mg% bilirubin solution.

**Conclusion:** These findings suggest that image analysis tool is capable of differentiating RBCs among different bilirubin solutions. This study could help pave way in learning effect of bilirubin on membrane characteristics of erythrocytes in jaundiced patients.

**Keywords:** Erythrocyte, Bilirubin, Image analysis,

**FPP-MISC-180**

**Does Sleep Quality Gets Affected among Newly Joined Medical Students: A Cohort Study**

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**Background:** Medical students are exposed to variety of stressors during the course of their study.

**Objectives:** Prospectively to assess the sleep quality of newly joined medical students and to compare their initial sleep quality with that after three months

**Materials and Methods:** The study was conducted over newly joined Ist MBBS medical students of Karwar institute of Medical Sciences, Karwar,Karnataka. A prospective sleep quality of the students was assesses using Pittsburgh sleep quality index (PSQI) questionnaire. Similar assessment of sleep quality was done on the same participants after 10 weeks on one day in the last week of Dec 2016.

**Results:** On comparing the average scoring of various components of PSQI of the participants during initial and after 3 months, statistically insignificant difference was noted. Improvement in global PSQI score was seen in 39.67% of participants. On the contrary, deterioration in global PSQI score was noted in 41.32%. 19.01% of them showed no change. There is no significant difference in the prevalence of poor sleep quality after 3months. But the subgroup of participants with global PSQI score >/5 did not remain the same after 3 months.

**Conclusion:** Knowing that sleep disturbance among newly joined medical students could be due to variety of stressors in the due course of their academics, would help the academic counselors, teachers to monitor and control these stressors to reduce stress experienced by these students.

**Key words:** Sleep Disturbance, PSQI, Stress

FPP-MISC-181

**Cross-Sectional Study of Anthropometric Parameters in Normotensive Offspring of Hypertensive Parents**

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**Background:** Hypertension is a major contributor to the global non communicable disease burden affecting nearly one billion people worldwide. Globally 13% of deaths are related to hypertension. In the year 2000, India had 41.5 million people with hypertension and
the number is projected to increase by another 5 million by the year 2025. Family history is an important non-modifiable risk factor for hypertension. The hereditary nature of hypertension is well known by numerous family studies.

**Objectives:** To measure and correlate the anthropometric parameters of normotensive offspring of hypertensive parents and normotensive offspring of normotensive parents.

**Material and Methods:** A cross-sectional study was carried out in 200 healthy subjects in the age group of 18-20 years after the approval of the ethical committee of the institute. Height, weight, body mass index, waist circumference, hip circumference, fat percentage and blood pressure was measured with standard technique and analysed using chi-square test.

**Results:** 71.4% of males & 45.5% of females of hypertensive parents showed increased BMI (p = 0.002**). 57.1% of males & 56.4% of females of hypertensive parents showed increased body fat percentage (p = 0.01*). 50% of males & 41.8% of females of hypertensive parents showed increased waist circumference (p = 0.000***). 21.4% of males & 10.9% of females of hypertensive parents showed increased diastolic BP (p = 0.04*).

**Conclusion:** Offspring of hypertensive parents should be considered as a special group with early dietary adjustment and lifestyle modifications.

**Keywords:** Hypertension, family history, special, lifestyle modifications

**FPP-MISC-182**

**Assessment of Knowledge of Medical Professionalism among Medical Students & Faculty.**

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Observational cross sectional questionnaire based study. This study was conducted in tertiary teaching Hospital – Chennai medical college Hospital & Research centre.

**Inclusion criteria:** Medical students (Undergraduates – I year –final year & Postgraduates), CRRI & Faculty.

**Exclusion criteria:** medicos who don’t give consent.

**Duration:** Three months

The study has been started after getting Informed consent from the participants and with the approval of IRB and Institutional Ethical committee clearance.

Professionalism is an ancient concept in medicine exemplified by Hippocratic oath. Medical Professionalism is a fundamental aspect of competence which entails positive, identifiable qualities, behavior and attitude that professional should strive for.

Professionalism includes a set of values and behaviors that reinforce the social relationship between the patients and physicians. The elements of professionalism are Altruism, Accountability Excellence, Duty, Integrity, honor and Respect for others.

The overall goal of Indian medical education programme (GMR2012) is to create an Indian Medical Graduate (IMG) possessing requisite knowledge, skills, attitudes, values and responsiveness. In order to function appropriately and effectively in his role as clinician, leader, member of health care team, communicator, lifelong learner and a
Professional. IMG must obtain a set of competencies during his/her graduation. Weak professionalism is the major cause for medical malpractice and mortality and morbidity in patients. Medical students should learn these values during their education, but many previous studies showed that certain aspects of professionalism is not understood completely by the medical students, residents and also by the doctors. Medical students and doctors need to be targeted for teaching and assessment in order to develop professionally responsible practitioners.

Methodology:

This study includes 870 participants including Undergraduate and postgraduate medical students, both males and females (from 1-yr MBBS-Final yr(450+25) including the residents(100) and Faculty(250). Pretested validated questionnaire developed by General medical council to assess the knowledge of professionalism was given to the participants. The questionnaire will be based on the honesty, concern about patient safety, maintaining boundaries with patients, confidentiality, self-appearance & own health, professional excellence. The response was analyzed (Descriptive analysis) by SPSS21 software to assess their knowledge about professionalism.

Results & conclusion: the awareness of professionalism is not completely understood by the preclinical and paraclinical students. The Junior faculty & CRRI and need to be sensitized & motivated by the senior Faculty members who have better acquired the positive values of professionalism. Future plan: With the permission of higher authorities Separate session can be arranged to create awareness about professionalism and what the right thing they should do.

Key words: Altruism, Accountability, Competency, Excellence, IMG, medical malpractice, professionalism.

FPP-MISC-183

Electrophysiological Characterization of Ion Channel Expression in Cultured Bovine Chondrocytes

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Background: Culture of articular cartilage is often performed aiming to increase the yield of cells for articular cartilage transplants. There is a possibility that the functioning of these cells can be altered with prolonged culture.

Objectives: To analyze the change in electrophysiological characteristics of bovine chondrocytes with culture.

Materials and Methods: Freshly isolated bovine chondrocytes were cultured until confluence. Patch clamp recordings were performed in the whole cell configuration on freshly isolated cells (day 0), mid culture (day 4-6) and at confluence (days 9-11). As the data were not normally distributed, the Kruskal-Wallis test was used for analysis.

Results: A significant increase in surface area (as measured by capacitance) was noted from day 0 to day 4-6 and day 9-11, median value at day 0 was 4.49pF, n=21, at day 4-6 was 13.6pF, n=24, and at day 9-11 was 13.89pF, n=19, p<0.001. A depolarizing voltage protocol applied to the cells caused large outward currents, activating at -40mV, inhibited by 10mM TEACl, suggestive of currents through delayed rectifier potassium channels. No inward currents were noted. There median
current density at +40mV on day 0 was 302.9pA/pF, n=9, on day 4-6 was 50.1pA/pF, n=13 and on day 9-11 was 332pA/pF, n=13. Although the median current density mid culture was low, the differences between the current densities in all three groups was not found to be statistically significant (p=0.138).

**Conclusion:** The predominant ion channel in bovine chondrocytes was the delayed rectifier potassium channel. Expression of this channel was largely unaltered during culture.

**keywords:** bovine chondrocyte, patch clamp, delayed rectifier potassium channels

**FPP-MISC-184**

**Comparative Assessment of Stress among Medical Students in Relation to Abo Blood Groups**

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**Background:** Stress is a term that refers to the sum of physical, mental and emotional strains or tensions on a person. Medical education can impose significant psychological stress on undergraduates. Considerable degree of psychological morbidity has been reported among medical students ranging from stress, interpersonal problems and suicidal ideation to psychiatric disorders and they tend to have greater psychological distress than general population. The academic demands of medical education are placed on students at time of their life when they are also involved in issues related to lifestyle and careers. There is very limited data available as of on Indian population regarding the link between stress and ABO blood groups.

**Objective:** To compare stress levels in students with different ABO blood groups.

**Materials and Method:** Blood grouping was done. The Medical Student Stressor Questionnaire (MSSQ) is a validated instrument used to identify sources of stress. The items in MSSQ represent 20 possible sources of stress in medical students identified from the literature grouped into six main domains: Academic Related Stressor (ARS), Intrapersonal and Interpersonal Related Stressor (IRS), Teaching and Learning Related Stressor (TLRS), Social Related Stressor (SRS), Drive and Desire Related Stressor (DRS) and Group Activities Related Stressor (GARS). Data collected was analysed using SPSS version 23. Descriptive analysis of levels of stress in all six domains were presented as frequency & percentages using ANOVA.

**Results:** No significant difference was found in stress levels in students with different blood groups.

**Conclusions:** The study showed that students with different blood groups have same levels of stress

**Key words:** Stress, MSSQ, Blood Groups
FPP-MISC-185

A Cross-Sectional Study to Assess Motor Performance of the Hands in the Laboratory Workers of Jawaharlal Nehru Medical College, Belgaum

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Background: Human motor performance (MP) and motor skills are essential aspects of the various daily activities. Skilled laboratory workers are involved in prolonged duration of skillful, repetitive work involving the hands and CTS is associated with sensory and motor abnormalities. However, no previous studies have assessed the MP in their hands.

Objectives: Objectives were to assess MP of the hands and relation between MP and workplace factors.

Material and Methods: Present cross-sectional study was conducted on 94 laboratory workers (technicians and attenders). MP was assessed by median MNCV, work done and fatiguability, hand grip strength and bimanual coordination.

Results: Mean values of median MNCV, work done and time for onset of fatigue were normal, but hand grip strength and efficiency index were slightly less and duration of error in executing the task was slightly more in CTS group, though these differences were statistically not significant.

Study showed that work pattern as attenders and increased years of employment were associated with decline in MP and increased working hours with better MP.

Conclusion and Interpretation: Most of MP measures being normal in those with CTS suggests that they are at early stages of development of CTS. If proper preventive measures are not initiated, they may progress and lead to late stages which can be quite debilitating. Also workplace factors may affect their work performance.

Keywords: Motor Performance (MP), Median Motor Nerve Conduction Velocity (MNCV), Mosso’s Ergography, Hand Grip Strength, Bimanual Coordination.

FPP-MISC-186

Evaluating Functional Gastro Intestinal Disorders in Patients of Chronic Abdominal Pain- A Prospective Study

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Background: Chronic abdominal pain (CAP) is a common condition and is often associated with significant health care utilization and impact on the quality of life. A functional etiology particularly, Functional abdominal pain syndrome (FAPS) in adults has psychosocial comorbidity and is a less extensively studied condition than other common functional gastro intestinal disorders (FGIDs).

Objectives: To evaluate the patients with functional gastro intestinal disorders and to obtain a data for FAPS in adolescents and adults in a population from North India.

Materials and methods: 150 patients in the age group of 10-60 years with chronic abdominal pain were selected. A careful history, clinical examination and
investigations were performed to find the etiology.

**Results:** 105 out of 150 patients with CAP were found to be having underlying organic causes. FAPS was diagnosed in 3 patients (2%) on the basis of Rome III diagnostic criteria. The treatment of FAPS was commenced with a bio psychosocial approach with emphasis on an effective doctor patient relationship and specific measures.

**Conclusion:** CAP has an extensive etiology, yet a detailed history coupled with a complete physical examination and investigative profile help to a great extent in diagnosing the cause. FAPS should be diagnosed on the basis of a careful clinical history and characteristic pain behavior during physical examination and only targeted investigations should be undertaken.

**Keywords:** Chronic abdominal pain, Functional abdominal pain syndrome, Functional gastro intestinal disorders.

FPP-MISC-187

**Study of Prevalence of Hepatitis in Multi-Transfused Beta Thalassemia Patients**

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**Introduction:** The thalassemia is an inherited hemoglobin chain disorder characterised by defective synthesis of hemoglobin chains, which hence causes hemolysis and impairs erythropoiesis. Alpha thalassemia and beta thalassemia characterised by defect in alpha chain and beta chain of hemoglobin respectively. Alpha thalassemia is dreadful disorder and is not compatible with the life while the affected children of beta thalassemia require regular lifelong blood transfusions for the survival. This treatment of transfusion of blood itself has its own side effects of which infections like hepatitis are dreadful and lead to lifelong infection to the person with no treatment available.

Hence the study was planned to see find out the prevalence of hepatitis in the beta thalassemia patients who have been receiving blood transfusions since more than 5 yrs. which will help to guide the blood bank authorities for the screening of the blood for TTIs.

**Aims and objectives:** To study the prevalence of hepatitis in patients of beta thalassemia who have been receiving regular blood transfusions since more than last 5yrs.

**Materials and Methods:** This is a cross sectional, single centric, open labeled, observational study in which patients of beta thalassemia of last five years attending thalassemia OPD for the regular blood transfusions were taken in account by taking data from HMIS, electronic record section of our tertiary care hospital as well as patients of beta thalassemia were attended personally after taking informed permission from institutional ethics committee. Data collected in a questionnaire with main focus on complications like HBV & HCV.

All the collected data is compiled in F

**Materials and Method:** This study was done using cross sectional design. 100 voluntary blood donors coming for replacement donation were screened and selected after obtaining informed consent. Information regarding basic demographic variables and personal habits like smoking of each subject were recorded in a pre-designed pro-forma. 2 ml of blood was collected and analysed using Sysmex automated analyzer.

**Result:** The MCV and MCH values of in group of smokers was higher than the
values of non-smokers, which were statistically significant (p<0.05). Increase in MCHC in smokers was found less marked and non-significant (p>0.05).

Conclusion: It has been concluded that smoking causes persistent state of hypoxia in the body due to smoke contents which cause increase in MCV and MCH. This effect should be considered while interpreting red cell indices values in different clinical scenarios. Early changes in hematological values could be used to encourage a healthier lifestyle.

Key Words: Smoking, MCV, MCH, MCHC

FPP-MISC-189

Perception of Undergraduate Medical Students on Medicolegal Autopsy Demonstrations as Teaching-Learning Medium in Second Professional MBBS Curriculum

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Background: Forensic Medicine subject is part of MBBS curriculum for Second Professional (3rd to 5th Semester). Learning of concept & technique of postmortem examination is imparted to medical students during autopsy demonstrations. Present study therefore is undertaken to study perception of undergraduate medical students of S. S. Medical College, Rewa (M.P.) on educational outcome & suggested improvements on medicolegal autopsy demonstrations to students.

Objectives: To determine perception of undergraduate medical students regarding current scenario & practice of practical teaching & demonstration of medicolegal autopsy to students

Material & Method: Cross sectional study on Second Professional MBBS students (142 students) & 24 Interns has been undertaken. Students were given pre validated questionnaire & their feedback received & analyzed.

Results: 86.75% participants in present study term level of hygiene & cleanliness in mortuary as poor. 90.36% do not agree that infrastructure in mortuary is adequate for PM demonstration. 85.54% felt that real cadaver have to be preferred over virtual alternatives. 55.42% consider present pattern of postmortem demonstrations to be effective in achieving desired outcomes. Majority (60-80%) rate the competence & confidence to undertake autopsy independently from 2-3 on a scale of 0-5.

Conclusions: The present study suggests that medical students appreciate the importance of autopsy demonstrations as a teaching learning method. They feel that there is immense scope for improvement with regards to infrastructure, timing & active participation of students.

Key Words: Autopsy Demonstration, MBBS Curriculum

FPP-MISC-190

Introduction of Case Based Learning in the Department of Physiology at IGIMS, Patna.

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Background: Case Based Learning (CBL) is student centric and it allows for interactive teaching, self-directed and motivated learning. CBL requires students to recall previously covered material to solve clinical cases.
Objectives: To assess effectiveness of CBL over Lecture based learning (LBL)

To assess perception of the Students towards CBL

Methodology: Case based learning was introduced along with didactic lectures in the Physiology teaching curriculum, during a tutorial class.

Modified “Seven Jump” method was adopted for CBL. The study group (n=80) was divided into Group A (40 students) and Group B (40 students). In tutorial for regulation of blood pressure for Group A was conducted using CBL and for Group B, it was conducted using LBL method. Methodology was reversed for groups in tutorial class for basal ganglia.

Assessment test in form of MCQ was conducted. Inter group comparison was done using unpaired t- Test Three-point Likert scale questionnaire having nine questions was used to assess their perceptions about effectiveness of CBL.

Result: In case of regulation of Blood Pressure the difference in scores of the assessment test was not statistically significant (Group A15±0.84, Group B 16±0.67). Similar result was obtained for basal ganglia. Analysis of questionnaire favoured CBL in tutorials.

Conclusion: In tutorial classes’ students preferred CBL as preferred mode of instruction.

Key Word: Case Based Learning, Lecture based leaning

FPP-MISC-191

Students’ Perception of “Low Fidelity Simulators” in Teaching Physiology.

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Background: Inclusion of simulations into the curriculum of medical students has seen significant growth. Simulations can be classified into low, moderate or high fidelity. As most of the simulators are expensive so in this study we have made an attempt to develop an inexpensive, low fidelity simulators& explore its usefulness in teaching clinical examination (cranial nerves III, IV, VI & free fluid in the peritoneal cavity)

Objectives:

1. To develop a low fidelity simulator.

2. To assess the effectiveness of low fidelity simulators.

Material and methods: This study is a pilot study. Questionnaire based on five points Likert’s scale. Total number of 30 students were randomly recruited from the first MBBS & divided into batches of 10-15. A session of 20 to 30 minutes was conducted for each examination & feedback was collected thereafter. Data analyzed.

Results: Of the 30 subjects, 96.5%=effective, 93.4%=engaging, 66.7%=motivated to read more about the topic, 93.3%= better understanding of clinical examination by this modality, 96%=found it to be a better teaching modality.

Conclusion: The above result has proven that the use of low fidelity simulators in teaching Physiology to 1st MBBS students is beneficial for their understanding of clinical examination.

Keywords: Simulation, Physiology, clinical examination, Likert’s scale, peritoneal cavity, cranial nerves
FPP-MISC-192

Approach of Medical Students towards Physiology Learning: A Feedback Study from Two Medical Schools in a Sub Himalayan State of India.

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Background: Demands of best health care necessitate the revamping of the medical curriculum including Physiology which is the core of medical teaching in first profession MBBS. Prior to revamping the curriculum we need to study the merits and demerits of the old curriculum. Students’ feedback is considered as one of the best methods for this, due to their direct involvement and remains the cornerstone of this revamp.

Objectives: Students’ feedback regarding the learning methodology, difficulties towards learning Physiology and opinion regarding the improvement in teaching will be collected from two medical schools in the Jammu province of Jammu and Kashmir (J&K).

Then comparing this data from two medical schools to see if their opinions differ or not?

The information gathered by the authors will give a feedback regarding the medical student’s favoured methods of learning Physiology, the drawbacks involved and their perspective of teaching improvement.

The information so gathered might help the medical fraternity in mapping the Physiology curriculum in a way to make it more informative and interesting for the medical students.

Material and Methods: A pre-tested Questionnaire prepared by the authors was used to seek the information from medical students regarding various parameters of learning and their difficulties while learning Physiology and also their opinion regarding the improvement in teaching the subject. It was administered to 1000 MBBS students, 500 each from ASCOMS & Hospital, Sidhra, Jammu and Govt. Medical College (GMC), Jammu (J&K). Data thus collected was analysed and Chi-square test was used as test of significance.

Results: Approximately, 80% of students each from both the colleges were affirmative of importance of lectures and practicals also and about 60% each voted that the lecture notes were useful. Higher proportion of ASCOMS students reported tutorials as tool in subject learning (p<0.05). More than 80% students of either colleges emphasized the need of reference books in case of difficulty while very few students interacted with their class fellows, seniors and teachers during this. Lower proportion of GMC students used previous physiology exam papers for help (p<0.05). About 40%, 30% and 20% of the students from each medical college were in favour of the use of overhead projector(OHP), power point presentation (PPT) and chalk and blackboard respectively while teaching Physiology. Students of either colleges underlined the importance of clinical problems in understanding physiology and laid stress on its use more often along with the integrated teaching (p>0.05).

Conclusion: Students underscored the importance of lectures, tutorials and practicals in physiology learning while clinical problems were elicited to be highly useful. Students also opined in favour of integrated teaching. Authors emphasise the use of hybrid methods like OHP, PPT.
and chalk and blackboard while teaching with addition of interactive teaching sessions like group discussions and problem based learning along with the integrated teaching. Further, teacher student relationship needs to be more open, encouraging and friendlier.

**Key words:** Physiology, Curriculum, learning methodology, medical students, medical schools.

**FPP-MISC-193**

**Comparative Study of Lecture Based Learning versus Project Based Learning on Academic Performance among Medical Undergraduates.**

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**Background:** In today’s world, students should be globally competent, problem solvers, critical thinkers, technology literate and collaborative. These characteristics cannot be taught through traditional lecture based learning (LBL) and therefore, Project based learning (PBL) can be one of the best ways to that. There is very limited research on the impact of PBL in medical education, therefore this study is designed to assess whether the academic performance is better in PBL than LBL.

**Materials and methods:** The present study was a quantitative interventional study consisting of 96, 2nd Year MBBS Students. Among 96 students, 48 were randomly selected for traditional LBL and another 48 for PBL. Academic performance was assessed through MCQ’s (Multiple Choice Questions) and SAQ’s (Short Answer Questions). The parameters were analysed for statistical significance using paired ‘t’ test and P<0.05 was considered the level of significance.

**Results:** The PBL group showed a better outcome in the academic scores (8.93) compared to LBL group academic scores (4.43), which was statistically significant (P<0.001).

**Conclusion:** This study showed that PBL compared to traditional LBL has a positive impact on academic performance in Medical education. PBL results in numerous benefits like greater depth of understanding of concepts, broader knowledge base and improved communication skills.

**Keywords:** PBL, LBL, academic performance, MCQ’s, SAQ’s, communication

**FPP-MISC-194**

**The Study of Emotional Intelligence and Perceived Stress in First Year MBBS Students**

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**Background:** Emotions have effect on almost all aspects of life i.e. decision making, behavior, interpersonal relations, profession, etc. and are accompanied by physiological and behavioral changes in the body. Emotional intelligence is increasingly discussed as having a potential role in Medicine, Nursing and other healthcare professions. Stress has been identified as being high for students in healthcare courses.

**Objectives:** This study is aimed to calculate the Emotional intelligence and...
perceived stress and also to study their relationship with each other in first year MBBS students.

Materials and Methods: All apparently normal and healthy 180 volunteers of first year MBBS students of tertiary health center were included in the study. The emotional intelligence score was calculated with the help of Schutte EI scale. The perceived stress score was calculated with PS scale. The scores were calculated at two occasions, first on admission and second just before final first year MBBS exam.

Result: There is significant inverse correlation between perceived stress scale (PSS) and emotional intelligence (EI) score among both on admission and before final exam group.

Conclusion: We can conclude that medical students showing higher Emotional intelligence scores suffered less perceived stress and higher EI might serve as a buffer for stress.

Key Words: Emotional Intelligence (EI), Perceived Stress (PS)

Objective: To study whether CTRP3 Levels are related to cardiac autonomic tone in obesity.

Materials and methods: Sixty subjects were recruited from general population into the studyand control groups, based on Body mass index (BMI as kg/m2). There were no drop outs. Newly diagnosed, drug naive obese subjects with BMI 25-35kg/m2 of both genders, aged 18-40yrs, with no associated co-morbidity or substance abuse, were grouped as CASES (n=30) and compared with age, sex and socioeconomic status matched CONTROLS (n=30) with BMI 19-22kg/m2 . Autonomic function tests including heart rate variability (HRV) were assessed in both groups using AD Instruments Finometer-Midi system (Model 2) and lead-II ECG using standard limb leads, and analyzed offline on Labchart Pro 8 software, alongwith anthropometric and fasting serum CTRP3 levels.

Statistical analysis: Unpaired Student's t-test and Pearson’s correlation and linear regressionusing SPSS-20 software. Data was presented as mean ± SD. p<0.05 was considered significant.

Results: CTRP3 levels correlated inversely with LF/HF ratio(p<0.01)in obese group. We also found increased LF/HF ratio(p<0.001) and lower serum CTRP3 levels(p<0.001), HRV variables– RMSSD(p<0.001), pRR50(p<0.001), E:I ratio(p=0.02), 30:15 ratio(p=0.003) and valsalva ratio(p=0.01) in cases.

Conclusion: As the CTRP3 levels decrease in obesity, there is decreased parasympathetic cardiac autonomic tone in obesity. Henceforth, improving CTRP3 levels may be beneficial for cardiovascular implications in obesity.

Key words: CTRP3, obesity, heart rate variability-HRV parameters(RMSSD, pRR50, LF/HF ratio), E:I ratio, 30:15 ratio, valsalva ratio
Expression of genes involved in epithelial-mesenchymal transition (EMT) is dysregulated in eutopic endometrium of patients with ovarian endometriosis

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Background: Various physiological processes are reportedly altered in eutopic endometrium of women with endometriosis, which render it to attach at ectopic sites such as ovary and peritoneum. Epithelial -mesenchymal transition (EMT) is one such important process which helps in migration and attachment of eutopic tissue to the ectopic sites.

Objectives: Expression levels of genes involved in EMT were examined among women with and without ovarian endometriosis based on whole human transcriptomic analysis followed by their validation using qRT-PCR protocol.

Methods: Endometrial samples were collected from patients with stage IV ovarian endometriosis (n = 27) and patients without endometriosis (n = 26). Total RNA was extracted, followed by expression microarray from samples with RIN > 8.0 (n = 50). EMT- related genes (243) were selected from Thompson Reuter’s database using GeneGO MetaCore portal followed by customized in-silico microarray data analysis using GeneSpring v14.8. Differentially (i.e., FC >2.0 at p < 0.05) expressed genes were validated by qRT-PCR.

Results: Out of 243 EMT associated associated genes, 47 genes were expressed in endometrium: 21/47 were differentially regulated with FC >2.0 and p value < 0.05 and these were validated in qRT-PCR analysis. Of these, 18 genes were up-regulated in eutopic endometrium: 3 genes (DAB2, ILK and TGFBR2) being overtly linked with EMT, 9 genes (TWIST1, SMAD3, RHOA, RAC1, LEF1, ID2, GRB2, CDC42, and ACTA2) linked with cellular processes requiring EMT involvement and 4 genes (BCL2, DDX5, TANK, and TRADD) indirectly linked with EMT. However 5 genes (BMP7, CREB1, DOCK2, ITGB3 and IL6) were down-regulated in eutopic endometrium but these were distantly linked to EMT.

Conclusions: Dysregulation of genes involved in EMT process may render enhanced migration and attachment of endometrium at ectopic sites, contributing to the distinct pathophysiology of endometriotic lesions.

A Pilot Study to Assess the Effect of Bhramari Pranayama on Heart Rate Variability

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Background: Pranayama is one of the most important yogic practices. Previous studies suggest that following pranayama practice there is a shift towards parasympathetic activity and decreased LF/HF ratio. However, all the studies have limited intervention time to five minutes only.

Objectives: To study the immediate effect of bhramari pranayama on HRV.

Materials & Methods: Ten healthy male volunteers with at least six months of prior experience of yoga with mean and standard deviation age of 25.8 ± 2.98 years
were recruited. Assessments were taken before and immediately after the practice of pranayama. Participants performed bhramari pranayama for three sessions, five minutes each followed by one minute of rest period after each session. The study was self as control study where each participant was assessed for two interventions on consecutive days i.e., bhramari pranayama and quiet sitting. The two interventions were assigned randomly using an online randomizer. This study has been approved by ethics committee of Patanjali Research Foundation.

Trends/Inferences: Considering that this was a pilot study with a sample size of ten subjects, no statistics was attempted. Trends indicate that there was an increase in low frequency spectrum, reduction in high frequency spectrum of HRV and an increase in LF/HF ratio when compared to the baseline recording.

Conclusion: The study shows a trend of increased sympathetic activity and reduced parasympathetic activity immediately after the practice of bhramari pranayama.

Keywords: bhramari pranayama, heart rate variability, yoga

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Assessment of Hand Grip Strength Before and After Isometric Exercises in Gymnasium

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Introduction: Hand grip dynamometer is an instrument used to measure maximal isometric grip. Reliable and valid evaluation of hand strength can provide an objective index of general upper body strength. The power grip is the result of forceful flexion of all finger joints with the maximum voluntary force that the subject is able to exert under normal biokinetic conditions.

Objectives: This study reveals the hand grip strength in persons work outing in gymnasium.

Methods and Materials: My study population consists of 60 adult subjects with age ranging from 20 to 50 years. The participant is asked to be in a standing position, arms at their side, not touching their body and keeping their elbow bent slightly, the test is administered on both hands. The participant to squeeze the dynamometer with as much force as possible. Three trials are made with a pause of about 10-20 seconds between each trial to avoid the effects of muscle fatigue. The results of each trial are approximated to the nearest kilogram. The best 3 measurements (i.e. the highest three) are measured. The results are compared between before and after exercise.

Results: There is significant change (p<0.01) in the hand grip strength of the persons before and after isometric exercise. There is also a significant result between the dominant and non-dominant hand grip strength (p<0.05). There is difference in hand strength between age and gender.

Conclusion: We conclude that the factors that influence the strength of the grip, includes muscle strength, hand dominance, fatigue, time of day, age, nutritional status, restricted motion and pain.

Keywords: Hand grip strength, gym, isometric muscle strength
Heart Rate Variability in children with Attention-deficit/hyperactivity disorder (ADHD) before and after treatment with Methylphenidate.

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**Background:** Attention-deficit/hyperactivity disorder (ADHD) is one of the most common psychiatric disorders in children and adolescents with estimated worldwide prevalence of 5.29\% . ADHD is associated with autonomic dysfunction which gets further modulated with drug therapy. The heart rate variability (HRV) is validated indicator of the cardiac-autonomic system activity and can be used to study the same in ADHD before and after treatment.

**Objectives:** There are few prospective studies to evaluate the changes of HRV parameters before and after methylphenidate treatment in drug naive patients with ADHD. Thus the present study was planned with the objective of studying the same among Indian population.

**Material and methods:** The study approved by IEC for human research included 52 patients of ADHD diagnosed by a psychiatrist were recruited from the Psychiatry OPD of Smt. Sucheta Kriplani Hospital, New Delhi. After informed written consent the Baseline ADHD Conners rating score and HRV were recorded. The patients then received methylphenidate therapy. The above parameters were repeated after 12 weeks of study period.

**Results:** There was a significant improvement (decrease) in the Conners scores. HRV parameters showed a significant increase in the power of Low Frequency component in normalized units (LF nu) and significant decrease in power of high frequency(HF) component in absolute (ms\textsuperscript{2}) as well as normalized units (nu) after methylphenidate treatment. The increase in LF indicates an enhanced sympathetic activity whereas the decrease in HF indicates a decrease in the Parasympathetic activity. The LF: HF ratio showed a significant increase after 12 weeks of MPH treatment indicating shift of sympathovagal balance towards sympathetic dominance. On the Time Domain Parameters the RMSSD decreased significantly after methylphenidate treatment indicating reduced HRV.

**Conclusion:** The present study shows that with methylphenidate therapy as the ADHD scores improved, the autonomic balance shifted in favor of sympathetic preponderance. Moreover reduction in RMSSD indicates reduced HRV and warrants cautious use of methylphenidate in patients vulnerable to cardiac arrhythmias.

**Keywords:** Attention-deficit/hyperactivity disorder (ADHD), methylphenidate, heart rate variability (HRV).
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