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### Abstracts of Papers/Posters presented during the 60th National Conference of the Anatomical Society of India, held at Bhubaneshwar, Odisha (27th-29th December 2012)

### **Oral Presentations**

#### 1. Bilateral Bilobed Testis

*Virender Kumar Nim* Pondicherry Institute of Medical Sciences, Kalapet, Puducherry

During routine dissection of the abdomen and pelvis, it was found that the right-hand side testis had a horizontal fissure at the junction of upper one-third and lower two-thirds across the anterior border from medial surface to lateral surface. It was deep enough to divide the testis into upper and lower parts or lobes. Similar anomaly was also found on the left-hand side. There are many different types of abnormalities of testis described, which can be present alone or along with epididymis, scrotum and spermatic cord, such as undescended testis, testicular tumor, cysts of testis, cryptorchidism, atrophic testis, varicocele, spermatocele, hydrocele, seminoma, etc. However, bilobed testis is a rare abnormality, and also bilateral. In the present case the testis function was normal. In case of children bilobed testis may get confused with tumors of testis. Hence tumors should be ruled out, especially in children.

## 2. A Study of Coracoclavicular Joint in the Rural Population of South Tamil Nadu

Umapathy Sembian, M. Muhil, S.D. Nalina Kumari Chennai Medical College Hospital and Research Centre, Irungalur, Trichy, Tamil Nadu

**Background:** Movements taking place in the shoulder girdle are result of complex coordinated movements between the glenohumeral, acromioclavicular, sternoclavicular and scapulothoracic articulations. Clavicle is connected with the first rib by the costoclavicular ligament, apart from the sternum and scapula through sternoclavicular and coracoclavic-

ular ligaments. Sometimes the area of attachment of these ligaments on the clavicle, first rib and scapula show faceted apophysis suggesting the presence of additional diarthrodial articulation. The incidence of coracoclavicular joint (CCJ) in various populations is estimated to be ranging from 0.8% to 9.8%.

**Aim:** The aim of this study is to ascertain the prevalence of coracoclavicular joint in south Tamil Nadu population.

**Materials and Methods:** The present study was carried out on 50 cadavers. Care was taken to include cadavers only from rural population of south Tamil Nadu. Cadavers exhibiting obscuring pathologies were excluded from this study. Dissections were carried out in all limbs to demonstrate the presence of a diarthrotic coracoclavicular joint, which is represented by the presence of an articular facet on the conoid tubercle of the clavicle and the superior surface of the coracoid process of the scapula.

**Results:** In this study, we came across a single cadaver with unilateral coracoclavicular joint on the left side.

**Conclusion:** Although CCJ is a rare entity, it should be borne in mind as a differential diagnosis for thoracic outlet syndrome or costoclavicular syndrome and, in general, for shoulder pain. This study reveals the presence of CCJ in our population and it constitutes only 2%.

#### 3. Peroneus Digiti Minimi Quinti: A Cadaveric Study

Surekha D. Jadhav, Shilpa N. Gosavi, B.R. Zambare Padmashree Vithalrao Vikhe Patil Medical College, Ahmednagar, Maharashtra

With the adaption to erect posture, the foot not only bears the body weight but also maintains the balance of body while walking and standing on uneven surface. The peroneal muscles are the cornerstones, which are evolved to perform this function. Frequent variations in the mode of origin and insertion of these muscles indicate that they are yet to attain their

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final evolutionary stage. The peroneus brevis is still in evolutionary stage and the tendon of insertion attached to the proximal or the intermediate phalanx of little toe represents tendencies to develop a peroneus digiti minimi quinti. The prevalence and morphology of this muscle is not precisely known. This study is an attempt to highlight the incidence and morphological description of peroneus digiti quinti muscle in Indian population. We studied 100 prosected lower limbs of adult individuals of unknown sex for this work.

#### 4. Organ Donation for Transplant

K.H. Oswal, Sandhya Dharwadkar, Pradnya Kulkarni USM-KLE International Medical Programme, Belgaum, Karnataka

The donation of human body or organs has been practiced since ancient times. Maharishi Dadhichi donated his living body to Lord Indra for an auspicious cause. Sushruta, a scholar and surgeon of Indian Medical Science (Ayurveda), quoted organ donation and skin grafting in his Sushrut Samhita. Corneal grafting has been practiced since 1837, blood vessels being grafted since 1920, kidney transplantation since 1940, transplantation of valves of heart being practiced since 1955. In 1974, California recognized brain death as irreversible end of brain activities due to necrosis of cerebral neurons on account of loss of oxygen supply. The time interval between brain death and total death, which ranges from few minutes to few hours, can be used for removal of important organs such as the heart, kidney, liver, pancreas, bone marrow, and this list of organs may increase in future due to advancement and newer techniques in medical science. With the increasing success rate of organ transplantation, the demand for organs has increased to a great extent, but there is shortage of donors mainly because of lack of awareness or erroneous belief among people that the dead will not attain salvation if the body is mutilated for donation of organs. This paper describes the ways to increase awareness among people, particularly the rural population, and how to motivate them to pledge for organ donation.

#### **5. Incidence of Ossification of Humeral Transverse Ligament** *Rajani Singh*

AIIMS, Rishikesh, Uttarakhand

**Background:** Bicipital groove or intertubercular sulcus is bounded by lesser tubercle medially and greater tubercle laterally. The contents of this groove are long head of biceps brachii, synovial sheath and ascending branch of anterior circumflex humeral artery. The groove is bridged by transverse humeral ligament. This ligament has been found to be ossified. This osseous tissue may damage the contents of bicipital groove during biomechanical movements of arm. The ossification of this ligament is a new discovery as far as known to author and bears clinical implications. Therefore, the study has been carried out to find out the incidence of ossification of humeral transverse ligament.

**Methods:** During examination of bones in the osteology lab in the department of anatomy, we came across a rightsided humerus out of 100 humeri showing complete ossification of transverse humeral ligament. The length, breadth and thickness of the ossified ligament were taken with digital vernier caliper. The photographs were taken and clinical implications were analyzed.

**Results:** The ossified ligament was observed in one humerus out of 100 humeri observed. Thus incidence is 1%. This osseous bridge extended from lateral margin of lesser tubercle to the medial margin of greater tubercle. The horizontal, vertical lengths and thickness of ossified ligament were 7 mm, 5 mm and 2 mm, respectively.

**Conclusion:** Ossified transverse humeral ligament may cause tendinitis of long head of biceps brachi leading to anterior shoulder pain. It may also cause misinterpretation of radiographs. Thus, knowledge of ossification of this ligament may be of utmost use to physicians for pain, orthopedic surgeons for prosthesis of shoulder, radiologists for avoiding misinterpretation of radiographs and for new variant of anatomists.

#### 6. Rectus Sternalis Muscle: Incidental Finding of a Rare Chest Wall Musculature—Two Case Reports

Minnie Pillay, Greeshma V. Biju, M. Mahendran Amrita School of Medicine, Amrita Institute of Medical Sciences & Research Centre, Kochi, Kerala

The past few years have seen an increased interest of generating awareness about anatomical variants with clinical significance to reduce the risk of surgical complications. In this context, we report two rare cases of the presence of sternalis muscle on the anterior chest wall of two male cadavers: in one case the muscle was present bilaterally and in the other unilaterally with contralateral attachment. The presence of this muscle can have clinical implications in the form of alterations in electrocardiogram, or confusing interpretation of a routine mammogram. Moreover, the presence of such a muscle can be misdiagnosed as a wide range of benign or malignant anterior chest wall lesions and tumors. This paper discusses the position, relations, innervation and development, as well as the clinical relevance of sternalis muscle.

#### 7. Determination of Sex of Human Hip Bone from Acetabulo-Pubic Index

Bijalaxmi Parija, Lalatendu Pattanaik, Biswabhusan Mohanty IMS & SUM Hospital, Bhubaneswar, Odisha

This study evaluates the adult bones of unknown sex from skeletons of people belonging to coastal Odisha. For this study, 100 hip bones were selected from both sexes, male and female. The study was conducted to determine the sex of hip bones from acetabulo-pubic index (A-P index) and compare the data with those of other workers. Sex was determined at the beginning on the basis of morphological features. The metrical measurements were taken on acetabular diameter and pubo-acetabular length. The index was calculated for each individual bone. The statistical analysis was done to determine whether it was significant or not. The range, mean and standard deviation (SD) in both sexes were derived. The A-P index was significantly higher in male than female. In male, the A-P index was between 90 and 108 and in female it was between 63 and 92, and the P-value was < 0.0001.

#### **8. Anatomy of Ansa Cervicalis and Its Variations** *Anuradha Baruah, Indranath Sutia* Assam Medical College, Dibrugarh, Assam

**Background:** The ansa cervicalis is a loop of nerves found in the anterior triangle of the neck, which gives motor innervations to the infrahyoid muscles. The ansa cervicalis is injured during surgical procedures, such as thyroplasty, arytenoids adduction, Teflon injection in vocal rehabilitation, etc. This nerve loop is usually used to reinnervate the larynx following recurrent laryngeal nerve paralysis. In order to avoid these injuries and safe mobilization of the surrounding structures, it is important to understand the course and variations of the ansa cervicalis. The aim of the study is to describe the anatomy of ansa cervicalis and its variations in terms of its origin, formation and relation to the great vessels of the neck.

**Materials and Methods:** This study is done on cadavers available in the Department of Anatomy at AMC. The study is carried out by simple dissection method.

**Result:** Variations are observed in superior root, inferior root, loop and its branches.

**Conclusion:** The results of the study provide additional information and new insight into the variation of the ansa cervicalis, which may have useful applications in laryngeal reinnervation surgery, anesthesia and other operative procedures.

#### 9. Study of Division of Sciatic Nerve below Pelvis

*Bijoy Kumar Borah, Giriraj Kusre, Roonmonni Deka* Assam Medical College and Hospital, Dibrugarh, Assam

**Background:** The sciatic nerve comprises the tibial and peroneal components within the same epineural sheath. It is eventually separated in the popliteal fossa.

**Aim:** To study the level of division of sciatic nerve and observe the variations in the division of the nerve below the pelvis.

**Materials and Methods:** Thirty formalin-fixed lower limbs of both perinates and adult cadavers were dissected in the anatomy dissection hall of AMCH, Dibrugarh by simple dissection.

**Observation:** The site of division was observed under the following headings: in gluteal region (upper one third), in the middle one-third of thigh, at the apex of popliteal fossa.

**Discussion:** Findings from this study were compared with those of previous works.

**Conclusion:** Precise knowledge regarding the level of division and the variation in the division of sciatic nerve is essential in treating sciatica, intramuscular injection in neonates, fracture neck of femur and dislocation of hip joint.

### 10. Variations of the Musculocutaneous Nerve: A Dissection-Based Study

Santanu Kumar Sarma, Roonmoni Deka, Jyotirmoyee Lahon, Anuradha Baruah, Rubi Saikia Assam Medical College and Hospital, Dibrugarh, Assam

**Aim:** Review of literature shows that the musculocutaneous nerve varies greatly. These variations are either common or rare. Thus, this study is a food for thought, especially to anatomists, regarding musculocutaneous nerve variations.

**Materials and Methods:** The perinatal cadavers from the Department of Obstetrics and Gynaecology, AMCH, Dibrugarh, and adult cadavers in the dissection hall of Anatomy Department were observed meticulously after following simple dissecting procedure.

**Results:** The musculocutaneous nerve is formed from the continuation of the lateral cord of the brachial plexus. It pierces the coracobrachialis. During the routine dissection of 76 upper limbs, variations of the musculocutaneous nerve were noted: the musculocutaneous nerve (a) arose from the median nerve, (b) arose from the median nerve but did not pierce the coracobrachialis, (c) continued from the lateral cord but did not pierce the coracobrachialis, (d) was absent and the median nerve supplied the anterior arm muscles, (e) communicated with the median nerve. Those communications were from the musculocutaneous nerve to the median nerve or vice versa.

**Conclusion:** This study will definitely kindle the flame of inquisitiveness amongst anatomists regarding the variations of the musculocutaneous nerve. The knowledge of these variations will undoubtedly prevent any untoward damage to the arm during surgery.

#### 11. A Study of Radial Nerve and Its Deep Branch in the Cubital Fossa

*Vaishali P. Ahire, Lakshmi Rajgopal* Seth GS Medical College and KEM Hospital, Mumbai, Maharashtra

**Background:** The radial nerve anterior to the lateral epicondyle divides into superficial and deep terminal branches. Entrapment or compression neuropathy of the deep branch of radial nerve (DBRN) or posterior interosseous nerve (PIN) leads to radial tunnel syndrome or PIN syndrome. It may also be one of the differential diagnoses of lateral epicondylitis.

**Aim:** The aim of this study is to (1) measure the distance between the interepicondylar line and the site of division of radial nerve and origin of nerve to ECRB, (2) note the site of origin of nerve to ECRB and its length, (3) measure the distance between the interepicondylar line and the site of origin of nerve to ECRB, (4) note the nature of some of the structures that may compress DBRN, (5) measure the shortest distance from radial tuberosity to the arcade of Frohse.

**Materials and Methods:** Thirty upper limbs from 15 formalin-fixed cadavers from the department of anatomy of our medical college were used. All upper limbs were carefully dissected. The radial nerve and its terminal branches were exposed in the cubital fossa. The various parameters were measured.

**Conclusion:** Knowledge of the structures causing this compression will help surgeons while exploring the elbow region during the surgical decompression of the DBRN.

### 12. Variations of Sciatic Nerve Division: A Fetal Study

Pranab Debbarma, Ch Rajlakshmi, N. Damayanti Regional Institute of Medical Sciences (RIMS), Imphal, Manipur

Aim: To know variations of sciatic division in fetus.

**Introduction:** The sciatic nerve is the largest nerve in the body and long course in the lower limb. Its main division into the tibia and common peroneal nerves may occur at any level from the lumbosacral plexus to the inferior part of the popliteal fossa.

**Materials and Methods:** Twenty dead normal spontaneously delivered fetuses of second and third trimester of pregnancy were collected from the Department of Obstetrics and Gynecology, RIMS, Imphal, after taking formal permission from the authority. Both sides of the sciatic nerves were traced following dissection from gluteal area to lower part of the popliteal fossa. **Observation:** Division of sciatic nerve was observed at different levels from lumbosacral plexus to the inferior part of the popliteal fossa including bilateral variation.

**Conclusion:** Knowledge regarding the division of sciatic nerve in various levels is essential in treating sciatica, fracture neck of femur, hip dislocation and intramuscular injection at gluteal region. Preoperative diagnosis by modern equipment, such as MRI, CT scan, will be of great value to the surgeons for surgical intervention of these underlying causes.

#### 13. Morphometric Analysis of Appendicular and Spinal Ventral Horn Growth: A Correlative Study in Human Fetuses

Mohd Salahuddin Ansari, Nafis Afaruqi, S.M. Yunus AIIMS, Rishikesh, Uttarakhand

**Aims and Objectives:** To study the growth pattern of cervical and lumbar enlargements of spinal cord of the limbs to which the supply and their inter-relationships.

**Materials and Methods:** Spinal cords were dissected out from 30 normal human fetuses of different gestational ages, divided into five equal groups. Mean lengths of arm, forearm and thigh were determined in each group. Section obtained from cervical and lumbar enlargements were stained with hematoxylin and eosin to determine mean transverse diameters of their ventral horns in each foetal group.

**Results:** Length of the forearm was smaller than that of arm until third trimester when a relative spurt in growth of forearm was noticed.

**Conclusion:** Direct correlation exhibited in growth patterns between transverse diameters of ventral horn of cervical enlargement and forelimb measurements and that of lumbar enlargement and hind limb parameters with a spurt of growth between second and third groups of fetuses.

#### 14. An Anatomical Study on the Variation of Retinal Nerve Fiber Layer Thickness with Ocular Axial Length in West Bengal

Alipta Bhattacharya, \* Alpana De(bose),<sup>†</sup> Gautam Bhaduri,<sup>‡</sup> Swapan Bhattacharya,<sup>‡</sup> Apala Bhattacharya<sup>‡</sup> \*National Institute for the Orthopaedically Handicapped, Kolkata, West Bengal, <sup>†</sup>R.G. Kar Medical College, Kolkata, West Bengal, <sup>‡</sup>Regional Institute of Ophthalmology, Medical College and Hospital, Kolkata, West Bengal

**Aim:** Axial length of the eyeball is one of the risk factors for primary open-angle glaucoma (POAG). It presumably reduces ganglion cell viability and retinal nerve fiber layer (RNFL) thickness. The objective of this study is to assess change of retinal nerve fiber layer thickness with changes in axial length of the eyeball in nonglaucomatous normal eyes in middle aged and elderly subjects of West Bengal.

**Materials and Methods:** Both eyes of 380 normal subjects of both sexes and aged above 40 years were examined and the results were recorded. Their ocular axial lengths were measured with USG A Scan Biometry and peripapillary fast RNFL thicknesses were measured with Stratus Optical Coherence Tomograph (OCT).

**Results:** Mean RNFL thickness of the study population was  $101.62 \pm 10.42 \mu m$ . Pearson correlation coefficient for the variation of axial length versus RNFL thickness is 0.45% (p < 0.0001).

**Conclusion:** Our results confirm more close to the southeast Asian studies (Leung et al, Sang hoon park et al) compared to the Caucasian population studies (Schweitzer K.D et al, Rauscher F.M. et al). Moreover, our study contradicts the findings of Hoh S.T et al, who failed to show any statistically significant correlation between these two parameters. Therefore, it is our recommendation that myopic subjects, especially moderate to severe ones, should undergo mandatory glaucoma evaluation and workout, particularly if they are middle aged or elderly, irrespective of their gender.

#### 15. Morphological Study of Popliteal Artery and Its Variation: A Fetal Study

S. Robert Ginlunmang Zou, N. Damayanti Dev Regional Institute of Medical Sciences, Imphal, Manipur

**Aim:** To evaluate the variation in course and branching pattern of the popliteal artery in fetus.

**Materials and Methods:** Formalin-fixed 30 fetuses (both lower limbs) were dissected at the Department of Anatomy, Regional Institute of Medical Sciences (RIMS), Imphal, after getting formal permission from the Ethics Committee of RIMS.

**Results:** Variation in the course and branching pattern were observed.

**Conclusion:** This variation study might be useful for the clinicians and surgeons when dealing with the lower extremities. Moreover, fetal dissection could be used in lieu of adult cadaver, if there is shortage, because of its similarity.

#### 16. Flowers Bone at Pterion: A Surgical Pitfall

Ajay Kumar, Anu Sharma, Poonam Singh Dayanand Medical College and Hospital, Ludhiana, Punjab

**Aim:** The pterion is the most commonly used neurological landmark. It is defined as a point at the junction of frontal, parietal and greater wing of sphenoid and the squamous part of temporal bones. Our aim is to identify the variation of flower or epipteric bones at pterion, which may be a potential surgical pitfall.

**Material and Methods:** Both sides of 80 skulls of Indian origin were examined. The shortest distance between the lateral orbital rim and the most anterior junction of the flower bones forming the pterion was measured.

**Result:** Out of 160 sides, the pterion was found to contain epipteric bone in 12 sides (7.5%), and in these skulls the most anterior junction of bones may be as close as 17.4 mm to the posterolateral aspect of frontozygomatic suture.

**Conclusion:** In skulls with an epipteric bone variation, the pterion can be mistaken for the most anterior junction of bones. This variation is of interest to anthropologists, forensic pathologist and surgeons.

#### 17. Histomorphological Study of Human Cervix in Different Age Groups in Population of Lower Assam

Santosh Kumar Sahu, K.l. Talukdar, H. Bayan, J. Sarma Gauhati Medical College, Guwahati, Assam

**Aim:** Cervix acts as a barrier at the entry of womb. Similar to other barriers it is also very prone to diseases, most importantly cancer of cervix, which is the second most common female cancer worldwide; 83% of cases occur in developing world. Therefore, histomorphological study of cervix is of great importance in this part of the country where very limited work has been done in this field. This study will help in management of various disease conditions of cervix.

**Materials and Methods:** The study was conducted in the Department of Anatomy, Gauhati Medical College, Guwahati. The cervices were divided into the following groups: (a) 20–35 years, (b) 36–49 years and (c) 50 years and above. The specimens were collected from autopsies of unclaimed human cadavers after fulfilling all medicolegal formalities from the Department of Forensic Medicine. Morphological values were taken before fixing the specimen in 10% formalin, for histology dissected specimens were made into 3–5 mm pieces and were fixed in formalin.

**Results and Conclusion:** During the study, emphasis was given to the shape of cervix and cervical canal, length of cervix, microanatomy of mucosal, muscular and serosal layer. There was significant difference of morphology and histology observed in different age groups.

#### 18. Histopathological Changes in Multiple Fetal Tissues Exposed In Utero to Zidovudine

Chongtham Rajlakshmi, \* Asima Bhattacharyya, † Mohan Kumar\*\*

Department of Anatomy, Regional Institute of Medical Sciences, Imphal, Manipur, †Department of Anatomy, North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences, Shillong, Meghalaya, \*\*Department of Pathology, IMS, BHU, Varanasi, Uttar Pradesh

Zidovudine (ZDV, AZT, 3'-azido, 3'-deoxythymidine) is an anti-HIV drug and a drug of choice for preventing maternal fetal HIV transmission during pregnancy. The ability of the drug in suppressing vertical transmission is tempered by an ever increasing new adverse effect in babies exposed in utero to ZDV. In this experiment, microscopic changes in fetal tissues were studied by administering ZDV (50 mg/kg) to pregnant swiss mice (40 experimental mice vs 25 control mice) from gestational day 8 to 16 by oral route. On gestation day 19, the pregnant mice were sacrificed and fetuses were collected. Fetal tissues were processed for histopathologic study. The results were compared with sections from fetal tissues of control group. Light microscopic changes in liver, kidney, brain, lungs and maternal ovary were detected. This study reveals the transplacental toxic effect of the drug at light microscopic level.

#### **19. Sonographic Assessment of Endometrial Receptivity in Infertile Women**

Pooja Jain, Shipra Paul, Anita Tuli, Usha Gupta, Manjula Jain Lady Hardinge Medical College and SSK Hospital, New Delhi

Implementation failure and poor endometrial receptivity can be one of the major reasons behind unexplained infertility, that is, the cases in which no other cause of infertility is identified. Ultrasound imaging is an investigative modality that is employed as a basic tool in gynecological examinations. Sonography picks up the changes in the endometrial throughout the menstrual cycle that is seen as a single thin line immediately after menstruation and expands under the influence of estrogen in the follicular phase of the cycle to the typical trilaminar hypoechoic appearance. This study was carried out to estimate the endometrial receptivity by sonography and its role in predicting the implantation rates. The 60 enrolled patients were subjected to transvaginal ultrasound (TVS USG) for follicular monitoring form the day 9 of the menstrual cycle to determine the endometrial thickness and pattern in the midluteal phase. Based on endometrial thickness and pattern, endometrium was graded as grade I (poor), grade II (intermediate) and grade III (good) endometrial receptivity. Of the 60 patients, three were in grade I, 11 in grade II and 36 in grade II. The conception rates of these grades were compared to identify the significance of sonography in delineating endometrial receptivity.

#### 20. Cytologic Evaluation of Buccal Mucosa

*Indranath Sutia, Anuradha Baruah* Jorhat Medical College, Jorhat, Assam

**Aim:** Buccal mucosa refers to the inside lining of the cheeks and is part of the lining mucosa, the nonkeratinized stratified squamous epithelium, found almost everywhere in the oral cavity. These flat, scalelike buccal cells are shed constantly as the tissue is renewed. The aim of this study is to evaluate cytologic variations between male and female cheek cells.

**Materials and Methods:** These cells are collected by gently scraping the inside of the cheek, they are harvested and then smeared, stained and examined under light microscope.

**Result:** We have found that very lightly stained cells are scattered accross the smear. Contrast male and female cheek cells are compared. The International Olympic Committee adopted the test as sex chromatin test many years ago to detect male imposters among female athletes.

**Conclusion:** This method may also help establish the sexual identity of newborns and to screen individuals suspected of having sex chromosome aneuploidy or as a mean to rapidly determine the sex chromosome complement age.

#### 21. AZF Microdeletion and Seminal ROS Analysis in Idiopathic Male Infertility

Dinesh Kumar, \* Kishlay Kumar, \* Sweatmita Mishra, \* Rajeev Kumar,  $^{\dagger}$ Rima Dada \*

\*Laboratory of Molecular Reproduction and Genetics, Department of Anatomy, All India Institute of Medical Sciences, New Delhi, <sup>†</sup>Department of Urology, All India Institute of Medical Sciences, New Delhi

**Introduction:** In the era of ART (assisted reproductive techniques), it is important to understand and identify the genetic etiology of infertility to prevent iatrogenic transmission of it to the offspring. In approximately more than 40% of the cases of male infertility, the etiology is still unknown. Azoospermia factor (AZF) microdeletion on the long arm of the Y chromosome is one of the major causes of idiopathic male infertility. One of the causes of denovo Yq microdeletion is oxidative stress that is found in about 35% men with idiopathic infertility.

**Aim:** To correlate the AZF microdeletions and seminal ROS (reactive oxygen species) levels in men with idiopathic infertility.

**Methods:** Twenty-five karyotypically normal men with nonobstructive azoospermia (absence of sperm in the semen) and oligozoospermia (<5 million sperm/ml) were included in the study. Semen sample was collected and analyzed according to WHO 2010 guidelines. Polymerase chain reaction-based microdeletion analysis was done and for this genomic DNA was extracted using peripheral blood. Sequence-tagged Sites (STS) primers tested in each were sY84 (AZFa), sY127 (AZFb), sY254, (AZFc). Seminal ROS analysis was done in each case by chemiluminescence assay within an hour of collection.

**Results:** The results show that 8% men harbored Yq microdeletions. Reactive oxygen species levels were elevated in men with idiopathic infertility with ROS levels in these cases being 478.73 RLU/sec/million sperm.

**Conclusion:** Understanding the genetic etiology not only helps determine the prognosis but also prevents the risk of vertical transmission to male offspring, and early detection of ROS levels help in initiating the antioxidant therapy to prevent sperm nuclear and mitochondrial damage.

## 22. Plastination by an Acid Curable Polymer at Room Temperature: A Pink City Technique

Chandrajeet Singh Chandel, Aarushi Jain, Sangita Chauhan, Chandrakala Aagarwal, Nandlal, Seema Gupta, Rajesh Arora, Dhiraj Saxena

Sawai Man Singh Medical College, Jaipur, Rajasthan

**Aim:** To develop cost-effective plastination technique by use of acid cure polymer as compared to standard S10 technique for preparation of plastinated specimens used for teaching.

**Materials and Methods:** Formalin, acetone, xylene, acid curable solvent, hardener, paint brush methodology: biological specimens were fixed in formalin, dehydrated in acetone, degreased in xylene, and finally impregnated with acid cure polymer with its hardener and finally dried and painted at room temperature.

**Result:** Dry, odorless, aesthetically pleasing, nontoxic, portable and durable specimens are produced, which are used for teaching.

**Conclusion:** Cost of plastination using standard S10 technique is high; therefore, using indigenous chemicals, it is possible to build a library of real specimen for normal, exotic and pathological anatomy at much lower cost.

#### 23. Morphological Features, Morphometric Parameters and Histological Appearance of Human Fetal Cecum at Different Gestational Ages

Md. Reshma, V. Subhadradevi, K. Thyagaraju, Md. Azharuddin. J. Ratna Priyanka

Mamatha Medical College, Khammam, Sri Venkateswara Medical College, Tirupati, Fatima Medical College, Kadapa, Andhra Pradesh, Khaja Banda Nawaz Medical College, Gulbarga, Andhra Pradesh

**Aim:** The present work on morphological and morphometric parameters and histological features of human fetal cecum was conducted to find out the gestational age-related changes.

**Materials and Methods:** Gestational age-related morphological, morphometric and histological features of 60 aborted human fetal ceca were observed in this study.

**Results:** Subhepatic position of cecum is the most common position. The incidence of quadrilateral and symmetrical shape is highest (68%), followed by quadrilateral and asymmetrical (22%) and conical and symmetrical (10%). The weight of cecum in female fetuses is more than that of male fetuses in <20 weeks gestational age. There is increase in the average length and width of cecum in male fetuses than in female fetuses. Ileocecal orifice width in both male and female fetuses increases with gestational age, and there is increase in the distance between ileocecal orifice and appendicular orifice in both male and female fetuses. Histological structure of cecum at 17 weeks gestational age

presented well-differentiated mucosa, submucosa, muscular coat and adventitia. Villous appearance of mucosa was observed at 17 weeks and disappeared at 20 weeks. The detailed observations and comparisons of the results were observed in this study.

#### 24. Anomaly Cell and Its Paramount Importance

Arun Kumar Bilodi, M.R. Gangadhar Mahatma Gandhi Medical College & Research Institute, Puducherry

**Objectives:** To set up a committee to eradicate the congenital anomalies and to make our society free from anomaly.

**Materials and Methods:** A six-year study from 2007 to 2012 was conducted in Kolar and Bengaluru district of Karnataka. Patients from the above two districts were taken for this study. Patient history, such as drug intake, systemic diseases, history of anomalies, was carefully examined.

**Observations:** A total of 450 patients were diagnosed to have anomalies ranged from newborn to adult. Of this, 67% of the patients with anomalies were born to consanguineous couples. Moreover, 48% mothers of anomalous babies had bad obstetric histories, e.g., repeated abortion, hydramnios, and stillbirths; 72% of anomalies were observed in males and 52% anomalies were surgically corrected. A mortality rate of 8% was observed in newborn babies.

**Conclusion:** This study is of paramount importance to reduce morbidity and mortality of congential anomalies. By making our society an anomaly-free society, people can have healthy living.

#### 25. A Study of Anatomical Variations in the Circle of Willis Using Magnetic Resonance Angiography

*B. Saikia, A. Handique, A. Sarma* North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences, Shillong, Meghalaya

The circle of Willis or the cerebral arterial circle present at the base of the brain acts as a potential pathway through which adequate distribution of the cerebral blood flow is maintained, in case of reduced blood flow through one of its proximal feeding vessels. Magnetic resonance angiography is a sensitive and noninvasive method for detecting angiographic images of the circle of Willis. In the present study, MR angiography was done on 70 healthy individuals in the Department of Radiography, North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences (NEIGRIHMS), Shillong, to investigate the morphological variations. The variations present were thus noted and discussed thoroughly to correlate their possible impact on the cerebral blood flow.

#### 26. Histological and Neurological Evaluation of the Spinal Cord Following Intracisternal Application of Glutamate Receptor Agonoist in Wistar Rats

Nilesh K Mitra, Tiffanie Goh, VD Nadarajah, Soga Tomako\* International Medical University, Kuala Lumpur, Malaysia \*Brain Research Institute, School of Medicine and Health Sciences, Monash University, Malaysia

**Aim:** Amyotrophic lateral sclerosis (ALS) is a fatal neurodegenerative disease. Glutamate excitotoxicity is one of the proposed hypotheses toward selective and progressive death of motor neurons. We attempted to develop an experimental animal model of this disease to enhance the knowledge of pathophysiological mechanism of ALS.

**Materials and Methods:** An ALS model rat was developed via infusion of kainic acid (KA) into the subarachnoid space, intracisternally for 4 days at a very low dosage of 50 fmol/day and 150 fmol/day (0.000005% and 0.000015% of LD-50). Locomotor activity, sensory function and histological changes of cervical; and lumbar section of spinal cord were evaluated after KA treatment. Glial fibrillary acidic protein (GFAP) and neurofilament protein (NFP) were used as immunohistochemical markers for reactive astrogliosis and neuronal damage, respectively. Specific superoxide dismutase (SOD) activity of spinal cord was estimated.

**Results:** The rats exhibited signs parallel to the clinicpathological characteristics of ALS, such as reduced locomotors activity and analgesia. The motor and sensory changes were persistent until 14th day. Nissl stain showed pyknosed nucleus and vacillation of neuropil. GFAP expression increased significantly in the lumbar section of the spinal cord with high dose of KA treatment (p < 0.05). NFP was expressed in axonal fibers around the neurons in KA-treated rats. A significant increase in specific SOD activity in both cervical and lumbar section of the spinal cord was found with low dose of KA treatment (p < 0.05).

**Conclusion:** This study concluded that spinal cord damage with some features similar to ALS can be produced by low dose intracisternal administration of KA.

#### 27. Presegmental Arterial Pattern of Human Kidneys in Indian Population

M.A. Doshi, S.D. Jadhav, \* M.P. Ambali, R.J. Patil, Priya P. Roy, R.R. Desai

Krishna Institute of Medical Sciences Deemed University, Karad, Maharashtra, \*Padmashri Dr. Vithalrao Vikhe Patil Medical College, Ahmednagar, Maharashtra

**Background:** Rental artery anatomy is becoming more important due to the recent advances and refinements in

renal surgery as well as gradual increase in interventional radiological procedures. Renal arteries supply the kidneys through a number of its subdivisions. Near the hilum each artery divides into anterior and posterior divisions, which further divide into segmental arteries supplying the renal arterial segments. Selective renal arterial ligation, particularly of the presegmental may allow laparoscopic partial nephrectomy to be performed with minimal ischemic risk to the remaining renal tissue.

**Aim:** The aim of this study is to investigate the variations in presegmental arterial pattern of human kidney in adult Indian population.

**Material and Methods:** Hundred adult human kidneys were studied by simple blunt dissection.

**Results:** Presegmental arteries were present in 100% of specimens. Variations were seen in the site of origin (extrahilar, hilar and intrarenal) of presegmental arteries. Results of our study will be compared with other studies from different population.

#### 28. A Study on the Axillary Artery and its Branching Patterns

Sudeshna Majumdar, Arpita Chatterjee, Santanu Bhattacharya Calcutta National Medical College, Kolkata, West Bengal

Variations in the branching pattern of the axillary artery have paramount importance among the anatomists, surgeons and radiologists. The branches of the axillary artery are the superior thoracic, acroimiothoracic, lateral thoracic, subscpular, anterior and posterior circumflex humeral arteries. The aim of our study is to provide additional information regarding the branching pattern of the axillary artery and to find out its correlation with different branches. Seventy formalinpreserved cadavers were dissected bilaterally (the upper limbs) in the Department of Anatomy, Calcuttaa National Medical College, between 2008 and 2011. Among the study population, 52 (74.3%) were male cadavers and the rest were female cadavers with average age of 62.01 years (SD = 6.6037) and average height of 1.59 meter (SD = 0.0965). Mean length of the axillary was 10.1486 cm (SD = 1.0559). Superior thoracic, anterior and posterior circumflex humeral arteries were the constant branches of it, while others showed considerable variations. High correlation was found between the distance of origin of acromiothoracic artery from the anterior border of the first rib and the length of the axillary artery among males in both upper limbs. Similarly, moderate correlation was obtained with superior thoracic and subscapular arteries among females in right upper limbs. In other cases, no significant correlation was found. Moreover, from this study, we can predict the length of axillary artery, distance of origin of one of its constant branches from the axillary artery. This study will help surgeons to carry out different vascular surgery in the axilla.

#### 29. Study of Variations in the Formation, Course and Termination of the Portal Vein with Relation to Structures at Porta Hepatis

Mrinalini S. Gaikwad, Aruna Mukherjee, Geetha K.N., Nazmeen Silotory MGM Medical College, Kamothe, Navi Mumbai, Maharashtra

**Aim:** The aim of our study is to find out the variations in formation, course and termination of portal vein with relation to structures at porta hepatis in human cadavers

**Materials and Methods:** The present study was undertaken on 30 cadavers and dissected irrespective of age and sex. Bodies on which abdominal surgery was done were excluded from the study.

**Results and Discussion:** Anatomic variations of the portal vein are relatively common, especially in the pattern of termination. Identifying deviations from normal portal architecture is important prior to interventional procedures, such as stent replacement, and embolization, liver transplantation and for placement of transjugular intrahepatic portosystemic stunts. The formation, course and termination of portal vein, and its relation with porta hepatis were studied to assess the prevalence of variations in portal vein. Further results were discussed at the time of presentation.

## 30. Variations in the Venous Drainage Pattern of Head and Neck

Panneer Selvi G., Senthil Kumar B, Rajitha V, Rekha G., Anitha M.R, Deepthi Shastri VMKV Medical College, Salem, Tamil Nadu

**Aim:** To study the variations in the superficial veins draining head and neck due to the complexity in their developmental pattern.

**Materials and Methods:** A total of 32 cadavers of both sexes were used for the study. Head andd neck region was dissected and the veins were carefully observed and photographed.

**Results:** Out of 32 specimens, 29 showed normal pattern of venous drainage; three specimens showed variations in the formation and termination of superficial veins and one specimen showed an absence of external jugular vein. This specimen had an undivided retromandibular vein which united with the facial vein to form a common facial vein which later received posterior auricular vein and then drained into internal jugular vein. A second specimen showed a common facial vein draining into the terminal part of external jugular vein and posterior external jugular vein originating from posterior auricular vein. A third specimen showed a common facial vein continuing as anterior jugular vein. A venous oblique arch connected the internal jugular vein and the anterior jugular vein.

**Conclusion:** The anomalies described in our study are rare. One of the anomalies is unique and has never been reported in literature before. To achieve success in surgical procedures of the head and neck region and to avoid intraoperative errors, a sound knowledge of the anatomy of variations of superficial veins of head and neck is of great importance. Hence, the study assumes significance.

#### **31. Study of Contributing Arteries to Superficial Palmar Arch Formation**

S.P. Bangale, K. Shyamkishore

Seth G.S. Medical College and K.E.M. Hospital, Parel, Mumbai, Maharashtra

**Background:** The superficial palmar arch (SPA) is formed predominantly by the ulnar artery with a contribution from the superficial palmar branch of the radial artery. However, the arch formation is highly variable. Contribution to the SPA knowledge will be helpful for the reconstructive hand surgical procedures such as arterial repairs, vascular graft applications and re-implantations. Participation in the arch completion has anatomical, embryological, and surgical importance.

**Aim:** To know about usually contributing arteries and variations related to superficial palmar arch formation.

**Materials and Methods:** Median and ulnar nerve and their branches in relation to arteries forming superficial palmar arch and flexor retinaculum in 15 formalin (10%) embalmed cadavers—11 male and 4 female—(30 sides) were dissected.

**Results and Conclusions:** Normally, superficial palmar arch is formed by superficial branch of ulnar artery and superficial branch of radial artery. However, some variations of contributing arteries were found, i.e., persistent median artery or only superficial branch of ulnar artery or ulnar artery with median and radial arteries was contributing to superficial palmar arch formation. Some variations regarding incomplete palmar arches were found as compared to normal.

## **32.** A Study of Dorsalis Pedis Artery and Its Variations in Cadaver

Kopal Saini, Pritha S. Bhuiyan Seth G.S. Medical College and K.E.M. Hospital, Parel, Mumbai, Maharashtra

**Background:** Because of its importance and variability, the arterial system of foot has attracted the attention of anatomists and surgeons for many years. The dorsalis pedis artery is the major source of blood supply to dorsum of the foot. Knowledge of the origin, course, and branching pattern is essential, as it forms the stem for one of the major myocutaneous flaps, used for plastic and reconstructive ankle surgeries. Evaluation of dorsalis pedis artery pulsations is a useful clini-

cal tool for assessing peripheral arterial perfusion. The dorsalis pedis artery is a continuation of the anterior tibial artery distal to the ankle and passes forward along the medial side of the dorsum, to the gap between the two heads of the first dorsal interosseous muscle. Then, the artery enters the sole and forms the plantar arch by joining with the deep branch of lateral plantar artery.

**Aim:** To study the gross anatomy of dorsalis pedis artery and its variations in cadavers

**Materials and Methods:** Thirty-six formalin-fixed lower limbs, and dorsalis pedis artery and its branches were dissected over a period of 1 year. Origin, termination, and branches of the artery were noted.

**33. Variations of Axillary Artery in Cadavers** *Anjalee G. Ovhal, Lakshmi Rajgopal* 

Seth G.S. Medical College and K.E.M. Hospital, Parel, Mumbai, Maharashtra

**Background:** The arterial system of upper limb begins with the axillary artery, a continuation of subclavian artery from the outer border of the first rib to the lower border of teres major. The variations in the traditional pattern of axillary arterial system are well documented. Accurate and detailed knowledge of the normal and variant anatomy of the axillary artery is of utmost importance for anatomists, surgeons, radiologists, and clinicians during various interventional, diagnostic, therapeutic and surgical procedures on pectoral and axillary regions.

**Aim:** The aim of the present study is to contribute to the existing knowledge of the variations in the branching pattern of the axillary artery, explaining its embryological basis and also its morphological and clinical significance.

**Materials and Methods:** Axillary artery was dissected meticulously in 30 upper limbs in 15 formalin-embalmed cadavers (11 male and 4 female). The cadavers allotted to the first-year undergraduate students for dissection in our department were used. Variations in the origin and branching pattern of axillary artery were noted.

**Results:** Variations in branching pattern of axillary artery such as common trunks of superior and lateral thoracic arteries; lateral and acromiothoracic arteries; lateral thoracic and subscapular arteries; anterior and posterior circumflex humeral arteries etc. were noted.

#### 34. Variations in the Origin of Profunda Femoris Artery and Its Circumflex Branches

Thokchom Dineshwar Singh, N. Damayanti, Th. Naranbabu Regional Institute of Medical Sciences (RIMS), Imphal, Manipur

**Background:** Even after the advent of highly advanced imaging techniques, arteriography still remains the main line

of several investigations. The femoral artery and its branches are most often chosen for interventional radiology because of its easy accessibility, and, of late, surgical procedures of hip joint have become very popular. This has prompted the study of the variations of the origin and course of the profunda femoris artery and its circumflex branches.

**Aim:** To study the variations of the origin of the profunda femoris artery and its circumflex branches.

**Design:** Cadaveric study; Setting: Department of Anatomy, RIMS, Imphal; Period: From 01-06-2012 to 30-09-2012.

**Material and Methods:** Twenty-four femoral triangles of 12 properly embalmed adult human cadavers were dissected and the origin and course of the profunda femoris artery and circumflex femoral branches were studied.

**Results:** The variations in the origin and course of the profunda femoris artery and circumflex femoral branches were revealed in the study.

**Conclusion:** To avoid iatrogenic results, while performing diagnostic and therapeutic procedures in the femoral triangle and hip joint, the existence of the variations in the course of the profunda femoris artery and the main circumflex branches should always be kept in mind.

## 35. Variations in the Posterior Part of Cerebral Arterial Circle

Vishnu Gupta, Vinay Sharma, C.S. Ramesh Babu Muzaffarnagar Medical College, Muzaffarnagar, Uttar Pradesh

The embryologic development of intracranial circulation is truly one of nature's marvels. Recognition of anatomic variants is increasingly important for various neurosurgical procedures. Variations of posterior cerebral and posterior communicating arteries are not uncommon. We studied 24 adult fixed human brains for variations in the posterior part of cerebral arterial circle. Incomplete formation of the circle with absence of posterior communicating artery was observed in one case on the left side. The incidence of absence of posterior communicating artery was reported in 6% cases by Ganbari et al (2008) and 13% cases by Al-Hussain et al (2001). In two cases, one right and one left, we observed hypoplasia of P1 segment of posterior cerebral with a dominant posterior communicating artery continuing as posterior cerebral artery and supplying occipital lobe. This configuration referred to as "fetal type of posterior communicating artery" was found in 28% cases. In such cases, the internal carotid artery provides major supply to the occipital lobe. This variant was found in 10% cases unilaterally and 5% cases bilaterally. In one case, on the left side, the hypoplastic P1 segment of the posterior cerebral gave two posterior choroidal arteries. These variations in the posterior part of cerebral arterial circle are relevant to vertebrobasilar ischemia and infarcts in the territory of posterior cerebral artery.

#### 36. Variations in the Origin of Profunda Femoris Artery and Its Circumflex Branches

Y. Shahidha Bhanu, S. Sundarapandian, N. Pratheepa Sivasankari

SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu

**Aim:** The aim of the present study is to explain the different patterns of origin of profunda femoris artery and its circumflex branches.

**Materials and Methods:** In the 40 dissected femoral triangles, the femoral sheath and its contents were identified. The profunda femoris artery and its circumflex arteries were dissected and observed. The distance of the origin of profunda femoris was also measured from the mid-inguinal point with the help of a scale (in cm).

**Results:** The observations of various parameters are as follows:

- Common origin of lateral circumflex and profunda femoral arteries,
- Common origin of medial circumflex and profunda femoral arteries,
- Common origin of medial circumflex, lateral circumflex and profunda femoral arteries,
- High origin of profunda femoral artery,
- Origin of lateral circumflex from femoral artery,
- Origin of medial circumflex from femoral artery.

**Conclusion:** This is of great surgical importance as such large and unexpected arterial channels can be damaged due to their different origins.

## **37. Bilateral Axillary Origin of Radial Artery and Its Aberrant Course**

Annapurna P.

Siddhartha Medical College, Vijayawada, Andhra Pradesh

Abnormal superficial subcutaneous course of radial artery or any other artery is vulnerable to trauma and bleeding. It may be mistaken for vein in view of the subcutaneous course. According to Quain (2010), high origin of radial artery from axillary artery in 1 out of 8 cases has been described. Ciacomini (2011) studied 270 dissected cases, out of which 43 cases showed radial artery arising from axillary artery. During the routine dissections of cadavers meant for undergraduate students (sample size 20), in a cadaver, radial artery was seen bilaterally arising from the third part of axillary artery, proximal to the union of two roots of median nerve. It continued in the arm medial to the brachial artery and median nerve. Then, it crossed the brachial artery and median nerve abnormally from the medial to the lateral side at the middle of the arm. In the cubital fossa, radial artery received a communicating branch from the brachial artery. In arm and

forearm, radial artery course was superficial throughout, underneath the deep fascia and superficial to the brachioradialis muscle while the remaining part of the course was normal from the site of radial pulse. Radial arteries of both limbs had similar pattern, which is uncommon. Axillary artery after giving the radial artery high in axilla, continued as brachial artery and ended by dividing into ulnar and interosseous artery. In view of sample size, percentage was not expressed.

# **38. Study on the Brachial Artery and its Branching Pattern in Manipuri Foetuses**

Aribam Jaishree Devi, N. Damayanti Devi Regional Institute of Medical Sciences (RIMS), Imphal, Manipur

Brachial artery is the artery of the free upper limb. Variations of the artery in its course and branching pattern are important in the clinical practices such as surgical exposure, flap and vascular surgery, orthopedic and radiographic procedures. In view of the extensive clinical application, the study was carried out in different gestational age groups of Manipuri fetuses. The findings are compiled and compared with the reports of previous workers in different populations.

#### 39. Pterion Ossicles: In Indian Dry Skulls

R.R. Desai, S.D. Jadhav, \* M.A. Doshi, M.P. Ambali, R.J. Patil, A.R. Desai

Krishna Institute of Medical Sciences Deemed University, Karad, Maharashtra \*Padmashri Dr. Vithalrao Vikhe Patil Medical College, Ahmednagar, Maharashtra

Sutural bones are small irregularly shaped ossicles which are found in the cranial sutures of the skull. They vary from person in number and shape and can be found on either side of the skull. They occur most frequently in the course of the lambdoid suture but are occasionally seen within the sagittal and coronal sutures. A specific wormian bone which is present at pterion is known as "pterion ossicles." Presence of pterion ossicles is clinically important because it may lead to complications in making burr holes at pterion, and may also be mistaken for fracture of skull in case of trauma of pterion region. Due to clinical implication, knowledge of the presence of pterion ossicles, their incidence, and number is essential to neurosurgeons and radiologists. This study was conducted on 90 (60 male and 30 female) dried adult human skulls of known sex. Both sides of each skull were examined for the presence or absence of pterion ossicles and their numbers. We observed pterion ossicles in 20 skulls. Sexual dimorphism for the presence of pterion ossicles was observed.

#### 40. Morphometry of Fetal Trachea

Sarada Devi Sattiraju, Muralidhar Reddy Sangam, Ravi Kishor Reddy V, Krupadanam K, Anasuya K. NRI Medical College, Chinakakani, Guntur, Andhra Pradesh

There is tremendous advancement in fetal therapy for developmental defects like congenital diaphragmatic hernias (CDH) where Fetal Endotracheal Tube Occlusion (FETO) is the choice and Ex-Utero Intrapartum treatment (EXIT) for managing Congenital High Airway Obstruction Syndrome (CHAOS). Laryngotracheal measurements are of immense help in these procedures. Literature on morphometry of fetal organs is very scarce and there is every need for these measurements to be established. With this background, a study is undertaken for measurements of fetal larynx and trachea.

Dead fetuses received from Department of Obstetrics and Gynecology after obtaining approval from IEC and written consent from parents were studied. They were fixed in formalin and fetuses without any apparent malformations were dissected and various measurements of larynx and trachea were recorded. They were correlated with CR length of fetus and male-female difference was also studied.

## 41. Morphometry of Suprascapular Notch and Its Correlation with that of the Scapula

Muralidhar Reddy Sangam, S. S. Sarada Devi, K. Krupadanam, K. Anasuya NRI Medical College, Chinakakani, Guntur, Andhra Pradesh

The suprascapular notch is situated in the lateral part of superior border of scapula, adjacent to the base of coracoid process. The notch is converted into a foramen by superior transverse scapular ligament and serves as a passage for suprascapular nerve. Morphometry of the notch is important clinically as suprascapular nerve entrapment—an acquired neuropathy—is secondary to compression of the nerve in the bony notch. The study was carried out on 104 dried human scapulae of unknown sex obtained from the NRI Medical College and other nearby medical colleges. Superior transverse diameter and maximum depth of the notch as well as maximum length and width of the scapula were measured. Data was analyzed statistically and correlation between the measurements of the notch and that of scapula was observed.

42. Usefulness of Tibial Lower End Index in Estimation of Length of Tibia

S.S. Mohite, B.N. Umarji, H.S. Mohite

**Aim:** To estimate the tibial lower end index and its correlation with length of tibia.

**Background:** Tibia is an important bone in the body and in some medico-legal cases only small parts of bone are available. Therefore, it is important to know the relation of the index of the lower end of tibia to the height of bone.

**Materials and Methods:** Hundred dry adult tibia are studied in the present study. Maximum breadth of lower end of tibia and height of medial malleolus is measured. Total height of tibia is measured by using osteometric board. Tibial lower end index is calculated and its relation with length of tibia is observed. These observations are statistically analyzed and regression formula is calculated.

#### 43. Study of Nutrient Foramina in Metatarsal Bones

K. Sandhya, R. Prasad, C. Chanda, N. Lugun, M. Baxla Regional Institute of Medical Sciences (RIMS), Ranchi, Bihar

**Aim:** Surgical management of fracture of metatarsal in sportsmen and avascular necrosis of metatarsal heads due to different pathological conditions, i.e., trauma, osteoporosis, use of steroid and hypercoagulability, are dependent on detailed knowledge of vascular anatomy of metatarsal bones. The present study is one step in this direction and includes study of diaphysial nutrient foramina of metatarsal bones.

**Material and Methods:** 150 bones available in Department of Anatomy were included in the study. Foramina for the nutrient artery were identified macroscopically and with help of hand lens on the shaft of all the metatarsal bones. An elastic rubber band was applied around these foramina. The bones were photographed with digital camera. Each bone was divided into three equal parts and was analyzed topographically. Length of metatarsal bone and distance of foramen from its base were measured with the help of slide calipers. Where two foramina were present, confirmation of primary foramen was done with the help of very thin iron wire. Foramina index were calculated using Hughes formula. Statistical analysis of indices was done and data were pooled in a tabular fashion

**Result and Conclusion:** The most frequent location of nutrient foramina was the middle third of bone and in majority, it was the only location. In medial four metatarsals, their location was on lateral aspect, whereas on fifth metatarsal, foramina were located on medial aspect. All foramina obeyed the general rule that is, directed away from the growing end of the bone.

#### 44. A Morphometric Study of Supratrochlear Foramen of Humerus

I. Veeresh, V.S. Shirol, Daksha Dixit, P.S Jevoor, S.P. Desai Jawaharlal Nehru Medical College, Belgaum, Karnataka

**Aim:** A thin plate of bone separates the olecranon and the coronoid fossa which may become perforated in some humeri

Krishna Institute of Medical Sciences Deemed University, Karad, Maharashtra

to give rise to a foramen known as supratrochlear foramen (STF). The knowledge of the presence of STF in a humerus may be important for preoperative planning for treatment of supracondylar fractures. The aim of this study is to focus on the evolutionary aspects of the foramen in addition to its surgical and orthopedic significance.

**Methodology:** The presence of the supratrochlear foramen was studied in 100 dry adult human humeri of unknown sex and age from the Department of Anatomy, J.N. Medical College, Belgaum. Morphometric measurements were taken using vernier calipers. In bones where the foramen was absent, opacity or translucency of the septum was observed.

**Results:** Out of the 100 bones studied, 28 cases showed the presence of STF. The STF was oval (18) and round (10) in shape. The mean length of the transverse diameter for supratrochlear foramen was 5.5 mm and 5.1 mm on the left and right sides, respectively. The mean length of the vertical diameter for STF was 4.4 mm and 4.3 mm on the left and right sides, respectively. Translucency of septum was observed in 52% of bones.

**Conclusion:** STF is more common on the left side, with the oval shape being more common. The anatomical knowledge of STF is beneficial for anthropologists, orthopedic surgeons, and radiologists.

#### 45. A Morphometric Study of the Left Atrioventricular Valve in Cadavers

Dhaval K. Patil, P.S. Bhuiyan Seth G.S. Medical College and K.E.M. Hospital, Parel, Mumbai, Maharashtra

**Background:** The left atrioventricular (mitral) complex is made up of a mitral orifice and its annulus, mitral valve cusps (described as anterior and posterior cusps), chordae tendineae and papillary muscles. The mitral valve is involved in many conditions such as stenosis, regurgitation, prolapse, rheumatic heart disease, endocarditis, etc. Hence, detailed information of the dimensions of the valve is essential, especially in surgical interventions such as reconstruction or replacement.

**Aim:** The study aimed at measuring the various dimensions of the mitral valve complex.

**Materials and Methods:** The study was conducted over a period of 1 year. Thirty adult hearts obtained from embalmed cadavers, Department of Anatomy of a municipal corporation medical college, were used for the study. These hearts were dissected using standard dissection kit. The mitral valve complex was exposed and the various parameters were measured.

#### 46. Morphological and Topographical Anatomy of Nutrient Foramina in Human Upper Limb Long Bones and Their Clinical Significance

*Kirti S. Solanke, Rajan Bhatnagar* Armed Forces Medical College, Pune, Maharashtra

**Aim:** To study the morphology and topography of nutrient foramina (NF) in human upper limb long bones and their clinical significance.

**Materials and Methods:** The study comprised 260 upper limb long bones, which included humeri, radii, and ulnae. The foramina were identified macroscopically in all the bones and patency was confirmed by inserting a 24-gauge needle. The centre of shaft was marked and the distance of NF from non-growing end was measured and compared with the centre of shaft. Transverse and anteroposterior diameter were measured at the level of NF with the help of digital vernier caliper. This diameter was correlated with number of foramina and the foramina index was calculated.

**Result:** 92% of humeri were with single NF, 4% without and 4% with double NF. In case of radii, 92.5% showed a single NF, 2.25% of radii were with double NF and in 5% it was absent, 96.25% of ulnae showed single NF and 3.75% bones were without NF, no ulna was with double NF. NF in all upper limb long bones was located between center of the shaft and non-growing end. Foraminal index for humerus, radius, and ulna was 52.657, 34.36, and 36.52, respectively.

**Conclusion:** The study provides additional information about morphology and topography of NF in upper limb long bones, the knowledge of which is important for microvascular bone transfer.

#### 47. Diaphyseal Nutrient Foramina in Human Femur

Nirmalya Saha, M. Matum Singh, N. Damayanti Devi Regional Institute of Medical Sciences (RIMS), Imphal, Manipur

**Background:** The major blood supply to long bones occurs through the nutrient arteries, which enter through the nutrient foramina. This blood supply is essential during growing period of ossification of bones. Knowledge regarding the nutrient foramina of bones is useful in surgical procedures to preserve circulation.

**Aim:** To analyze the location and numbers of nutrient foramina in diaphysis of human femur.

**Materials and Methods:** The study comprises examination of 100 human femurs collected from the Department of Anatomy, RIMS, Imphal. The nutrient foramina location and number/s along with other parameters are identified macroscopically. **Results:** Mostly, the femur had single nutrient foramen. However, some showed double foramina. Absent diaphyseal foramen was also found. The location is mostly on medial lip of linea aspera.

**Conclusion:** This study provides data on the morphology of diaphyseal nutrient foramina in human femur which is helpful to clinicians for vascular graft surgery as well as microvascular bone transfer.

#### 48. Morphometric Classification of Septomarginal Trabeculae in South Indian Cadavers

Divya Shenoy, A.S. D'souza, L.C. Prasanna, Mamatha Suhani Kasturba Medical College, Manipal University, Manipal, Karnataka

**Background:** Most human hearts present a specialized bridge known as septomarginal trabecula which extends from the right side of the ventricular septum to the base of the anterior papillary muscle. We decided to study this because of its role in the hemodynamics and conduction of electric impulses in the heart.

**Materials and Methods:** For the present study, we took 30 human hearts and studied the thickness of the septomarginal trabecula, the height of its attachment to the ventricular wall by considering the supraventricular crest as the landmark, the angulation it forms with the ventricular wall, length of septomarginal trabecula and mode of attachment to the septal wall.

**Results:** We found that in most of the cases, the septomarginal trabecula originated about upper or middle third of the ventricular wall. The thickness varied from 0.75 mm to 12 mm. We also found variation in the way of attachment of the septomarginal trabecula to the ventricular wall (like thin, filamentous, adherent). Some of the septomarginal trabeculae branch before getting attached to the base of the anterior papillary muscle.

**Conclusion:** Cardiac disorders such as double-chambered right ventricles and arrhythmias have lent importance to the anatomical knowledge of this structure.

## 49. Morphology and Morphometric Analysis of Suprascapular Notch

*Lajja K. Sutaria,* \* *H.R. Jadav,* \*\* *C.A. Pensi*\* \*B.J. Medical College, Ahmedabad, Gujarat, \*\*GMERS Medical College, Sola, Gujarat

**Background:** The morphology of the suprascapular notch (SSN) has been associated with suprascapular entrapment neuropathy, and injury to the suprascapular nerve in arthroscopic shoulder procedures.

**Aim:** This study aimed to describe the morphology and morphometry of the suprascapular notch in dry scapulae.

**Materials and Methods:** The present study was done in 314 dry scapulae obtained from B.J. Medical College, Ahmedabad. In the present study, the suprascapular notch is classified on the basis of two classifications. According to one classification, SSN was classified into 5 types: type I without a discrete notch; type II a notch that was longest in transverse diameter; type III a notch that was longest in vertical diameter; type IV a bony foramen; type V a notch and a bony foramen. Based on gross appearance, SSN was classified as 'U' shaped, 'V' shaped, 'J' shaped, absent notch and indentation instead of a notch. The complete and partial ossification of the superior transverse scapular ligament was also noted.

**Results:** According to the first classification, following observations were made in the present study: type I – 29%; type II – 52%; type III – 16%; type IV – 2%; type V – 1%. According to another classification, following observations were made: 'U' shaped notch 38%, 'V'-shaped notch 7%, 'J'-shaped notch 22%, absent notch 16%, and indentation instead of a notch 10%. The complete and partial ossification of the superior transverse scapular ligament was seen in 2% of cases.

**Conclusion:** This anatomic information is important in the management of entrapment neuropathy or interventional procedure of the SSN.

#### 50. Morphometric Study of Supratrochlear Foramen of Humerus

Sejal V. Patel, S.H. Aterkar , C.A. Pensi B.J. Medical College, Ahmedabad, Gujarat

A thin, transparent plate of bone known as supratrochlear septum varying in thickness from 0.5 mm to 1 cm and lined in fresh state by the synovial membrane of elbow joint separates the olecranon and coronoid fossae. This septum may contain several perforations and in some cases may become perforated to form an aperture known as supratrochlear aperture or 'supratrochlear foramen' (STF). This study aimed to find out the presence of supratrochlear foramen in lower end of humerus and to measure its dimension. The present study was done in 565 dry humeri of unknown sex and age obtained from B. J. Medical College, Ahmedabad. The STF was measured using digital vernier caliper. In the present study, the STF was seen in 24% of total humeri, oval shape being more common and present more frequently on left side (60%) compared to right side (40%). The translucent septum is more common on right side (67%) than on the left side (49%). The knowledge of the presence of supratrochlear foramen in lower end of humerus may be important for preoperative planning for treatment of supracondylar fractures for orthopedic surgeons. It is also beneficial for anthropologists and radiologists in day to day clinical practice.

#### 51. Morphometry of Thyroid Cartilage in Adult Cadavers

Ravi Kishor Reddy Vintha, S. Sarada Devi, S. Murali Dhar Reddy, K. Krupadanam, K. Anasuya NRI Medical College, Chinakakani, Guntur, Andhra Pradesh

Increased application of sophisticated methods of laryngeal framework surgery requires a profound knowledge of the size and proportion of human larynx and its cartilages. Thirty specimens of larynx (20 males, 10 females) in age group of 30–50 years, from embalmed, dissected cadavers at NRI Medical College, Chinakakani, were subjected to morphometric analysis of thyroid cartilages. Measurements of height of laminae, breadth of laminae, depth of superior thyroid notch, anterior thyroid height and dorsal thyroid height on right and left side were taken and examined for presence or absence of foramina. Data is subjected to statistical analysis for normal values, variation, sex differences and bilateral symmetry.

## 52. Morphometric Analysis of Clavicle in Keralite Population

K.G. Arunkumar, A. Amar Jayanthi, V.K. Girijamony Government Medical College, Thrissur, Kerala

The present study was done to measure morphometric parameters of clavicle in Central Keralite population. Age and sex estimation from skeletal remains is easy when the entire skeleton is available. However, a neglected bone, clavicle, can be helpful in age and sex estimation when no other bone is available. The parameters length, weight, midshaft circumference, curvatures, rhomboid fossa, and nutrient foramen were studied in 70 clavicles available from the Department of Anatomy, Government Medical College, Thrissur, Kerala. Morphometric analysis of clavicle with special emphasis on mid-shaft circumference, weight, and length can contribute to the already available anthropometric data and may help the field of forensic science. Special situations of clavicular fractures which require open reduction and internal fixation is a challenge for orthopedicians. When internal fixation is to be done with a plate and screws, the plate must be bent to follow the contours of the clavicle. Knowledge of curvatures in cranial plane and direction of nutrient foramen will help orthopedicians during intramedullary fixation of fractured clavicles in the above settings. Curvature in dorsal plane in the present samples revealed inferior curvature only. This shows that all the clavicles of the Keralite population studied belong to type I which is seen in modern humans.

#### 53. Incidence of Lambdoid Ossicle (a Cranial Variant) in North Indian Population

M.K. Pant, S.H.H. Zaidi, \* Hirak Das\*\*

Government Medical College, Haldwani, Nainital, Uttarakhand, \*Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh, \*\*Assam Medical College, Dibrugarh, Assam

Research workers have shown considerable interest in the study of non-metric cranial variants because of their racial and regional importance. Thirty-two North Indian skulls of Uttar Pradesh were studied for the ossicle at lambdoid, a cranial variant in the present study. Findings are discussed and compared with other global studies and races found to be of considerable regional and racial significance.

#### 54. A Morphometric Study of the Dry Human Atlas Vertebrae

*Lata Munde, P.S. Bhuiyan* Seth G.S. Medical College and K.E.M. Hospital, Parel, Mumbai, Maharashtra

**Background:** The atlas vertebra is critically located in close relation to vital centers of the medulla oblongata which may get compressed by dislocation of the atlanto-axial complex or instability of atlanto-occipital joint. So, stability of these joints is important. The variation in location of the groove for vertebral artery on the posterior arch of atlas vertebra may complicate surgical procedures.

**Aim:** To measure various dimensions of dry human atlas vertebra.

**Materials and Methods:** Fifty dry adult human atlas vertebrae of undetermined age and gender obtained from the Department of Anatomy of a reputed public medical college were used for the study. Atlases with pathological features were excluded from the study; all the parameters were measured by using vernier caliper. The following parameters were used for the study: the width of the atlas vertebra, maximum transverse and anteroposterior diameters of vertebral foramen, heights of anterior and posterior arches in the midline, anteroposterior and transverse diameters of superior and inferior articular facets, distance from midline to the medial most edge of the groove for vertebral artery, thickness of the groove for vertebral artery.

#### 55. A Study of Sexual Dimorphism of Mandible by Multivariate Discriminant Functional Analysis

*Capt. Rishi Pokhrel, Col. Sushil Kumar, Col. Rajan Bhatnagar* Armed Forces Medical College, Pune, Maharashtra

**Background:** Sex estimation from skeletal remains is a crucial step in identification of unknown individuals, as it halves the number of possible matches. Human mandible is among the last bones to perish due to the thick cortical bone lining its surface. Earlier studies in various populations have shown that mandible, in whole or in fragment, exhibits significant sexual dimorphism. Hence, mandible can be used for determination of sex from skeletal remains.

**Aim:** To determine parameters of mandible that can be used to determine sex of an unknown individual from skele-tal remains.

**Materials and Methods:** This study was conducted in a sample consisting of 103 intact mandibles of known sex from Marathwada region of Maharashtra. A total of 13 variables were measured. Data thus collected were subjected to statistical analysis using multivariate discriminant functional analysis.

**Results and Conclusion:** Among 13 variables, minimum ramus breadth and mandibular angle showed most significant sexual dimorphism and 85.4% of mandibles could be accurately sexed using these two variables only. Hence, mandible can be used for sexing of an unknown individual with good accuracy.

#### 56. Demystifying the Patellar Complex from via Indices

Gaurav Agnihotri, Gurdeep Singh Kalyan\* Ravikant Sharma, Ramandeep Kaur\*

Government Medical College, Amritsar, Punjab, \* Government Medical College, Patiala, Punjab

Indices are effective tools for defining balanced dimensions as they compensate for extremes in sizes and do not rely on absolute measurements for total knee arthroplasty with patellar resurfacing, selection of patellar components, patellofemoral contact stress, and patellar tracking in the trochlear groove. A higher patellar index value for man and gibbon vis-a-vis the values for gorilla and chimpanzee indicate that the patella is most important functionally in the more extended positions. Several standard anatomy texts contain significant omissions regarding the patellar complex from the details which are important to a full understanding of the function and pathology of the patella. As such, the present study was designed to characterize patellar indices and provide data useful for anthropologists, anatomists, clinicians, and researchers. The results indicate:

- a) The mean patellar index value of 98 is comparable to the Vallois patellar index (100) calculated for North Americans and the index for Madagascar native population (106).
- b) The breadth thickness index value 2.2 is in accordance with the value determined for the British population.
- c) When the values for right and left indices were compared, only the height thickness index was statistically significant (p < 0.05).
- d) The North Indian patellae were classified as medium height (50–55), medium width (51–56) patellae, according to breadth index and height index values.

#### 57. Influence of Metric and Nonmetric Osteogenetic Traits on Cranial Architecture of North Indian Crania (Predominantly Haryanavi)

Suresh Kanta Rathee, Usha Dhall, P. Raghavan Pt. B.D. Sharma PGIMS, Rohtak, Haryana

Measurements play an important role in skeletal morphology. Cranial and postcranial measurements were used to describe individuals and to correlate various ethnic and racial groups. These measurements have shown the shape and size variations of different racial groups. The craniometric methods have extensive use in forensic anatomy by reconstructing the most probable human faces and physiques from dry skeletal remains. For the present study, 150 complete skulls (115 males, 35 females) were used and both cranial metric and nonmetric traits were studied. The metric and non-metric study includes 47 cranial measurements and 20 cranial traits, respectively. For metric study, cranial measurements were taken according to systems proposed by Howells while the non-metric study of the crania was based on the system of sexing and population affinity proposed by Larnach. According to Larnach, Freedman and Macintosh system, traits were studied by comparing them with standardized casts and sketches and were considered as small, medium, and large. Both metric and non-metric traits were compared in four neighboring ethnic groups of India, i.e., Uttar Pradesh, Madhya Pradesh, Punjab and Haryana. Metric analysis of male and female data from Haryana showed that some of the cranial measurements were found to be different as compared to all other three ethnic groups i.e., Uttar Pradesh, Madhya Pradesh, Punjab. Glabella-occipital length and nasiooccipital length (cranial length) were found maximum in Haryanvi crania. Biauricular breadth and minimum cranial breadth (width of crania) were found to be minimum in Harvanvi crania. Some of the nonmetric traits were found to be significantly different from crania of neighboring ethnic groups in non-metric traits study of Haryanvi crania, external occipital protuberance development, occipital torus glabella developments were found to be maximum. Metric and nonmetric traits are dependent on each other and in both types of studies similar results are seen.

## 58. Sex Determination by Using Measurement of Mastoid Process

S. Sundarapandian, S. Saravanakumar, Thangaraj,\* Hemaltha\*

Department of Anatomy, \*Department of Forensic Medicine, SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu

Mastoid process is a conical prominence projecting from the undersurface of mastoid portion of temporal bone located just behind the external acoustic meatus and lateral to the styloid process. Its size varies and it is larger in male than in female. Studies in determination of sex by mastoid process morphometry in South Indian population skull are few. The present study is proposed to determine the sex from morphometry of mastoid process. The present study was conducted in the Department of Anatomy and Forensic Medicine, SRM Medical College, Tamil Nadu, on 40 dried skulls of cadaveric origin with the help of vernier caliper. The parameters measured are mastoid length, breadth and anteroposterior diameter. The data obtained was analyzed and correlated with previous studies.

## 59. A Study on the Variable Occipital Sulci in the Human Cadavers

*N. Jacques Britto, Antony Sylvan D'souza, L.C. Prasanna* Department of Anatomy, Kasturba Medical College, Manipal University, Manipal, Karnataka

**Background:** The human occipital sulci show significant and complex variability in superior occipital sulcus (SOS), Superior lateral occipital sulcus (SLOS), Occipitopolar sulcus (OpS), Lunate sulcus (LuS), and Inferior occipital sulcus (IOS). The position and the extent of human occipital cortical areas defined functionally have characteristic relationship to the occipital sulci.

**Objective:** The aim of this study is to define the variability of the human occipital sulci with regard to: i) presence, ii) position, iii) extent, iv) intersections, and v) length.

**Materials and Methods:** A total of 50 formalin-preserved human brains without apparent neuropathology were studied. The occipital sulci were traced along the medial, lateral, and inferior surfaces of the hemispheres.

**Conclusion:** The variable occipital sulci may be used as anatomical landmarks for functionally defined visual areas and during less-invasive neurosurgical procedures in cases of focal lesions within the occipital lobe.

**60. Surgical Sacral Anatomy** *Manisha B. Sinha* AlIMS, Raipur, Chhattisgarh

**Background:** Unstable lumbosacral spine due to trauma, degenerative conditions, congenital defects and neoplasm

may require fusion and stabilization. Posterior pedicular screw fixation has been widely used for the stabilization. Measurement of pedicle diameters of the first sacral vertebra is crucial for safe placement of the screw.

**Material and Methods:** Thirty dry sacra were used for study of first sacral vertebra of Central Indian population. Various measurements of sacra, S1 were done.

**Conclusion:** Detail knowledge of the morphometric data about sacrum is very important for spinal surgery in cases of screw placement to the S1, to avoid injury to vascular structures anteriorly and nerve root medially.

#### **61. Anatomical Study of the Radial Tunnel by Cadaveric Dissection, for Possible Sites of the Posterior Interosseous Nerve Entrapment** *Bhavana Sunil Junagade, Aruna Mukherjee*

MGM Medical College, Kamothe, Navi Mumbai, Maharashtra

**Background:** The deep branch of the radial nerve courses through the radial tunnel between the superficial and the deep layers of the supinator muscle. During its course through the tunnel, it is liable to undergo compression at various sites, giving rise to the radial tunnel syndrome or the posterior interosseous syndrome.

**Method:** For the present study, 30 embalmed human cadaveric upper limbs were dissected and the following potential entrapment points were studied: the morphology of the upper (arcade of Frohse) and the lower borders of the supinator muscle, the presence of radial recurrent artery or its vascular arcade (leash of Henry). The measurements were taken from the proximal border of the head of the radius to the radial nerve bifurcation and the points of entry and exit of the posterior interosseous nerve (PIN) between the two layers of the supinator muscle. Both anterior and posterior approaches were used to expose the course of the PIN.

**Results and Conclusion:** The upper border of the superficial layer of the supinator muscle was found to be tendinous in 70% of specimens. For the course of the PIN through the supinator, the measurements were taken from the proximal border of the radial head, which is easily palpable externally. The posterior approach made it easier to expose the PIN. This approach along with the above measurements as a guide will help the surgeons to make minimal possible incision during the surgery.

62. Study of Anatomical Variation and Branching Pattern of the Femoral Nerve in 25 Cadavers

Urmila N. Pateliya, Bharat D. Trivedi, Kanan P. Shah Smt. N.H.L. Municipal Medical College, V.S.G.H., Ahmedabad, Gujarat

In several surgeries, femoral nerve is used for nerve block. The knowledge of femoral nerve in thigh is important for anatomists, anesthetics, and surgeons to prevent iatrogenic femoral nerve palsy. We dissected 25 human cadavers to study the anatomy of femoral nerve. We dissected the femoral nerve bilaterally in the Department of Anatomy, Smt. N.H.L. Municipal Medical College, and recorded the branching pattern of femoral nerve with digital photography. The aim of the study was to highlight variation in branching pattern of the femoral nerve. We found saphenous nerve arising from the anterior division of femoral nerve. However, much variations were not observed in our study, further results were discussed at time of presentation.

## 63. Nonregular Course of Median Nerve in Relation to Brachial Artery

Y. Rebecca, K. Lalitha, K.S.N. Prasad Siddhartha Medical College, Vijayawada, Andhra Pradesh

Knowledge of variation of median nerve will be of great help to understand the effect of lesion. Keen (1961) has reported superficial course of brachial artery in relation to median nerve. In 2.3% cases, Pandy and Shukla found the roots did not join but continued separately. The course of median nerve in relation to brachial artery is studied in 30 upper limbs. In 26 upper limbs, median nerve has crossed anterior to brachial artery at the insertion of coracobrachialis as described. In a cadaver bilaterally and in two right upper limbs (4 out of 30), the median nerve is seen crossing the brachial artery from its posterior aspect and further, both the median nerves of one cadaver had variability of origin and distribution. In both the upper limbs of the same cadaver, median nerve is formed at the upper third of arm as two roots, while musculocutaneous nerve is absent at its regular origin and seen as continuation of lateral root of median nerve. Superficial course of brachial artery in 3.6% of cases is reported by Keen (1961) and the present study showed 13.7%. It is not prudent to compare this work with the literature in view of sample size.

## 64. Variation of the Sciatic Nerve and Its Relation with the Piriformis Muscle

Anuja Sinha, Antony Sylvan D'souza, R.K. Sushma Kasturba Medical College, Manipal University, Manipal, Karnataka

The sciatic nerve is the largest branch of the sacral plexus and is also the thickest nerve of the body. It leaves the pelvis via the greater sciatic foramen, descends along the back of thigh and divides into tibial and common fibular nerves in the lower thigh above the popliteal fossa. However, variations in this arrangement have been reported. Therefore, the aim of our study was to analyze the incidence of sciatic nerve variations with regards to its formation and termination. Sixty gluteal regions were examined in 30 formalin-fixed adult cadavers in the Department of Anatomy, Kasturba Medical College, Manipal. The variations were photographed and recorded. The sciatic nerve showed variations in its formation as well as termination. High division of the sciatic nerve was most common and was observed bilaterally in 20 cadavers. These sciatic nerve variations are important for surgeons, as this is an area of frequent surgical manipulation, nerve injury during deep intramuscular injections, sciatic nerve block etc. They may lead to inadvertent injury during surgeries, piriformis syndrome, nondiscogenic sciatica, muscle atrophy, failure of sciatic nerve block and many other complications.

#### 65. A Study of Variations in the Branching Pattern of Lateral Cord of Brachial Plexus

S. Viswa Santhi

Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, Chinavutapalli, Andhra Pradesh

**Background:** The anatomy of axilla assumes great importance to the clinicians, surgeons, radiologists, and anesthesiologists. The neurovascular variations in the axilla are not uncommon, particularly that of median and musculocutaneous nerve. The study was carried out to know more about these variations.

**Aim:** The aim of the study was to observe the variations in the branching pattern of lateral cord of brachial plexus.

**Materials and Methods:** The present study was carried out in 15 human cadavers (30 upper limbs), during routine dissection of axilla in the Department of Anatomy, Dr. PSIMS and RF, Chinavutapalli.

**Observations:** Variations in the branching pattern of lateral cord were observed in eight cadavers, three bilateral and five unilateral. Most commonly observed variation was the formation of median nerve with three roots in six cadavers. Musculocutaneous nerve was absent in two cadavers.

#### 66. Study of Anatomical Variations and Incidence of Accessory Foramen Transversarium of Human Cervical Vertebrae

M. Uma Maheswari, K. Kathiresan, M.S. Trinesh Gowda, H.T. Geetanjali, Sanjeev Kumar Nagalaxmi Mandya Institute of Medical Sciences, Mandya, Karnataka

The foramen transversarium is a result of the special formation of the cervical transverse processes. It is formed by the vestigial costal element fused to the body and the true transverse process of the vertebra. The vertebral vessels and nervous plexus are caught between these two bony parts. Two hundred adult dry cervical vertebrae of human C1=20, C2=20, C7=20, C3-C6=140 were studied for the presence of any accessory foramen transversarium and classified according to presence or absence, unilateral or bilateral and size of foramen. The possible factors (in addition to the embryological ones) involved in causing these variations, for example, are mechanical stress, size, course, and number of vertebral vessels. The variation recorded in this study includes the presence of accessory foramen transversarium of cervical vertebrae. It narrows the size of the real transverse process and this may result in pressure on the vertebral artery and the sympathetic plexus embedded in it. The findings may be of clinical interest to radiologists, neurologists, orthopaedic surgeons, anthropologists, and forensic personnel. The contribution of the present study to the understanding and diagnosis of pathological conditions related to the vertebral artery and its sympathetic plexus is stressed.

#### 67. Morphological Variations of Liver Lobes and its Clinical Significance in North Indian Population

Muktyaz Hussein, Mahboobul Haque, \* Nema Usman\*\* M.R.A. Medical College Ambedkar Nagar, Uttar Pradesh, \*S.R.M.S. Institute of Medical Sciences, Bareilly, Uttar Pradesh, \*\*J.N. Medical College, Aligarh, Uttar Pradesh

Anatomical variations of liver are irregularities in form, occurrence of one or more accessory lobe or presence of cysts. Less common abnormality is atrophy, or complete absence of one of the lobes. Knowledge of such anomalies is important since they do not always remain clinically latent. Accessory lobe can occur in numerous places. The exact reason for the origin of accessory lobe of liver in man is still unknown. Accessory liver lobes may be attached to the liver by a pedicle of liver tissue or by mesentery (John Stone, 1965). In most cases, the accessory lobe is found in the infra-hepatic position. Riedel's lobe is the best known example of a sessile accessory lobe. Accessory lobes may also stimulate tumor. In cases where the accessory lobe has a pedicle, torsion is a common event leading to discovery of the abnormal mass. The present study was conducted in the Department of Anatomy M.R.A. Medical College Ambedkar Nagar, and Shri Ram Murti Smarak Institute of Medical Sciences Bareilly, Uttar Pradesh. The materials used for present study comprises 41 adult livers with age ranging from 18 to 70 years which were dissected during routine dissection classes for medical undergraduate students over a period of 4 years. The aim of the present study is to find out the morphological variation of liver lobes occurring in North Indian population as these congenital abnormalities can cause diagnostic confusion for physicians, surgeons, radiologists, and anatomists. The livers lobes were carefully studied and appropriate measurements, photographed and its clinical implications discussed.

#### 68. Radiological Study of Anatomical Changes in Deformed Leprosy patients in Chitradurga Taluk of Chitradurga

Parvathi S. Sri Basaveshwara Medical College, Chitradurga, Karnataka

**Objectives:** 1. Assess the magnitude of the leprosy, 2. different types of leprosy, 3. to rule out percentage of disabili-

ty—the autoabsorption and autoamputation, 4. defaults, 5. deformity, 6. treatment and rehabilitation.

**Place of Study:** Chitradurga Taluk in Chitradurga district of Karnataka.

Time period: From 15/07/2012 to 30/9/2012.

**Materials and Methods:** In the district already known for leprosy patients: 1) eight disabled leprosy cases are observed in the taluk, 2) radiological X-ray taken in severe cases, 3) age: adults—males and females. All eight cases in Chitradurga taluk are multibacillary.

**Deformity:** Taken X-ray taken in the changes.

**Results:** History of personal, professional Rx, family history, defaults. Dropout Rx.

**Conclusion:** This study was later correlated with earlier works and available literature. Leprosy is still present in the country and NLEP is working hard toward its eradication.

#### 69. Radiological Study on Configurations of Patella and Trochlear Groove of Femur in Assessment of Patellofemoral Stability

*M. Sobana, S. Sundarapandian, Bhuvaneshwari* SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu

**Aim:** To study the "bump sign" and "crossing sign" on lateral knee radiographs and correlate them with the patellar thickness and patellar height ratios for the assessment of patellofemoral stability status.

**Materials:** Fifty digital lateral knee radiographs of both sexes were collected from the clinical laboratory in Chennai Image J software.

**Methods:** On the lateral knee radiographs, the following were measured 1) bump sign and crossing sign, 2) patellar thickness and patellar height ratio. Correlating the above parameters concludes the patellofemoral stability status.

**Results:** Out of 50 samples, 23 were present with "bump" sign; among those 23, only 10 were present with decreased thickness of the patella and 12 were present with alteration in the positioning of patella.

**Conclusion:** All four factors should be considered for assessing patellar stability. In planning for surgical approaches, the bump sign alone should be taken for diagnosis of patellar instability.

#### 70. Comparison of the Medial and Lateral Joint Space Width of Knee Joint and Assessing the Deformity and Stability Status: A Radiological Study

J. Godwin Issac Jebaselvan, S. Sundarapandian , Sharmila Aristoltle

SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu

Assessment of medial and lateral joint space width of the knee joint will provide good knowledge about the stability status of knee joint and the other possible deformities like Genu Varum and Genu Valgum. This knowledge helps us in assessing the biomechanical function and the line of weight transmission of the knee joint. When comparing the medial and lateral joint space widths, if the medial joint space width is lower than the lateral joint space width that denotes the presence of Genu Varum; if the medial joint space is higher, it denotes the presence of Genu Valgum. This increase or decrease will make the knee joint unstable and gives rise to much mechanical stress which predisposes arthritis or acute strains of the ligaments. Sixty X-rays of knee joint with AP view were collected from various radiological laboratories in Chennai. The study was conducted in SRM Medical College, Chennai. Medial and lateral joint space widths were measured in the X-rays using Image J software. The results were compared and statistically analyzed. Since the difference in the joint space width greatly assesses the stability of knee joint, knowledge of joint space width will be a useful guide for orthopedicians and physiotherapists in assessing the stability and deformities of knee joint.

#### 71. Comparative Radiological Study of Carrying Angle in Male and Female and Its Clinical Importance

*R. Dinesh Kumar, S. Sundarapandian, Sharmila Aristotle* SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu

**Aim:** The study was carried out to assess the carrying angle in male and female and to determine its values in both sexes. Estimation of values could be useful in management of elbow disorders, such as fractures and epicondylar diseases and evaluation of elbow reconstruction.

**Materials and Methods:** Sixty X-rays were collected from various clinical laboratories in Chennai. The carrying angle was measured with the help of Image J software. The study was conducted in SRM Medical College, Chennai. It was measured between a line passing through the mid axis of lower third of humerus and a line along the mid axis of the upper third of forearm; the lines were extended to meet at the midpoint of transepicondylar line where the angle was measured.

**Results and Conclusions:** This study demonstrated that the carrying angle is significantly greater in females than males. As such, it can be considered as secondary sex character. The recorded measurement might be helpful in the management of elbow disorders and its reconstruction after fractures.

## 72. Need to Do Away With Formalin as a Preservative

*Lt. Col Aseem Tandon, Col. Rajan Bhatnagar* Armed Forces Medical College, Pune, Maharashtra

**Background:** On 10 June 2011, the US National Toxicology Program described formaldehyde as "known to be a human

carcinogen." Occupational health authorities throughout the world are, therefore, likely to put stricter regulations to its use within anatomical disciplines as well.

**Aim:** To find a viable alternative for formalin as a preservative.

**Materials and Methods:** Samples preserved in formalin were compared with those in 1% phenoxyethanol over a period of six years. Histology slides prepared using phenoxyethanol as a preservative were also compared with the conventional ones.

**Results:** Specimens in phenoxyethanol remained soft and flexible with a consistency and color retention suitable for dissection, demonstration, and display purposes. Culture of the two showed no growth after 72 hours. Microscopic structure of the tissues remains satisfactory when processed with 1% phenoxyethanol.

**Conclusion:** Prolonged exposure to formalin has to be avoided at any cost. Phenoxyethanol is a suitable alternative for preservation of specimens. However, efforts have to be made to reduce or replace the use of formalin as a primary fixative.

## 73. Comparative Study of Cardiac Size by Chest X-Ray and Echocardiography

U. Sinha, U.S. Sahay, \* S.A. Athavale, \*\* R. Deopujari, S. Kumar\*\*\*

Peoples College of Medical Sciences and Research Centre, Bhopal, Madhya Pradesh, \*Darbhanga Medical College and Hospital, Darbhanga, \*\*All India Institute of Medical Sciences, Bhopal, Madhya Pradesh, \*\*\*All India Institute of Medical Sciences, New Delhi

**Background:** The study of cardiac size is important for the diagnosis of various types of cardiac disease like left ventricular enlargement due to aortic stenosis and right ventricular enlargement due to pulmonary stenosis. Although echocardiography is considered as gold standard for diagnosis of cardiomegaly, it is costly and needs trained personnel for performing and interpreting the results of this diagnostic procedure. Chest X-ray is used as an alternative.

**Materials and Methods:** The present comparative study was carried on 35 males aged 25–60 years. On the basis of provisional clinical diagnosis, patients were divided into three groups: (i) Group A – 15 patients in whom clinical history did not suspect any cardiac enlargement, (ii) Group B – 15 patients, whose clinical history predisposed to left ventricular enlargement, and (iii) Group C – 5 patients whose clinical history predisposed to right ventricular enlargement. All patients underwent chest X-ray (PA view) and 2D echocardiography examinations. The findings of the two modalities were compared.

**Observations:** The observations were very informative and it showed that chest X-ray is useful for diagnosis of cardiomegaly due to various types of cardiac diseases. On chest X-ray, cardiothoracic ratio and transverse diameter showed strongly positive correlation with total ventricular dimension on echocardiography. Other parameters like transverse diameter and transverse left diameter on chest X-ray also showed positive correlation with right ventricular dimension on echocardiography.

**Conclusion:** In absence of echocardiography, chest X-ray is a reliable alternative for diagnosis of cardiomegaly.

#### 74. The Morphometric Study of Fourth Ventricle by Computerized Tomography

Mangesh S. Selukar, V.P. Dahiphale, P.R. Kulkarni Government Medical College and Hospital, Latur, Maharashtra

The structure of human brain is complicated and not yet fully understood. As the human brain ages, characteristic structural changes occur that are considered normal and accepted. Thus, the thorough knowledge of the normal changes that occur in the brain with age is critical before abnormal findings are analyzed. According to Schochet (1998), as ageing occurs, the brain undergoes many gross and histopathology changes leading to the enlargement of the ventricles. Both imaging and autopsy studies suggest that increase in cerebrospinal fluid and reduced cerebral volume accompany normal human ageing. Due to these changes that occur normally with aging, the diagnosis of disease in elderly patients is often complicated. Two major changes that may occur in elderly individuals without neurologic deficits are enlargement of ventricles and cortical atrophy. The Moral and Wildi study shows that ventricular enlargement was seen as early as 55 years of age. The aim of this study is to analyze the size and dimension of the fourth ventricle and to compare the fourth ventricle size of males and females.

## 75. Ultrasonographic Study of Morphology of Kidney in Adults, Male and Female

Paninish Chandra Runnu, Supriya Dhaboo Mahatama Gandhi Memorial Medical College, Jamshedpur, Bihar

**Aim:** The purpose of this study is to provide normal value of length, width, thickness, and volume of kidney in normal adult male and female. These renal dimensions are important for the diagnostic and the prognostic of the pathological renal conditions.

**Materials and Methods:** Individuals aged between 20 and 85 years were divided into three groups. Group A: 20–39 years; Group B: 40–59 years, and Group C: from 60 years on-ward. Length, width, and thickness of the kidney of both sides were measured in an age- and sex-stratified random sample of 155 normal individuals. Measurements were made with individuals supine or in lateral decubitus position. All the ultrasonographic examinations were done by the same experienced radiologist. All the renal dimensions were correlated with age.

**Results:** Average renal length, width, thickness, and volume are 10.67 cm, 5.03 cm, 4.02 cm, and 115.35 cm, respec-

tively. Renal dimensions are also provided separately for Group A, B, and C, for males and females of both sides. All the renal dimensions of the left kidney are nonsignificantly more than the right kidney in all age groups except the length (p = 0.01 and 0.001 for male and female, respectively), width (p = 0.03), and volume (p = 0.05) of female kidney of Group B, and thickness (p < 0.001) and volume (p < 0.001) of female kidney in the length of left kidney in male and female in Group C and D. Width of the male kidney is significantly more than the female kidney in all age groups and on both sides (p < 0.001). The male kidney in all age groups. The volume of the male kidney is significantly more than that of the female kidney in all age groups. The volume of the male kidney is significantly more than that of the female kidney in all age groups. The volume of the male kidney is significantly more than that of the female kidney in all age groups. The volume of the male kidney is significantly more than that of the female kidney in all age groups. The volume of the male kidney is significantly more than that of the female kidney in all age groups. The volume of the male kidney is significantly more than that of the female kidney in all age groups. The volume of the male kidney is significantly more than that of the female kidney is significantly more than that of the female kidney is significantly more than that of the female kidney is significantly more than that of the female kidney is significantly more than that of the female kidney is significantly more than that of the female kidney is significantly more than that of the female kidney is significantly more than that of the female kidney is significantly more than that of the female kidney is significantly more than that of the female kidney is significantly more than that of the female kidney is significantly more than the female kidney is significantly more than the female kidney is significantly more than the female kidney is significantly mor

**Conclusion:** The results of this study show the normal values for renal dimensions according to age, which could be helpful in assessing the size of patient's kidney in different clinical settings.

#### 76. Assessment of Fetal Gestational Age in Different Trimesters from Ultrasonographic Measurements of Various Fetal Biometric Parameters

S. Babuta, S. Chauhan, R. Garg Sawai Man Singh Medical College, Jaipur, Rajasthan

**Background:** Fetal biometry is a methodology devoted to measure several parts of fetal anatomy and their growth.

**Aim:** The present study was carried out to assess the gestational age in second and third trimesters with the help of ultrasonographic (USG) measurements of four fetal biometric parameters (i.e., biparietal diameter [BPD], head circumference [HC], abdominal circumference [AC], femur length [FL]) in local population (Jaipur zone) of Rajasthan. The study also aimed to evaluate the efficacy and significance of these four fetal biometric parameters in the prediction of gestational age by ultrasound and to find the predictive accuracy of gestational age determined by USG with menstrual age determined by last menstrual period (LMP) method in local population.

**Materials and Methods:** A total 330 cases of normal pregnant females were studied (165 second trimester [13–28 weeks] and 165 third trimester [29–40 weeks]) with known LMP. They were studied once during gestation.

**Results:** BPD and HC were found to be equally best predictors of gestational age and to determine expected date of delivery (EDD) in second trimester. BPD and FL were in third trimester. AC was least accurate parameter in both trimesters. Variability in predicting GA (using all four parameters) was  $\pm 2$  weeks in second trimester and  $\pm 2-4$  weeks in third trimester. Accuracy decreased and variability increased as the pregnancy advanced from second to third trimester. Mean measurements of fetal biometric parameters were found lower than western monograms in each week of both trimesters.

**Conclusion:** Variation in predicted GA by USG is attributed to anthropometric difference between the two populations due to racial, genetic, nutritional, and socioeconomic factors. Therefore, population-specific measurements should be done to generate tables and regression equations for more precise reporting of GA and EDD by ultrasonography.

## 77. A Radiological Study on the Anatomical Site and Size of Ureteric Calculi

A. Kafeel Hussain, Vathsala Venkatesan, \* W.M.S. Johnson\*\* Sree Balaji Medical College (SBMCH), Chrompet, Chennai, Tamil Nadu

Pain induced due to ureteral stone radiates from the loin to the groin according to the site at which they are present and the severity of the pain is seldom related to the size of the calculi. The aim of this study is to evaluate the size and location of the ureteric calculi. A retrospective study of 95 patients with renal colic was conducted to investigate the location and size of the calculi along with the diameter of the unaffected (normal) ureter with the use of noncontrast CT. We derived that the uretero-pelvic junction (UPJ) and the ureter at the level of the external iliac vessels (UEIV) were not common sites of ureteral stones as reported earlier. The smaller the stones, the closer to the uretero-vesical junction (UVJ) were they located. The diameter of the ureter at the level of the external iliac vessel was not markedly narrower than the diameter of the normal ureter at other sites. Information on the location and size of the stone is essential for the selection of a proper treatment modality.

#### 78. Evaluation of Possible Metal Toxicity of an Ayurvedic Preparation: Histopathological, Biochemical and Behavioral Analysis

S. Jessica, S. Suhani, Gururaj Bhatt, \* Lydia Quadros, A.S. D'souza, Kumar M.R. Bhat

Department of Anatomy, Kasturba Medical College, Manipal University, Manipal, Karnataka, \*Muniyal Ayurveda College, Manipal, Karnataka

Ayurveda, an ancient Indian medicinal system, is regarded as a complementary and alternative medicine in recent years. However, there are reports to show the toxic effects of certain ayurvedic preparations which use metals as an ingredient in their preparation. One such medicine is *Ekangaveera rasa*, which contains equal parts of many metals such as copper, zinc, mercury, lead, iron, etc., along with other herbs and minerals. This herbo-minero-metallic preparation is used to treat the pain of neurological origin. There are no published reports available to evaluate the toxic effects of such metals used in this preparation. Therefore, the aim of our present study is to evaluate the possible alteration caused by the *Ekanganveera rasa* on brain, liver, and kidneys by histological, biochemical, and behavioral analysis. For this evaluation, Wistar rats of either sex were taken and divided into groups of six animals each. Group 1 – normal control; Group 2, 3, and 4 were treated with *Ekangaveera rasa* at doses of half, equal, and five times more of human equivalent dose for 30 days. Behavioral parameters were assessed on 15th and 30th day by using passive avoidance test. At the end of the treatment period, blood was collected and subjected to basophilic stripling and biochemical analysis. Tissues were collected 30 days after the treatment and processed for histopathological evaluation. Possible histopathological, biochemical, and behavioral alterations due to administration of *Ekangaveera rasa* were discussed.

#### **79. Evaluation of Wound-Healing Property of Topical Application of** *Glycyrrhiza glabra* (*Yastimadhu*): A Histopathological Study

R.K. Sushma, M. Salma, S. Suhani, Kumar M.R. Bhat Kasturba Medical College, Manipal University, Manipal, Karnataka

Ayurveda, the most ancient and traditional Indian medicine, describes more than 200 herbs for skin care. Therapeutic benefits of plant materials on wound treatment have been reported in many studies. One such plant known to exhibit wound-healing property is the dried rhizome and roots of Yastimadhu – Glycyrrhiza qlabra (GB). It is an important and principal drug mentioned in Sushruta Samhita. This sweet, moist, and soothing herb has powerful anti-inflammatory, antibacterial, antioxidant, antispasmodic, and antihyperglycemic properties. The wound-healing properties of this plant have been mentioned in Ayurveda. However, an experimental evidence for the same has not been reported. Therefore, the present study is designed to assess the efficacy of GB on wound healing using the rat incision wound model. One set of animals were grouped as untreated control and in another set of animals, the incision wound was treated with the aqueous extract of GB topically. Based on the results on breaking strength of the wound, histopathology of the wound tissue including epithelialization, granulation, fiber composition and distribution, lymphocytic infiltration, and vascularization, the efficacy of the GB on wound healing was assessed.

80. Effect of Carbaryl Pesticide on the Histomorphology of Liver in Albino Rats

Reeha Mahajan, Harbans Singh, \* Sajad Hamid, \* Anita Tuli Lady Hardinge Medical College, New Delhi, \*Government Medical College, Jammu, J&K

**Aim:** Carbaryl, a carbamate pesticide, is being extensively used in commercial agriculture, poultry, and garden pest control. It was the most frequently detected carbamate in

juice samples. The search of available literature revealed that there is paucity of literature regarding the histopathological changes in liver associated with administration of carbaryl which has prompted us to initiate this study as liver plays an important role in the first pass metabolism of carbaryl.

**Materials and Methods:** The present study was conducted on 40 laboratory-bred adult Wistar albino rats ranging between 150 g and 200 g in weight. Rats were injected with 200 mg/kg body weight of carbaryl intraperitoneally, 5 days a week for 30 days. Controls of the same weight were maintained. The rats were sacrificed within 24 hours of the last injection. The tissue was processed for paraffin sectioning. Sections of 5–7 µm thickness were cut and stained with hematoxylin and eosin stain.

**Results:** There was a significant decrease in weight of the experimental rats recorded prior to their sacrifice (p < 0.001) as compared to controls. The experimental rats showed disrupted pattern of hepatic cords, capsular fibrosis, subcapsular inflammatory cells, enlarged hepatocytes, ballooning degeneration, microvesicular and macrovesicular fatty change, cytoplasmic basophilia, fibrosis, and inflammatory infiltrate around the portal triads along with dilatation and congestion of the blood vessels and proliferation of bile ductules and areas of hemorrhage.

**Conclusion:** Carbaryl induces toxic histomorphological effects on liver in the dose of 200 mg/kg body weight.

#### 81. Effect of Phenytoin on Albino Rat Testis

R. Rajkumar, Vathsala Venkatesan\*

Mahatma Gandhi Post-Graduate Institute of Dental Sciences, Puducherry, \*Sree Balaji Medical College and Hospitals, Puducherry

**Aim:** The present study aimed at exploring the effect of phenytoin on albino rat testis.

**Materials and Methods:** Albino rats were divided into two groups: control and test. The test group was given phenytoin 150 mg/kg of body weight orally while the control group was given equal amount of normal saline. After 45 days, with the rat under deep anesthesia, the testis were removed from the scrotum and examined macroscopically. Their weight and volume were obtained and their major and minor axis was measured. Then, the testis were sectioned at their equatorial plane, fixed in Bouin's liquid and subjected for histopathological examinations using hemotoxylin and eosin, Masson's trichrome, Periodic acid Schiffs and Van Gieson staining techniques. Histological and morphometric observations were done to determine the mean diameter of the seminiferous tubules, the total and numerical volume of the testis, and the obtained results were subjected for statistical analysis.

**Result:** The result obtained showed significant degenerative changes of the testis.

#### 82. Effect of Andrographis penniculata on Cisplatin-induced Hepatotoxicity in Mice

Sant Suman Rastogi, Mandavi Singh

Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh

Cisplatin is one of the established potent chemotherapeutic agents used for the treatment of neoplasia.

**Aim:** The major dose-limiting side effects of cisplatin include hepatotoxicity. Thus, the aim of the present study is to assess the changes in liver of offspring of Swiss albino mice after cisplatin exposure during intrauterine life.

**Materials and Methods:** The experimental animals were randomly divided into 4 groups. The first group consisted of controls and the second group was treated intraperitoneally with cisplatin in a single dose of 4 mg/kg body weight on day 10 of gestation. The third group was treated with cisplatin in the same dose on the same day along with methanol extra of AP from GD 10 to GD 17 via oral route. The fourth group of experimental mice were administered AP only in the dose of 50 mg/kg body weight from GD 10 to 17. The control as well as the drug-treated groups were sacrificed on GD 18 and their fetuses were collected to observe gross malformations, if any. The liver of formalin-fixed fetuses was removed for histopathological observation.

**Results:** Cisplatin-induced marked hepatotoxicity even in a single dose. It was partially protected by AP but it could never reach the quality of control liver.

**Conclusion:** The therapeutic used of cisplatin during pregnancy should be monitored with great caution.

#### 83. Prenatal Histogenesis of Human Fetal Testis

*M. Pramila Padmini, B. Narasinga Rao* Maharajah's Institute of Medical Sciences, Nellimaria, Vizianagaram, Andhra Pradesh

One of the defining characteristic features of the living beings is their ability to continue the progeny which is emphatically the function of the testis with an additional course of endocrine function in human species. The present prenatal study of histogenesis of human fetal testis was carried out to know the occurrence of various cell population, such as germ cells, leydig cells sertoli cells, and peritubular myoid cells at different gestational periods. The testicular cords develop within mesenchymal tissue between 10 and 12 weeks of gestation. Differentiation of leydig cells is well appreciated by 16 weeks and become more prominent in 18 weeks. Lobulation is distinct with seminiferous tubules by the end of week 24 of gestation. Differentiation of sertoli cells precursors and prespermatogonial cells are well marked during week 28 of gestation. Tunica albuginea and the organization of tubules into lobules are observed by week 28 of gestation. Lobules of testis and seminiferous tubules are prominent between 30 and 34 weeks of gestation.

## 84. Histological Changes of Gallbladder in Cholelithiasis

Gyanaranjan Nayak, Bijay K. Dutta, Bana B. Mishra, \*Rajashree Biswal Department of Anatomy, \*Department of Surgery, SCB Medical College, Cuttack, Odisha

**Aim:** To study histological changes of gallbladder in patients of cholelithiasis.

**Materials and Methods:** Gallbladder specimens were collected from 70 surgery indoor-admitted patients of cholelithiasis undergoing cholecystectomy. The specimens were fixed in formal saline and detailed gross examination was done. Small specimens for microscopy were obtained from fundus, body, and neck of the gallbladder as well as from pathological abnormal sites. Routine processing of tissue section with hematoxylin and eosin staining was done and sections were subjected to light microscopy (magnification 10×, 40×).

**Results and Conclusion:** Most of the cases showed chronic cholecystitis and its variants followed by acute cholecystitis. Only one case was found to harbor carcinoma.

#### 85. Effects of Ibuprofen on Kidneys of Albino Rats

P. Baisakh, B.K. Dutta, C. Sarangi, R. Biswal, M. Panda SCB Medical College, Cuttack, Odisha

**Aim:** Ibuprofen is one of the most commonly prescribed nonsteroidal, anti-inflammatory drugs in osteoarthritis, rheumatoid arthritis, fever, mild to moderate pain and primary dysmenorrhea. Due to its easy accessibility, abuse of the drug is very common, leading to its various side effects.

**Material and Methods:** In the present study, the effects of ibuprofen were seen experimentally on kidneys of 72 albino rats over the period of 6 weeks at therapeutic doses. They were divided into control and experimental groups and the effects were seen every week by sacrificing 6 from the experimental group and 6 from the control group. Measurements were taken by ocular micrometer for different segments of tubule, interstitium, and blood vessel.

**Results:** At therapeutic doses of Ibuprofen, the findings in different weeks were corroborated with the control group. There were different morphological changes including shrunken glomeruli, increased capsular spaces, congested blood vessels along with dilated and thickened renal tubules in the later weeks of treatment. Interstitium revealed moderate fibrosis and edema with chronic inflammatory cell infiltrate.

**Conclusion:** On prolonged use, NSAIDs (ibuprofen) causes tubulointerstitial nephritis.

## 86. Effect of Aspartame on Urinary Bladder of Adult Swiss Albino Mice

Vijay Gujar, Pradeep Vokariya, A.M. Tarneker, M.R. Shende Mahatma Gandhi Institute of Medical Sciences, Sevagram, Maharashtra

Worldwide, aspartame is one of the most widely used artificial sweeteners. It is a high-intensity sweetener added to a large variety of food. It is most commonly used as alternative sweetening agent by diabetics and calorie-conscious people. The study was conducted to know any ill effect of the prolonged use of aspartame on urinary bladder of adult Swiss albino mice. A total of 60 mice were taken, out of which 30 were as control and 30 were given doses of 100 µg/g of body weight by intragastric route up to 8 weeks. The mice were sacrificed after 8th week and urinary bladder was dissected. The urinary bladder thus obtained was examined grossly as well as histologically.

#### 87. Hepatotoxic Effect of Silver Nanoparticle on Swiss Albino Mice and Their Fetus

*Jyoti Prakash Pani, Chhandamayee Mohanty* Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh

**Aim:** The present work was aimed to study the hepatotoxicity of silver nanoparticle on Swiss albino mice and their offsprings.

**Materials:** Fifteen female Swiss albino mice were procured from Department of Anatomy, Institute of Medical Sciences, Banaras Hindu University, with due permission granted from HOD, Department of Anatomy, IMSBHU. The mice were exposed to male mice of same stock and same variety for mating in order to acquire fetuses.

**Methods:** Silver nanoparticle colloidal solution (5 mg/kg body weight) was administered orally to the pregnant mice on day 7, 8, and 9 of gestation and the fetuses were collected on day 18.

**Results:** The mean weight of the liver of treated mice and their offsprings were reduced in comparison to the control. Dilatation and distortion of central vein, disruption of endothelial lining along with inflammation of epithelial lining, disturbance in the pattern of hepatocytes along with severe degeneration in both mother and fetuses were observed after histological processing.

**Conclusion:** As the work is in its preliminary stage, definite conclusions cannot be made about hepatotoxicity of silver nanoparticle.

#### 88. Organogenesis and Morphogenesis of Kidney in Human Fetuses at Different Weeks of Gestation

Amitav Panigrahi, Geetanjali Arora, Arpan Haldar, A.K. Nanda, Dipti Basu Hi-Tech Medical College and Hospital, Bhubaneswar and

Rourkela, Odisha **Aims and Objectives:** Kidneys develop in intermediate mesoderm of human embryos as pronephric kidney, mes-

mesoderm of numan embryos as pronephric kidney, mesonephric kidney, and metanephric kidney. Metanephros remains as permanent kidneys and pronephros and mesonephros disappear. They develop early in the 5th week and start to function around 9th week (week of gestation). Kidneys develop from two sources: Metanephric diverticulum (ureteric bud) forms the collecting part, while metanephric mass of intermediate mesoderm (metanephric blastema) forms the secretory part. This study was done to correlate the chronological pattern of kidney development in this geographical eastern region of India and to compare the results from other researchers nationwide and worldwide.

**Materials and Methods:** Aborted 20–30 fetus, 10–38 weeks with no obvious congenital abnormality collected within 6 hours after delivery from Department of Obstetrics and Gynaecology, Hi-Tech Medical College and Hospital, Bhubaneswar, were immediately fixed in 10% formalin for 1–2 hours. Kidney dissected under dissecting microscope and fixed in 10% formalin for 48–72 hours were processed for paraffin sections of 5 µm thickness. The gestational age of fetuses were determined by ultrasound, crown-rump length, and women's cycle of amenorrhea. The Paraffin blocks sectioned and stained in H&E and special stains like Masson's trichrome, Mallory Azan, etc. were observed under microscope.

**Observations:** At 10 weeks, cortex and medulla were not differentiated. However, they were well differentiated by 12 weeks. At 14 weeks, nephric vesicles were present; by 16 weeks, cortico-medullary junction was well differentiated. At 18 weeks, cortex differentiated into Pars Compacta and Pars Radiata, and by 20 weeks, collecting ducts terminated into ducts of bellini. At 22 weeks, cortex showed mature and developing glomeruli and by 24 weeks renal pyramids containing loops of Henle and ducts of bellini were observed. At 26 weeks, cortex was compact, and by 28 weeks thickness of subcapsular nephrogenic zone increased. Between 30 weeks and 38 weeks, there was much better differentiation and development of already-present structures.

**Summary and Conclusion:** Ascent and fusion of kidney was same in both the sides. Both kidneys were equally vascular. Structural symmetry of both kidneys was observed and did not show marked differences with earlier researchers. Detailed structural study along with knowledge on kidney development at various stages was carried out to corroborate observations of scientists who have worked in similar field. The present study is aimed to provide detail information to

all the researchers working on this topic worldwide and correlate the earlier data from other regions in India.

#### 89. Organogenesis and Histogenesis of Spleen in Human Fetuses at Various Weeks of Gestation

Arpan Haldar, Geetanjali Arora, Amitav Panigrahi, A.K. Nanda, Dipti Basu Hi-Tech Medical College and Hospital, Bhubaneswar and Rourkela, Odisha

**Aims and Objectives:** The spleen functions as a complex filter interposed in the blood stream. The red pulp is concerned with clearing the blood of particulate matter, efferent cells and the White Pulp is a lymphoid organ concerned with immune defense against blood-borne antigens. The study provides the chronological pattern of splenic development in this geographical eastern region of India and compares the results from other researchers nationwide and worldwide.

**Materials and Methods:** About 20–30 aborted human fetuses approximately 12–28 weeks with no obvious congenital abnormality were collected within 6 hours after delivery from Department of Obstetrics and Gynaecology, Hi-Tech Medical College and Hospital, Bhubaneswar. They were immediately fixed in 10% Formalin for 1–2 hours. Spleen was dissected under dissecting microscope and fixed in 10% formalin for 48–72 hours and processed for paraffin sections (5 µm thickness). The gestational age of fetuses was determined by ultrasound, crown-rump length, and women's period of amenorrhea. The paraffin blocks were sectioned and stained in H&E and special stains, such as Reticulin Stain, Pearl Stain etc. and observed under microscope.

**Observations:** There are three stages in the development of human spleen. Preliminary stage (primary vascular reticulum) lasts from 5th week up to 14th week, where primordium of spleen appears in 5th week and blood vessels appear in 6th and 7th week. The transformation stage starts from 15th gestational week where splenic lobules and red pulp begin to form. The last stage of lymphoid colonization begin around 18th gestational week where white pulp develops. Erythrocytes, normoblasts and macrophages are seen among a network of mesenchymal cells during 12-14 weeks. Hemopoiesis, especially erythropoiesis, can be recognized by 14th week. During 15–17th week, red pulp forms at the periphery of splenic lobules. Splenic cord, splenic corpuscles and splenic sinis were recognized in 15-16th week. White pulp develops in 18th week and lymphocytes accumulate around central arteries during 19th and 20th week.

**Summary and Conclusion:** Vascularity and Structural symmetry of spleen was almost same and did not show marked differences with earlier researchers. Detailed structural study along with knowledge on splenic development at various stages was carried to corroborate observations of scientists who have worked in similar field.

#### 90. Morphological Variations of Lung: A Cadaveric study

M.P. Ambali, S.D. Jadav, \* M.A. Doshi, R.J. Patil, Priya P. Roy, Rajeev Desai

Krishna Institute of Medical Sciences Deemed University, Karad, Maharastra,

\*Padmashri Dr. Vithalrao Vikhe Patil Medical College,

Ahmednagar, Maharashtra

Background: The presence of fissures in the normal lungs enhances uniform expansion and hence facilitates more air intake. Accessory and incomplete fissures of varying depth can be seen in unusual locations of the lung, delimiting abnormal lobes which correspond to the normal broncho-pulmonary segments. The knowledge of anatomical variations of lung fissures is essential for clinicians, surgeons, and radiologists for recognizing various images of related abnormalities because an accessory or anomalous fissure can be mistaken for a lung lesion or an atypical appearance of pleural effusion.

Aim: The aim of the present study is to observe the morphological variation of fissures and lobes of the lungs.

Materials and Methods: Fifty pairs of lungs were used for this study. We noted details of lobes and fissures, i.e., complete or incomplete, presence of any variant fissure, accessory fissures.

#### 91. Extensor Digitorum Brevis Manus: A **Cadaveric Study**

Priya P. Roy,\* Jadhav Surekha,\*\* M.A. Doshi,\* B,R. Zambare,\*\* R.R. Patil,<sup>\*</sup> M.P. Ambali,

\*Krishna Institute of Medical Sciences Deemed University, Karad, Maharashtra \*\*Padmashri Dr. Vithalrao Vikhe Patil Medical College, Ahmednagar, Maharashtra

The extensor digitorum brevis manus (EDBM) is an atavistic, small muscle which rarely present on the dorsum of the hand. It was first described by Albinus in 1734 as "musculus extensor brevis digiti indicis vel medii" but Macalister coined it as "extensor digitorum brevis manus." The incidence of this muscle has been reported to be from 1% to 10% in cadavers but in clinical practice, it is rarely found. It can be unilateral or bilateral. It is often misdiagnosed as ganglion, synovial cyst, soft tissue tumor, giant cell tumor or carpal bone and results in unnecessary exploratory surgery. A detailed knowledge of the anatomy and incidence of EDBM muscle is of great practical importance to prevent diagnostic errors and to avoid surgical complications during hand surgery. Considering its importance, this study was conducted to evaluate its anatomy and incidence. The aim of the present study was to observe the incidence and anatomy of extensor digitorum brevis manus. Ninety four upper limbs of adult cadavers of unknown sex were studied to note the incidence, nerve supply and blood supply of extensor digitorum brevis manus. This muscle was observed in 4.1% cadavers. The details of the study were discussed during presentation

#### 92. Variations of Fissures and Lobes in Human Lungs

Rituparna Basu, Enakshi Ghosh, Anjana Dhur, Anindya Roy, Amitava Biswas

R.G. Kar Medical Collage, Kolkata, West Bengal

Being a vital organ of respiration, the human lungs are divided by fissures into lobes which facilitate movements of lobes in relation to one another. This knowledge of fissures and lobes is important for appreciation of lobar anatomy, as well as for accurate diagnosis and treatment of various lung pathologies. It is of great significance for accurate interpretation of different imaging techniques, for surgical restriction of individual lung segments and also of academic interest to all medical professionals. Considering its clinical importance, anatomical variations of fissures and lobes were studied in 82 human cadaveric lungs over a period of 1 year. Our study on lungs revealed the absence of oblique fissure in one lung and absence of horizontal fissure in 22 right lung specimens. None of the right lungs showed any accessory fissure. Among the left lungs, incomplete oblique fissure was seen in 29 lungs and absence of oblique fissure in 2 specimens. Hence, awareness of anatomical variation of lungs with respect to its lobes and fissures is of great clinical importance.

#### 93. Morphological Variations of the Lung **Fissures and Lobes**

K. Hema Sreenivas Narayana Medical College, Chinthareddypalem, Nellore, Andhra Pradesh

Background: The morphological variation in the fissures and lobes of lungs and its anatomical knowledge are of great clinical importance.

Aim and Objective: During routine dissections, a variation in the major fissures, lobes and supernumerary lobes were observed. Hence, the present study was undertaken to highlight these salient features so that it improves the knowledge of not only anatomists but will also enable us to explain these variations to the radiologists and cardiothoracic surgeons.

Materials: The thoracic cavities of 50 properly embalmed cadavers containing lungs were dissected. Previously stored lung specimens were also taken to study morphological features like fissures and lobes and were observed for anatomical variations.

Method: Dissection method.

Observation: Out of 50 lungs, 30 lungs showed these variations in fissures and lobes.

Results: 1. Absence of horizontal fissure: 10 right-sided lungs. 2. Incomplete oblique fissure: 05 right-sided lungs; 04 left-sided lungs. 3. Absence of fissures: 01 left lungs. 4. Accessory fissures or supernumerary lobes: 06 right-sided lungs; 04 left lungs.

**Conclusion:** Intimate knowledge regarding the position of fissures, lobes of the lungs is necessary for the appreciation

of lobar anatomy and thus locating the bronchopulmonary segments. Awareness regarding anatomical variations is essential for performing lobectomies and surgical resection.

## 94. Surgical Anatomy of Lateral Nasal Wall in North Indian Population.

Kayalvizhi, Gargi Soni, Usha Dhall Pt. B.D. Sharma PGIMS, Rohtak, Haryana

Both the success and safety of intra nasal functional endoscopic sinus surgery depend on the surgeon's knowledge of nasal and sinus anatomy, especially the lateral nasal wall. This study will provide a set of data, which will be useful to the endoscopic surgeon. The purpose of this study is to determine measurements between lateral nasal wall landmarks for which we utilized 40 embalmed cadaver half heads. Constant specific landmark from anterior to these following structures was studied: the anterior attachment of interior wall of bulla ethmoidalis, the ostium and anterior limit of sphenoidal sinus, the openings of eustachian tube and sphenopalatine foramen. Linear measurements from natural ostium of maxillary sinus to anterior end of interior turbinate were also studied. Ostium of sphenoidal sinus and to Eustachian tube was carried out. The mean range and standard deviation for these measurements were tabulated, analyzed, and discussed. These measurements can be used as an intraoperative guideline. Our study represents a unique compilation of linear measurement to important anatomic landmark of the lateral nasal wall in North Indian population.

#### 95. Prenatal Efavirenz-induced Behavioral Changes in Swiss Albino Mice

Anand Mishra, Mandavi Singh, Samsher Shrestha, Uttam Shrestha

Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh

Efavirenz is a nonnucleotide reverse transcriptase inhibitor (NNRTI) which is commonly used as a component of polytherapy for the treatment against HIV-1 infection. It was also previously given to pregnant mothers to prevent mother to child transmission of HIV virus. Efavirenz has been found to be teratogenic in few cases but its effect on the behavior of child who received this drug prenatally is yet to be elucidated. Pregnant Swiss albino mice were taken for this experiment. They were given efavirenz from day 6 to day 15 of gestation by gavage. Similarly, control mice were given tap water. The female mice were allowed to deliver and their pups were reared up to 8 weeks after which they were subjected to cognitive behavioral experiments like open field exploratory test, Elevated plus maze test, Morris water maze test. The results of these experiment showed that efavirenztreated mice showed enhanced anxiety and depression and

reduced spatial learning and memory in a dose-dependent manner.

#### 96. Use of Bleaching Powder in Collection and Preservation of Human Skeletal Remains Obtained from Dissected Cadavers: A New Method

Baneswar Baro, Joydev Sarma Gauhati Medical College, Guwahati, Assam

**Aim:** To collect and preserve the skeletal remains of dissected cadavers by employing a new technique in the Department of Anatomy, Guwahati Medical College.

**Materials:** Cadavers dissected in the Department of Anatomy, Guwahati Medical College.

**Method:** Completely dissected cadavers (all viscera including brain removed) were separated into skull, limbs, and trunk and immersed in plastic container containing water and bleaching powder solution. After adequate softening and removal of the soft parts, further processing of the skeletal remains were allowed using same solution and was checked periodically. Finally, thorough cleaning of whole skeleton was done and dried under direct sunlight.

**Results:** Skeletons were found in very good condition without any loss and breakage which is usually not observed in burial decomposition.

**Conclusion:** From our study employing the new technique, we have observed that this procedure is comparatively less time-consuming, involves less manpower, is practically an indoor procedure and pollution-free. Most importantly, the quality of skeleton is much better than that acquired from burial decomposition.

#### 97. Morphogenesis and Histogenesis of Urinary Bladder in Human Fetuses

*Y. Elizabeth Devi, Ch. Rajendra Singh, N. Saratchandra Singh* Regional Institute of Medical Sciences, Imphal, Manipur

**Aim:** i) To study the morphology of developing urinary bladder in terms of size, shape, and also its relationship with neighboring visceras. ii) Study the histological cytoarchitecture of urinary bladder at different stages. The sequence of events in the development and maturation of the organ during fetal life will be studied. Its morphology at term will be compared with the adult cytoarchitecture.

**Materials and Methods:** Fifty human fetuses aged between 15 weeks and term were studied morphologically by gross inspection as well as histologically by light microscopy using Hematoxylin and Eosin stain, Van Gieson's stain, Masson's Trichrome and Verhoeff's elastic tissue stain.

**Results:** At 15 weeks, the urinary bladder is visible to the naked eye as round shaped, jelly-like bulge in the upper part of urogenital sinus. Histologically, the urinary bladder wall at

this stage shows the presence of three layers viz., inner mucosa, middle smooth muscle layer, and outer adventitia. Subsequently, around 18–20 weeks, the urinary bladder assumed ellipsoid shape with further increase in length compared to the breadth. From 33 weeks onward, to the naked eye, the urinary bladder's shape is almost like that of adult. Histologically, the lining epithelium has assumed adult urothelium by 22 weeks.

**Conclusion:** The human fetal bladder undergoes a series of vital developmental changes during 15–33 weeks of gestation both morphologically and histologically finally acquiring the typical adult shape with a typical urothelial lining and well-developed muscle coat.

## 98. Estimation of Time After Death by Histological Changes in the Kidney

*T. Rajni, M. Goyal, C. Banerjee, R.K Singh,* <sup>\*</sup> *G. Renuka*<sup>\*\*</sup> Department of Anatomy \*Department of Forensic Medicine, \*\*Department of Pathology Pt. J.N.M. Medical College, Raipur, Chhattisgarh

Estimation of time since death is one of the most important objects of postmortem examination. Many degenerative changes begin to take place in the body immediately or shortly after death and progress in a fairly orderly fashion until the body disintegrates. Kidney is one of the most important excretory organs of human body and undergoes a series of gross as well as histological changes. Keeping in mind this important factor, 30 kidney specimens were studied in the present study. The kidneys were collected from the Forensic Department. Histological changes in the kidney such as definite microscopic changes of capsule, parenchyma, uriniferous tubules, malpighian corpuscles, renal tubules and collecting tubule and blood vessels were noted. These histological changes were correlated with the time passed since death. The findings can be helpful for the forensic experts and in the medico-legal cases.

99. Multiple Neurovascular Variations in the Limbs of a Single Cadaver

Sudeshna Majumdar, Santanu Bhattacharya, Arpita Chatterjee, Sibani Mazumdar Calcutta National Medical College, Kolkata, West Bengal

Neurovascular variations are of interest to the anatomists, anesthesiologists, and especially to the surgeons. During routine dissection of a 65-year-old male cadaver in the Department of Anatomy, Calcutta National Medical College, several neurovascular variations were detected. It was found that in the left lower limb, medial circumflex femoral artery arose from the femoral artery and the sural nerve provided communicating branch to superficial peroneal nerve. In the right lower limb, no such variation was found. In the left upper limb, a single venous channel was found (the cephalic vein in the lower part continued as basilic vein in the upper part) and on both sides axillary veins were formed at a higher level by the union of the basilic vein and the venae commitantes of the brachial artery.

## 100. Some Interesting Variations in the Insertion of Peroneus Longus

*R. Chhaparwal, P.S Mittal, S.S. Joshi, S.D. Joshi* Sri Aurobindo Medical College and Post Graduate Institute, Indore, Madhya Pradesh

In man, peroneus longus (PL) assumes special significance in keeping and maintaining the foot plantigrade and simultaneously maintaining the arched character of the foot. During evolution, it has migrated from the lateral border of foot to reach its medial border along the deep part of sole getting the purchase on the contiguous parts of lateral surface of the medial cuneiform and base of first metatarsal in its lower part. For certain unexplained reasons at its insertion, PL tendon shows interesting variations from the normal in about 50% cases. In 25% feet, it flared out into a triangular expansion. Of these, half of them received a slip from the tendon of tibialis posterior (TP) along its proximal border. The main tendon of TP was lying superior to this expansion. In one case, slips from the tendon were seen to join flexor hallucis brevis (FNB). In 12% cases, tendinous slip from tendon of PL near its insertion was seen entering the proximal part of first interosseous space and was found to become continuous with first dorsal interosseous muscle.

**101. Morphology of Psoas Minor: Reviewed** *S. Agichani, Yogesh Sontakke, S.S. Joshi, S.D. Joshi* SAIMS Medical College and Post-graduate Institute, Indore, Madhya Pradesh

Psoas minor muscle belongs to the category of the vestigial muscles. It is large in size in all those animals who brachiate, can produce extreme arching of their back, and who can leap or run with very fast speed. Since none of these functions are required in bipedal plantigrade man, it has receded. A large number of variations of this muscle have been described in the literature with regards to the site of origin, size of fleshy belly, and the site of insertion. There is mention of racial variation. Psoas accessorius muscle has also been described. The present study has been conducted in 10 cadavers. It was present bilaterally in 50% cases and was unilaterally in 12.5% cases. Average length of fleshy belly was 7.75 cm and its width in the upper part was approximately 2.25 cm. The length of the tendon was 14.4 cm and its maximum width was 0.7 cm. The expansion of tendon into the fascia of the region as it reaches the iliopectineal line might be serving some special functions, hitherto unappreciated.

#### 102. Clinical Significance of Morphological Variations of Spleen in North Indian Population

Muktyaz Hussein, Mahboobul Haque, \* Arun Sharma MRA Medical College Ambedkar Nagar, \*SRMS Institute of Medical Sciences Bareilly, Uttar Pradesh

The spleen is the largest lymphoid organ in the body situated in the left hypochondrium. It is wedge shaped and has two ends (anterior and posterior), two surfaces (diaphragmatic and visceral), and three borders (margins)-superior, inferior, and intermediate. The superior margin of the spleen possesses characteristic notches. Normal adult human spleen is about 1" thick, 3" broad, 5" long and weighs around 7 ounces. Normally, spleen is not palpable. This study was structured to investigate the gross anatomical variations in 32 formalin-fixed cadaveric spleen (23 males and 9 females) obtained during routine dissection classes of undergraduate medical students in M.R.A. Medical College, Ambedkar Nagar, Uttar Pradesh, and S.R.M.S. Institute of Medical Sciences, Bareilly, Uttar Pradesh. This study highlights the morphological variations and developmental anomalies of spleen existing in North Indian population, which forms a cornerstone for safe and effective surgery. The knowledge of morphological variations of spleen is important to surgeons, radiologists, medical practitioners, and anatomists.

#### 103. Study of Insertion of Levator Palpebrae Superioris and Its Correlation with Upper Eyelid Crease Surgery

*Lt. Col. S. Pandit, R.K. Zargar, Col. Rajan Bhatnagar* Armed Forces Medical College, Pune, Maharashtra

**Background:** The extra ocular or extrinsic muscles of eye include an elevator of the upper eyelid, the levator palpebrae superioris (LPS). The insertion of LPS into the upper eyelid has gained importance recently as the formation of crease in the upper lid is related to its pattern of insertion. In this beauty-conscious age, the absence of crease in the upper eyelid among the eastern races has compromised their pursuit for beautiful eyes. Upper eyelid crease (double-fold) surgery which utilizes the pattern of LPS insertion into the upper lid for the formation of crease has become one of the most popular cosmetic procedures in Asia.

**Aim:** A pilot study was done to substantiate the pattern of insertion of LPS and its clinical relevance to upper eyelid crease surgery.

**Materials and Methods:** Twenty-five human eyelids ranging from 15 years to 80 years were studied. The specimens were collected from unclaimed bodies obtained by the Department of Anatomy from a local mental hospital. Eyelid specimens were taken and immediately kept in 10% formalin. Dissection was carried out in 15 specimens and all 25 specimens were processed for paraffin section histological analysis.

**Results and Conclusion:** Cutaneous insertion: a) skin – 01, b) interfascicular tissue – 01, c) subcutaneous tissue – 17,

d) undetermined – 02. tarsal insertion, e) lower one-third of tarsal plate – 23, f) undetermined – 02.

#### 104. To Observe the Variations in the Attachments of Dorsal Digital Expansion of Thumb: A Cadaveric Study

Saroj Lata, C.S. Chandel, Sangita Chauhan, Dhiraj Saxena Sawai Man Singh Medical College, Jaipur, Rajasthan

**Aim:** To describe the various attachments in dorsal digital expansion (DDE) of thumb.

**Background:** As in other fingers, a triangular DDE is present on the dorsum of thumb but its formation and attachments are different from DDE of other fingers. In thumb, presence of more than one extensor tendon permits greater variation in extension. Going through the available literature, the DDE is present in all the thumbs. However, according to Schafer et al. (1923) and Sinnatamby (1999), the DDE on thumb is absent in all cases.

**Materials and Methods:** The present study was undertaken in the Department of Anatomy, SMS Medical College, Jaipur, on 40 hands of the embalmed cadavers. Hands were dissected over a period of 6 months. The dorsum of the thumb along with tendons of various muscles were carefully dissected and observed.

**Conclusion:** Everyone knows that the human thumb plays a crucial role in prehension, opposition, and in performance of skilled and precision movements of hand. Thus, it has a proportionately larger representation in brain compared to other fingers. We have found a triangular DDE on thumb in all the cases. Its base has a hood and is directed proximally on metacarpophalangeal joint of thumb. Its prominent medial margin receives contribution mainly from the oblique head of adductor pollicis but in some cases also from the transverse head of adductor pollicis and first dorsal interosseous muscle. In many cases, its lateral margin receives contribution from abductor pollicis Brevis, flexor pollicis Brevis.

## 105. Some Facial Profile Angles in Nepalese Students: A Photographic Study

Biswas Satyal, S.C. Gupta Nepalgunj Medical College, Chisapani, Banke, Nepal

Interestingly, a person with a very acceptable full-face view may not demonstrate proper proportion on lateral views. The most significant area of deformity on a profile view is usually the nasal complex, which is defined by nasofrontal, nasofacial, nasomental, and nasolabial angles. The purpose of this investigation was to obtain average measurements for these angles that can be used for aesthetic treatment goals. Additionally, sex differences were tested. In this investigation, the soft tissue facial profile of undergraduate students studying at Nepalgunj Medical College, Nepal (160 individuals: 80 males and 80 females, 18–25 years of age), was studied by means of photographic records taken in the natural head position (NHP). Angular measurements were recorded using Adobe Photoshop Software. The average values of nasofrontal were 133.83° and 138.22° in male and female, respectively. For nasofacial, the values were 38.61° and 36.69°. Similarly, for nasomental, they were 126.80° and 128.12° and those for the nasolabial were 102.48° and 101.12°. Statistical analysis revealed significant sex difference in nasofrontal and nasofacial angles. On the contrary, nasomental and nasolabial angles showed no sex difference.

# 106. Sexual Dimorphism in Mandibular Canines and Their Related Indices

Mangesh Bajracharya, D.R. Singh Nepalgunj Medical College, Chisapani, Banke, Nepal

Teeth exhibit remarkable sexual dimorphism. Since they are well preserved even after death, they provide excellent materials for forensic investigations for identification of sex. The present study was undertaken on permanent mandibular canines of 40 male and 40 female undergraduate students in age group of 20–25 years of Nepalgunj Medical College, Nepal. The mesiodistal width for right and left mandibular canines and intercanine distance were measured. Subsequently, canine index was calculated for both sides. Significant sexual dimorphism was found in all parameters except intercanine distance. All the results were compared with previous studies and discussed in the light of genetics, evolutionary, and metabolic reasons of sexual dimorphism.

#### 107. Study of Branching Pattern and Mode of Insertion of Extensor Digitorum Muscle in Forearm

M. Uma Maheswari, M.S. Nagalaxmi, Trinesh Gowda, H.T. Geetanjali, K. Kathiresan, Major Sanjeev Kumar Mandya Institute of Medical Sciences, Mandya, Karnataka

In the present ongoing study of 20 upper limbs, branching pattern and mode of insertion of tendons of extensor digitorum muscle in dorsal surface of forearm and hand, we found a variation showing 5 tendons instead of normal 4 in the left forearm. Of one upper limb, among 5 tendons, 2 tendons for indicis splitting and gaining its insertion one to index and another to medial side of middle finger. Extensor digitorum arises from the lateral epicondyle of the humerus, by the common extensor origin. It divides in the middle part of forearm into 4 tendons, diverges on the dorsum of the hand, and are inserted through extensor expansion at the base of middle and distal phalanges of 2nd, 3rd, 4th, and 5th fingers. The anatomical variations, arrangements, and prevalence of these tendons have been documented in the previous clinical and anatomical studies. Prior anatomical knowledge of such variation may help to investigate any inadvertent injury during hand surgery, and helps in planning tendon graft surgeries.

#### 108. Mysterious Venous Patterns on Dorsum of Spinalcord at Thoraco-Lumbar Level: Probable Cause for Postoperative Complications

A. Arunkumar, Sudha Seshayyan Madras Medical College, Chennai, Tamil Nadu

**Aim:** To study the causes for the postoperative complications of spinal cord surgeries at thoraco-lumbar level.

**Materials and Methods:** Formalin-fixed adult human cadavers. Conventional dissection method (posterior approach). Both male and female cadavers were analyzed.

**Conclusion:** Many orthopedic surgeries and important procedures like lumbar puncture, epidural steroid injections have been done at this level. This cadaveric study will give additional knowledge of spinal cord. Knowing these details will help neurosurgeons, neuro-angiographers, vascular surgeons, orthopedic surgeons, and anesthetists to fine-tune their procedures. During those complex surgical procedures, if any inadvertent damage to these vessels happens, cadaveric details will be helpful in recouping the vascularity.

#### 109. Gross and Endoscopic Anatomy of Sphenoid Sinus in Cadavers and Adults of North Karnataka: A Cross-sectional Study

Manisha S. Chougule, Daksha Dixit J.N. Medical College, KLE University, Belgaum, Karnataka

This study is an attempt to know the percentage of variations in North Karnataka population through cadaveric dissection and CT scan study. We used 30 cadavers available in the Anatomy Department of J.N. Medical College, Belgaum, and 30 CT scan (age range 18-85 years) from Radiology Department of KLE's Dr. Prabhakar Kore Hospital and Research Center, Belgaum. Gross and endoscopic study was done in cadavers. Dimensions and relations of sphenoid sinus were noted and tabulated. Findings from CT scan study were tabulated separately. Sphenoid sinus shows various types of pneumatization, and when pneumatization spreads outside the body of sphenoid sinus, it creates various recesses. These place the sinus in close proximity to important neurovascular structures present around the sinus. Newer techniques are emerging for safety of patients due to complex and highly variable anatomy of the sphenoid sinus. Now, intraoperative fluoroscopic imaging or intraoperative navigational devices are used to confirm surgical landmarks making these techniques very safe.

#### 110. Coronary Artery: A Preliminary Study

Shubhangi Yadav, S. Shamal Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh

Knowledge of coronary artery is essential for corrective surgical and medical procedures. Regional variations in the coronary arteries were documented. In 37 cases of post-mortem specimen, the left coronary artery (LCA) and right coronary artery (RCA) were studied. Right dominance was seen in 68%, left dominance in 20% and balanced in 12% cases. The S.A. node was supplied by RCA in 60% cases and 30% were LCA. The S.A. node supplied by both coronary arteries was 10%.

#### 111. Histological, Functional and Morphological Study of Brachial Artery and Popliteal Artery in the Same Person

Keshaw Kumar Samta

G.S.V.M. Medical College, Kanpur, Uttar Pradesh \*Major SD Singh Medical College and Hospital, Farrukhabad, Uttar Pradesh

Morphologically, popliteal artery is homologous to brachial artery, therefore to observe the differences in their gross anatomy, microanatomy and function in 10-mm long arterial segments were obtained from five dead bodies belonging to adult age group from postmortem house and preserved in 10% formalin. Lumen of each arterial segment was opened by cutting it longitudinally. Wall thickness and lumen circumference were measured in all arterial segments. Paraffin sections of 10-µm thickness were cut with the help of rotary microtome stained with orcein and counter-stained with hematoxylin and eosin. Pulse pressure, pulsatory power and volume of blood entering the lumen of each arterial segment during each heart beat were calculated according to the laws of arterial pulsation density of elastic fibers, and smooth muscle fibers per magnified field was compared in age arterial segment to ascertain whether it was a muscular artery or elastic artery. Lumen circumference of brachial artery was more (15 mm) in comparison to popliteal artery (11 mm). Pulsatory power of brachial artery and popliteal artery was equal, i.e. 800 J per heart beat, because wall thickness of both these arteries is equal, i.e. 0.4 mm, because according to the second law of arterial pulsation, wall thickness is directly proportional to pulsatory power artery having 1 mm wall thickness is reported as 2000 J per heart pulsatory power. Volume of blood entering the lumen of brachial artery was 15 ml during each heart beat and it was 11 ml per heart beat in the case of popliteal artery because according to the third law of arterial pulsation, lumen circumference of an artery (in mm) equals with volume of blood (in ml) entering the lumen of that artery during each heart beat and according to the

first law of arterial pulsation, pulsatory power of an artery equals to pulse pressure × volume of blood entering the lumen of that artery during each heart beat, therefore the pulse pressure in brachial artery was 53 mmHg and in popliteal artery it was 73 mmHg. Density of smooth muscle fibers was 4+ in femoral artery and 3+ in brachial artery while density of elastic fibers was 1+ in femoral artery and 2+ in brachial artery. Because smooth muscle fiber density was more than the elastic fiber density, therefore these arteries are muscular type of arteries. Although the histological structure is similar, functional and morphological differences between these arteries which are homologous to each other are due to free movements of upper limb because of shallower glenoid cavity and restricted movements of lower limb because of deep acetabular cavity, so that more blood is required for upper limb during each heart beat in comparison of lower limb. Pulse pressure in popliteal artery (73 mmHg) is more than the pulse pressure in brachial artery (53 mmHg) because of large size of lower limb in comparison of upper limb.

#### 112. Study of Variations of Arterial Supply of Cecum and Appendix in Human Cadavers

Zafar Sultana

Chalmeda Anandrao Institute of Medical Sciences, Bommakal, Karimnagar, Andhra Pradesh

**Aim**: (1) To evaluate the arterial supply of cecum and appendix; (2) to evaluate number of arteries supplying appendix, including the presence of accessory appendicular artery.

**Material and Methods**: The present study was carried out in the Department of Anatomy, Chalmeda Anandrao Institute of Medical Sciences, Bommakal, Karimnagar and Prathima Institute of Medical Sciences, Karimnagar (A.P.) from July 2010 to July 2012. Fifty human cadavers were studied irrespective of age and sex by routine dissection method for cecum and appendix along with stem of ileocolic artery and specimens preserved in 10% formalin.

**Results and Conclusions**: Most common type of cecum was ampullary (82%). Most common position of appendix was retrocecal or retrocolic (38%) followed by pelvic (28%). Cecum is supplied by anterior cecal artery and posterior cecal artery, which are the branches of inferior division of ileocolic artery. Superior division may give anterior and posterior cecal branches (16%). Main appendicular artery is a branch from ileal branch of inferior division of iliocolic artery. Main appendicular artery arises from posterior cecal artery in 2% from the trunk of ileocolic artery in 2% and from superior division in 2%. Accessory appendicular artery arises from posterior cecal artery and supplies the base of the appendix. Rcurrent appendicular artery was noted in 10%.

#### 113. Study of Morphologic Variations of the Superficial Palmar Arch with Clinical Significance

C. Swathi Poornima

Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, Chinnavutapalli, Andhra Pradesh

The high incidence of anatomical variations in the arterial pattern of the hand has been the subject of many anatomical studies. The superficial palmar arch is a dominant structure of the palm and together with deep palmar arch provides blood supply to all the fingers. The fact of frequent anatomic variations attracted the interest in checking its incidence, improving the knowledge of the territory of the hand aiming clinical and surgical applications. Classically superficial palmar arch is formed by superficial branch of ulnar artery and superficial branch of radial artery, with major contribution from the ulnar artery. The aim of this study is to observe the morphology of superficial palmar arch with special attention to the frequency of the variations regarding the contribution of the other arteries to its formation. To carry out this work, thirty hands of 12 male and 3 female embalmed human cadavers of Andhra origin are being studied by the method of macroscopic dissection. As the study is in progress, the analyzed hands are being dissected and photographs are being taken. The observations and results shall be derived and will be presented in detail. Conclusions will be derived from the results and clinical significance in relation to hand surgeries shall be discussed.

### 114. Persistent Axis Artery in the Forearm and Palm

Madhumita Patnaik, Shipra Paul, Sanjib Ghosh Lady Hardinge Medical College, New Delhi

The main continuation of the axis artery into the forearm passes deep to the flexor muscle mass and terminates as a deep plexus in the developing hand. It persists as the anterior interosseous artery and the deep palmar arch. An unusual finding with respect to median artery was observed in 2% cases during dissection of forearm and palm over a period of 2 years, in 50 cadavers (100 upper limbs). The ulnar artery in the cubital fossa gave (a) median artery, (b) common interosseous artery at the same point and then continued as ulnar artery proper. The median artery pierced the median nerve and descended superficial to it in a common sheath and passed deep to flexor retinaculum. There was a definite absence of the superficial palmar arch. An accessory head of flexor pollicis longus, which is a usual finding associated with persistent median artery was seen in one case on right side. The median artery supplied the lateral half of the palm and lateral 2½ digits in all cases observed. The medial side of palm and the medial 21/2 digits were supplied by the ulnar

artery. The radial artery had a normal course, and anastomosed with the median artery at the first web space. This has implications in median nerve compression neuropathy. The variations in the vascular supply of hand have to be kept in mind during surgery of hand.

#### 115. Anomalous Origin of Obturator artery Presenting Bilateral and Unilateral Variations in South and North Indian Population—A Comparative Study

Arun Kr. Sharma, Muktyaz Hussein, Arvind Yadav, Mahbool Haque\*, Ketu Chauhan\*\*

M.R.A. Medical College, Ambedkar Nagar, Uttar Pradesh, \*S.R.M.S. Institute of Medical Sciences, Bareilly, Uttar Pradesh, \*\*Kasturba Medical College, Manipal University, Manipal, Karnataka

**Background:** Vascular variations have always been a subject of controversy and curiosity because of its clinical significance. Interesting variations in the origin and course of the obturator artery have received greater attention of anatomists, radiologists and surgeons.

**Materials and Methods:** This study was carried out on 64 embalmed cadavers (42 male and 22 female) for 5 years in the Department of Anatomy, M.R.A. Medical College, Ambedkar Nagar, U.P., K.M.C., Mangalore, Karnataka and S.R.M.S. Institute of Medical Sciences, Barelly, U.P., India. The objectives were to study the variations in origin of obturator artery in male and female cadavers, to study the incidence of unilateral and bilateral presence of anomalous obturator artery, and to compare the results observed in South and North Indian population.

#### 116. Variation in the Division of Brachial Artery

*Basavaraj B. Dhabale, A.V. Angadi, Gourishankar Ganga, A.H. Shivakumar* S.S. Institute of Medical Sciences and Research Centre,

Davangere, Karnataka

**Aim:** To demonstrate variation in the division pattern of brachial artery, embryological basis and its clinical correlation.

**Materials and Methods:** During our routine dissection in the Department of Anatomy, S.S.I.M.S. and R.C., Davanagere, in 40 limbs, variations were found in brachial artery division pattern.

**Results:** High origin of superficial ulnar artery. Second division of brachial artery at the neck of radius.

**Conclusion:** According to the literature, these variations are seen in 2.8% of cases. The knowledge of such variation of brachial artery is important during surgical procedures, such as amputations, fractures, and decompression procedures.

#### 117. Variations of Anterior Part of Circle of Willis—A Cadaveric Study

Anubha Saha, S. Mandal<sup>\*</sup>, J. Chatterjee, M. Bandopadhyaya<sup>\*\*</sup> Department of Anatomy, Midnapore Medical College, Paschim Medinipur, West Bengal; <sup>\*</sup>Department of Medicine, Medical College, Kolkata, West Bengal; <sup>\*\*</sup>Department of Anatomy, Baharampur Medical College,

Murshidabad, West Bengal

**Aim:** The Circle of Willis is a major source of blood supply to brain. A thorough knowledge of this arterial circle, especially its anterior part is essential as anterior communicating artery is the common site for aneurysm formation.

**Materials and Methods**: This study was conducted on 40 formalin-fixed brains of adult male cadavers.

Results: In 30% cases there were variant vascular circle.

**Conclusion**: Variations have important influence on the manifestation and treatment of some cerebrovascular diseases.

#### 118. A Study of Anatomy and Landmarks for Third Common Digital Nerve and Its Variations

Sridevi P. Bangale and K. Shyamkishore Seth G.S. Medical College and K.E.M. Hospital, Parel, Mumbai, Maharashtra

**Background:** Third common digital nerve (TCDN) has been described as the most commonly injured digital nerve during carpal tunnel release (CTR). Study of anatomy, landmarks, and variations of origin and course of TCDN from median nerve may be helpful to predict location of TCDN to minimize risk for injury to TCDN during CTR.

**Aim:** The aim of this study is to know about anatomical landmarks and variations of third carpal digital nerve.

**Materials and Methods:** Median and ulnar nerve and their branches, superficial palmar arch (SPA) and flexor retinaculum (FR) were dissected in 15 formalin (10%) embalmed cadavers; 11 male and 4 female cadavers (30 sides).

**Results and Conclusions:** Variations of origin of TCDN were identified: type I originating proximal to distal edge of FR, type II originating distal to FR but proximal to the SPA, type III originating distal to FR and at distal to the SPA were observed. Origin of TCDN was measured as average around 5 mm distal to cardinal line. Third common digital nerve coursed along or medial or lateral to oblique vector from scaphoid tubercle to mid-point of palmar digital crease of ring finger. Communicating branch from ulnar nerve was absent in some cases.

#### 119. Variations of Musculocutaneous Nerve in South Indian Population

E. Santhanakrishnan, S. Sundarapandian, N. Pratheepa Sivasankari

SRM Medical College Hospital and Research Center, Chennai, Tamil Nadu

**Aim:** To explain the varying patterns of musculocutaneous nerve.

**Material and Methods:** The work has been carried out in 80 limbs. The upper limbs were dissected and the musculocutaneous nerve was traced out for observation.

**Results:** The observations are as follows: The nerve does not pierce the coracobrachialis. A communicating branch is given to the median nerve at various levels. There is variation in the termination of the nerve.

**Conclusion:** The variations of the musculocutaneous nerve have clinical significance during surgical procedures, such as brachial plexus block and in diagnostic clinical neurophysiology.

# 120. Study of Division of Sciatic Nerve and Its Relationship with Piriformis Muscle

Vandana Kumbhare, U.L. Gajbe JNMC Sawangi (Meghe), Wardha, Maharashtra

Sciatic nerve enters the gluteal region through greater sciatic foramina below the piriformis muscle. It divides into the tibial and common peroneal nerves outside the pelvis.

#### Aim:

- 1. To study the level of division of sciatic nerve.
- 2. To study the relationship between the sciatic nerve and piriformis

**Materials and Methods:** This study was performed on 30 formalin-fixed cadavers. The inferior extremities of the cadavers were classified into 5 groups depending on the level of sciatic nerve division in the gluteal region, the upper one-third, and middle one-third and lower one-third of the back of the thigh, and the popliteal fossa.

**Results:** We studied the division of sciatic nerve and its relation with piriformis muscle. In few cases, sciatic nerve division was observed in the gluteal region, in few cases it was in upper one-third, in few cases it was in middle one-third and in few cases it was in lower one-third of the posterior compartment of the thigh. In few cases of the specimens, the sciatic nerve was divided into the popliteal fossa.

**Conclusion:** The differences in the division of sciatic nerve are important for surgeons, as this is the area of frequent surgical manipulation.

#### 121. MR Imaging—Estimation of Brainstem Volume in Normal and Neurodegenerative Diseases

*P. Vinodhini, Antony Sylvan D'souza, L.C. Prasanna* Kasturba Medical College, Manipal, Karnataka

**Background:** Brain stem atrophy is a significant finding in neurodegenerative diseases. For this reason, quantitative measurements are of crucial importance in the follow up of such diseases for determining the progression rate and observing the effects of the treatment. Documented evidence shows the differences in the brain stem volumes as the age advances and in neurological disorders, especially in the pons and medulla oblongata.

**Aim:** To determine the brain stem volume and the volume ratio of the brain stem to total brain volume related to gender and age using computer assisted imaging analysis system on MR images.

**Materials and Methods:** This study was carried out retrospectively in 50 healthy adults among subjects who were admitted to the Department of Radiology at Manipal University.

**Results:** Total brainstem volume to total brain volume was compared on gender basis. The percentage values of the fraction of the brainstem to the total brain volume are estimated.

**Conclusion:** Neuron loss that occurs in some neurodegenerative diseases can lead to volume alterations by causing atrophy in the brain stem. Volume fraction of a component within the reference volume is widely used parameter in biomedical science. In conclusion, brain stem to total brain volume fractions can be important tools in determining clinical parameters in neurodegenerative disorders.

#### 122. Anatomical Variations in the Cutaneous Innervation on the Dorsum of the Foot

Vanishri S. Nayak, Antony Sylvan D'souza Kasturba Medical College, Manipal University, Manipal, Karnataka

**Background:** Among the branches of common peroneal nerve, the superficial peroneal nerve provides cutaneous innervation to major part of the dorsum of the foot and deep peroneal nerve supplies the skin over the first interdigital cleft region, the sural nerve supplies the lateral part of the dorsum of the foot.

**Aim:** The aim of this study is to classify the varoius patterns of cutaneous nerves found on the dorsum of foot in South Indian population.

**Materials and Methods:** A total of 40 lower limbs from 20 cadavers (15 male, 5 female) were dissected and the branching patterns of nerves are sketched and specimens photographed.

**Results:** The branching pattern of superficial peroneal, deep peroneal and sural nerves on the dorsum of foot showed significant anatomical variations.

**Conclusion:** Detailed knowledge of anatomical variations of the nerves on the dorsum of the foot provides information to clinicians to avoid injury to them in real clinical situations.

#### 123. Communication Between Median and Musculocutaneous Nerves and Its Significance: A Cadaveric Study

V. Nandhini and Priya Ranganath

Bangalore Medical College and Research Institute, Bengaluru, Karnataka

**Background:** The median nerve is formed by union of 2 roots from the lateral (C5,6,7) and medial (C8, T1) cords while the musculocutaneous nerve (C5,6,7) arises from the lateral cord of the brachial plexus. Communication between the branches of brachial plexus is a common phenomenon and it has several clinical and surgical implications.

**Objectives:** To study the formation of the nerves, direction of communication, site of communication, number of communicating branches, length of communicating branches, unilateral or bilateral.

**Material and Method:** Sixty upper limbs (30 right and 30 left) were dissected in the Department of Anatomy, Bangalore Medical College and Research Institute, Bengaluru.

**Results:** Eight (13.33%) upper limbs showed communicating branches between median and musculocutaneous nerves out of which in one it was bilaterally present.

**Conclusion:** These variations are of great interest and importance to anatomists, surgeons, orthopaedicians, neurologists, anesthetists and may be vulnerable to damage in surgical procedures. Knowledge of the possible communication is also important in the anterior approach for the fracture of the humerus, regional nerve blocks, posttraumatic evaluations, and exploratory interventions of the arm for peripheral repair, nerve entrapment syndromes of the upper limb. A lack of awareness of variations with different patterns might complicate surgical repair and may cause ineffective nerve blockade.

#### 124. Rare Concurrent Variation of Median and Musculocutaneous Nerve: Its Embryological Basis and Clinical Significance

Uma Shivanal, K. Kathiresan, M.S. Trinesh Gowda, Geethanjali H.T., Nagalaxmi, Major Sanjeev Kumar Mandya Institute of Medical Sciences, Mandya, Karnataka

Median nerve is one of the chief nerves of the upper limb supplying muscles of the front of the forearm, muscles of the thenar eminence, cutaneous innervation to the lateral part of palm and lateral 3½ digits. It is formed by the union of roots from the medial and lateral cords of brachial plexus (root value of C4–8, T1).Musculocutaneous nerve is derived from the lateral cord and conveys the fibers from C5, C6, and C7. It supplies coracobrachialis, biceps and brachialis and then continues as the lateral cutaneous nerve of the forearm. In this ongoing study, formation, course, and branching pattern of median and musculocutaneous nerves in the arm were observed in 50 dissected human cadaver upper limbs. Out of 50, 4 upper limbs showed different types of variations. This study aims to provide additional information about the variations of median and musculocutaneous nerves. Knowledge about these variations will help the surgeons to avoid injury during routine surgeries on the axilla, radical neck surgeries, and surgeries on the upper arm, coracoid graft transfer surgeries and coracobrachialis flap surgeries.

#### 125. Innervation of Flexors of Arm by Median Nerve: A Serendipity

*G. Rajasegar, Shipra Paul, Sanjib Ghosh* Lady Hardinge Medical College, New Delhi

Variations are common in the formation of brachial plexus as it is formed by several spinal nerves. The musculocutaneous nerve normally arises opposite the lower border of pectoralis minor, pierces the coracobrachialis and descends inferolaterally between the biceps brachii and the brachialis. It then terminates at the lateral cutaneous nerve of the forearm. During routine dissection in a 65-year-old male cadaver with no history of any obvious neurological deficit, the absence of musculocutaneous nerve was observed. The median nerve was formed normally and after about 3 cm of its course medial to the axillary artery divided in arm into 5 muscular branches: (a) To coracobrachialis, (b) to biceps brachii, (c) two branches to brachialis, and (d) to brachioradialis. It continues as median nerve proper lying medial to brachial artery and supplies the flexors of forearm. The origin of the brachioradialis muscle was extending upward merging with the insertion of the deltoid. Part of the biceps was fused with brachialis. An upward extension of the brachialis passed anterior to the insertion of the lattissimus dorsi and attached higher than its insertion. Due to the absence of the musculocutaneous nerve, its continuation as the lateral cutaneous nerve of forearm could not be traced. These variations in the nerve supply to the upper limb should be kept in mind in patients presenting with weakness of forearm flexion and supination due to high median nerve paralysis.

#### 126. Localization of Motor Neuron Somata of Ulnar Nerve in Rabbit

Imran Mohd., F. Kirmani, N.A. Faruqi J.N. Medical College, Aligarh Muslim University, Aligarh, Uttar Pradesh

Disagreement exists about the accuracy of cranio-caudal extent of spinal grey column that contains the motor neuron

somata of ulnar nerve and also their relative positions in different spinal segments.

Six adult rabbits were procured from Animal House, J.N.M.C., A.M.U., Aligarh. Under general anesthesia, their ulnar nerves of left side were sectioned in arm. Animals were sacrificed after 8–28 days and perfusion fixed in 10% buffered formalin. The cervical spinal cord segments 4th, 5th, 6th,

7th, 8th and thoracic spinal cord segments 1st and 2nd were processed for paraffin embedding. From all blocks, 40-µ thick serial transverse sections were cut. Every 5th section was stained with thionine and studied light microscopically to observe either typical chromatolysis or cell body response induced by axotomy. Cranio-caudal extent of spinal grey column that contains motor neuron somata of ulnar nerve extended from caudal part of 7th cervical spinal segment (medial part of dorsolateral column), whole length of 8th cervical spinal segment (medial part of retrodorsolateral column) to almost whole length of 1st thoracic spinal segment (medial part of dorsolateral column) except its caudal end.

#### 127. Anatomic Variations of the Extrathoracic Course of the Intercostobrachial Nerve and its Clinical Significance

Soubhagya Ranjan Nayak, Ashwin Krishnamurthy\* College of Medicine and J.N.M. Hospital, WBUHS, Kalyani, Nadia, West Bengal, \*Kasturba Medical College, Center for Basic Sciences, Bejai, Manipal University, Mangalore, Karnataka

**Aim:** The anatomical knowledge of extrathoracic course of the intercostobrachial nerve (ICBN) is significant in axillary surgery for breast cancer. There is a paucity of literature regarding ICBN nerve variations in Indian population.

**Materials:** The anatomy of the ICBN was examined in 60 adult human cadavers (120 axilla), with particular emphasis on the communications and branching in the axilla.

**Methods:** From July 2007 to August 2011, we dissected 120 axilla and surrounding structures for the variations of the ICBN and documented the same.

**Results:** In 100% cases the ICBN originated from the second intercostal space, with contributions from the first and third intercostal nerve each on 4 and 25 occasions, respectively. The course and division of posterior axillary branch (PAB) was variable. The ICBN had a variable relationship to the lateral thoracic vein. ICBN supplied 100% cases to the proximal half of the arm, and in 38% cases it reached the level of the elbow joint. In 23% cases there was a connection to the medial cutaneous nerve of the arm.

**Conclusion:** The ICBN is highly variable in its origin, course, and connections in the present study. The knowledge of its variability will help the surgeons to preserve the ICBN and to reduce the morbidity in the post operative phase of the axillary surgery for breast cancer.

128. The Point of Vulnerability of Facial Nerve

R. Malhotra<sup>\*</sup>, M. Malhotra<sup>\*\*</sup>, H.P. Singh<sup>†</sup>, S. Bharti<sup>‡</sup>, R. Yadav<sup>\*\*\*</sup>, D. Gupta<sup>#</sup>, C. Agarwal, J. Yadav<sup>§</sup>, S. Kashyap<sup>§</sup>, K. Singh<sup>\*\*</sup>, V.P. Singh<sup>\*\*</sup>

\*Department of Anatomy, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, \*\*Department of ENT LLRM Medical College, Meerut, Uttar Pradesh, \*\*\*BRD MC, Gorakhpur, Uttar Pradesh, <sup>†</sup>KGMC Lucknow, Uttar Pradesh, <sup>‡</sup>ESI, Jhilmil, <sup>§</sup>MLB Jhansi, Uttar Pradesh, <sup>#</sup>SNMC, Agra, Uttar Pradesh

**Objectives:** It is a well known fact that facial nerve is the most important nerve for ear surgeons because it is under risk of getting damaged in mastoid surgeries for chronic otitis media, which are one of the most commonly performed surgeries by them. However, it has not been reported in the literature that which portion of its interatympanic course is under threat most of the times. The purpose of this study is to find the most vulnerable portion of facial nerve during mastoid surgery so as to caution the new ear surgeons.

**Study Design:** Retrospective study from 6 different centers involving 10 different surgeons of almost surgical same experience.

**Material and Methods:** Hospital data of last 1200 cases of mastoid surgeries was collected from 6 different medical schools on the basis of questionnaire designed by the author and compared stastically.

**Results:** It was found that all surgeons had similar rate of cases in which facial nerve was affected or damaged. Neuropraxia was the most common form of injury and second genu of the intratympanic course was found to be the most anatomically vulnerable site of facial injury.

**Conclusion:** Facial nerve is most vulnerable at the point of second genu followed by the vertical portion in the intra-tympanic course.

therapy is catching up to help the unborn, this type of examinations and recording the defects will help the sinologist to explore in a more detailed manner for the defects.

#### 130. Morphometric Analysis of Mitral Valve Complex in Human Adult Cadavers

N. Charanya, S. Sundarapandian SRM Medical College Hospital and Research Center, Chennai, Tamil Nadu

According to Gray's Anatomy (39th edition), mitral valve mean circumference is 9.0 cm in males; 7.2 cm in females. Orifice is almost vertical in diastole and at 45° to the sagittal plane with slight forward tilt. Posterior cusp has two-thirds of circumferential attachments. This work studies the morphometry of mitral valve and its leaflets by dissection method. There are variable reports of mitral valve morphology. A total of 32 adult hearts procured from cadavers of dissection hall from Department of Anatomy, SRM Medical College, Chennai, were used for study irrespective of sex and age above 50 years. The hearts were meticulously dissected for mitral leaflets with the annulus, chordae, and papillary muscles were removed as described by Louis A. Du Plessis and Paul Marchand. The overall prevalence of mean annular circumference was found to be 8.77 cm, Length of free edge of valve curtain 7.88 cm, maximum length of leaflet anterior 2.4 cm and posterior 1.49 cm. The data presents the dimensions of mitral valve that may be of interest to anatomists and surgeons. Knowledge of normal measurements of the components parts of the valve will help the surgeon during operation to assess the exact mechanical reason for valve insufficiency.

### **129.** Fetus with Persistent Truncus Arteriosus with Laryngotracheal Anomaly

Sarada Devi Sattiraju, Suma Dev, D. Muralidhar Reddy Sangam

NRI Medical College, Chinakakani, Mangalagiri, Guntur, Andhra Pradesh

Congenital malformations form a major cause for fetal loss in pregnancy. Although regular scans with definite intervals are taken during pregnancy to assess fetus, some defects may escape the view of sinologist. Foetal autopsy reveals more information on any developmental or other causes for the fetal loss. With this objective fetuses received from OBG department of NRI General Hospital are dissected and examined after taking prior IEC permission and written consent from parents. Among the malformations of various systems, CVS anomalies form about 8/100 births. As this is a considerably high incidence, cardiovascular system of formalin embalmed fetuses were examined. A male fetus of 22 weeks' gestation presented with a persistent truncus arteriosus defect and associated laryngeotracheal anomalies. As the concept of fetal 131. Morphometric Analysis of Tricuspid Valve Complex in Human Cadaveric Hearts

*P. Preethi, Christilda Felicia* SRM Medical College Hospital and Research Center, Chennai,

SRM Medical College Hospital and Research Center, Chennai, Tamil Nadu

The right atrioventricular valve complex or the tricuspid valve complex present between the right atrium and right ventricle is analyzed morphologically and morphometrically in this study. The valve complex consists of: (i) Three leaflets or cusps (anterior, septal and posterior); (ii) three commissures (anteroposterior, posteroseptal and anteroseptal); (iii) three papillary muscles (anterior, posterior and septal) and (iv) chordae tendinae (leaflet, commissural types). Thirty cadaveric human hearts have been utilized in this study obtained from the Department of Anatomy, SRM Medical College Hospital and Research Center. A thorough morphometric assessment of the different components of the tricuspid valve complex was done. The valve orifice was triangular and bordered by 3 leaflets. The total annular length of the
valve; the annular length and height of each leaflet and commissure; the number of papillary muscles and chordae tendinae and its type of attachment were observed and tabulated. No extra-leaflet tissues or perforated cusps were recognized. The total annular length of the tricuspid valve according to *Gray's Anatomy* is 11.4 cm on an average, where as in this study it was 11.61 cm. The average height of anterior, posterior and septal leaflets are 2.3 cm  $\pm$  0.85, 2.13 cm  $\pm$  0.90, and 1.83 cm  $\pm$  0.98, respectively; whereas in this study, it was found to be 2.26 cm, 1.98 cm, and 1.62 cm. The anatomical description of the tricuspid valve complex will offer a valuable help to the cardiac surgeons.

#### 132. Morphometric Analysis and Variations of Right and Left Coronary Arteries in Cadaveric Human Hearts

S. Vinnarasie, Sundarapandian

SRM Medical College Hospital and Research Center, Chennai, Tamil Nadu

The objective of this study is to know the normal and variant anatomy of coronary arteries with reference to its origin, course, branching pattern, and variations supplemented by morphometric analysis. A sample of 20 heart specimens was obtained from the Department of Anatomy, SRM Medical College Hospital and Research center. The coronary arteries were dissected, noting their morphometric analysis, branching pattern, dominance, and variations. In the present study, right coronary ostium was present in the entire specimen in the anterior aortic sinus. In 95% the ostium was below the supravalvular ridge (SVR) and in 5% it is at SVR. Sixteen percent of specimen shows separate ostium for right conus artery where it is called third coronary artery, 5.5% shows a separate ostium for SA nodal artery. The left coronary ostium was present in 85% below the SVR, 10% at the SVR, 5% above it. The ostium diameter of the left coronary artery (LCA) is greater than the RCA, the average outer diameter of RCA is 3.5 and LCA is 4.3 which is greater than the previous one, the length of the left coronary artery is shorter than the right one that is statistically significant. 80% of the specimen shows right dominant circulation and 20% shows left dominance, the branching pattern of LCA shows variations such as trifurcation and tetrafurcation.

#### 133. Morphometric Study of Tricuspid Valve Complex

Pande Mukta, P.R. Kulkarni, S.I. Shaikh, A. Badaam, C.V. Diwan

Government Medical College, Aurangabad, Maharashtra

**Aim:** Considering the clinical importance of the tricuspid valve, this work is undertaken to explore the precise morphology and morphometry of the tricuspid valve complex.

This study has been done mostly in the Western and South Indian populations. Studies in Maharashtrians have been rare.

**Materials:** Vernier caliper, magnifying lens, scale (foot ruler), scissors, malleable metal wire.

**Methods:** Twenty embalmed cadaveric hearts allotted to undergraduates were studied irrespective of gender and cause of death. Quantitative value and range of dimensions of the tricuspid valve in adult human heart were obtained by dissecting cadaveric hearts. The papillary muscles and the chordae were exposed by window dissection of both the anterior and posterior right ventricular walls. Chordae tendinae were counted at their origin. Papillary muscles were noted for their occurance, number and morphology.

**Result:** The tricuspid valve annulus circumference ranges from 9.2 cm to 14.2 cm (mean = 11.7 cm). Diameter measured at two separate perpendicularly oriented plains at maximally separated points were in 2.3–4.9 (mean = 3.8 cm) and 2.3–4.2 (mean = 3.2 cm) range.

**Conclusion:** Findings were similar with previous studies with anterior papillary muscle being largest and frequently 2-headed. The septal papillary muscle itself was the least prominent and posterior papillary muscle and frequently bifid or trifid.

#### 134. Tortuous Aortae and Associated Anomalies: A Case Series

*M. Vijayvargiya, R. Deopujari, U. Sinha, S.A. Athavale*\* People's College of Medical Sciences and Research Center, Bhopal, Madhya Pradesh, \*\*Department of Anatomy, All India Institute of Medical Sciences, Bhopal, Madhya Pradesh

A dilated tortuous aorta has been reported in the literature as a cause of various clinical conditions. It has been reported to cause dysphagia, retrosternal chest pain, simulates aortic dissection in transesophageal echocardiography, and causes obstruction during catheterization procedures. During the routine undergraduate dissections 4 cases of tortuous aorta were encountered. Incidentally, all cases were adult female cadavers. All of them were associated with some vascular anomaly besides a tortuous aorta, like 4 branches of arch of aorta, hepatomesenteric trunk, accessory renal artery, tortuous/spiral ovarian artery.

135. A Comparative Morphometric Analysis of the Mitral Valve in Human and Pig Hearts

Shavi Garg, Poonam Singh, Anu Sharma, Sudha Chhabra, Gaurav Gupta, Prakriti Vohra Pt. B.D. Sharma Post graduate Institute of Medical Sciences, Rohtak, Haryana

**Background:** Mitral valve replacement is used for patients with deformed valves, severe regurgitation or valvular stenosis. The ideal valve replacement of human heart would be with valve of similar geometrical properties. Keeping in mind the usage of transgenic technology of pig heart to support life in human recipient, we aim to compare morphometry of mitral valve of pig hearts with human cadaveric hearts.

**Aim:** To observe the morphometric analysis of the mitral valve in human and pig hearts.

**Materials and Methods:** The study was conducted in the Department of Anatomy, DMCH, Ludhiana, Punjab. For the study, 30 human hearts were dissected, of which 15 were human cadaveric hearts and fifteen were pig hearts. The total annular length, length and height of anterior and posterior leaflets, the number and length of chordae tendineae of mitral valve in human and pig hearts was measured and statistical analysis was done.

**Results:** The mean annular length of mitral valve in human was comparable [p = 0.089 (non-significant)]. The average length of anterior leaflet and posterior leaflet in human and pig was not significant with p = 0.09 and p = 0.092, respectively. The mean height of anterior leaflet and posterior leaflet in human and pig was insignificant with p = 0.092 and p = 0.091, respectively. The length of chordae tendineae in human and pig was insignificant (p = 0.140). The number of chordae tendineae was significant in human and pig with p = 0.002.

**Conclusion:** This study recommends the use of porcine valve tissue in human mitral valve replacement.

136. Variance in Coronary Venous Anatomy: A Critical Determinant in Optimal Candidate Selection for Cardiac Resynchronization Therapy

Arpandeep Randhawa, Abhimanyu Saini\*, Anjali Aggarwal, Manoj Kumar Rohit\*\*, Daisy Sahni

Department of Anatomy, Postgraduate Institute of Medical Education and Research, Chandigarh, Punjab; \*John H. Stroger Jr. Hospital of Cook County, Chicago, Illinois, USA; \*\*Department of Cardiology, Postgraduate Institute of Medical Education and Research, Chandigarh, Punjab

**Background:** Knowledge of coronary sinus (CS) anatomy and its variations is one of the important factors determining the final position of left ventricle pacing lead during cardiac resynchronization therapy (CRT).

**Methods:** Coronary venous system anatomy, including number, diameter and opening angles of tributaries, were studied in 50 normal formalin-fixed adult cadaveric hearts.

**Results:** Thebesian valve (TV) and vieussens valve (VV) were present in 64% and 60% cases, respectively. CS ostium coverage of e" 75% by TV was seen in 25% (8/32) cases. Number of prominent tributaries lying between anterior interventricular vein (AIV) and middle cardiac vein (MCV) varied from 1 to 4. In 28% of hearts only one prominent tributary was present. Mid-lateral vein (average diameter 1.75  $\pm$  0.66

mm) with an average distance of 43.5 ± 12.2 mm from coronary ostium was present in 58% (29/50) hearts, out of which it formed an acute angle with coronary sinus axis in 4 (13.39%) cases. Posterolateral vein (average diameter 1.62 ± 0.45 mm) with an average distance of 33.4 ± 11.7 mm from coronary ostium was found in 72% (36/50) cases and formed an acute angle with CS in 3 (8.33%) cases.

**Conclusion:** Restrictive TV covering e" 75% CS ostium (25% cases), presence of single prominent tributary (28% cases), and formation of acute angle of tributary with CS axis (1/4 cases with anterolateral vein, 4/29 cases with mid-lateral vein, 3/36 cases with posterolateral vein and 3/28 cases with posterior veins of left ventricle).

#### 137. A Study of Branching Pattern of Coronary Artery in Cadaveric Human Hearts

A.R. Vatsala, A.V. Angadi, C.M. Shailaja, Naseema S.S. Institute of Medical Sciences and Research Center, Davangere, Karnataka

**Aim:** Coronary artery diseases are the major cause of death in both developed and developing countries. This study is undertaken to know the branching pattern, variation, its predominance and anomalies.

**Materials and Methods:** Branching patterns of coronary arteries were studied in 50 cadaveric hearts by dissection method in SSIMS and RC, Davangere. The hearts were fixed in 10% formaldehyde solution. Pericardium was removed to expose the coronary arteries.

**Results:** Right coronary artery dominance was found in 68% of cases. Left coronary artery dominance was found in 20% of cases. In 10% of cases posterior interventricular artery is a branch of circumflex artery.

**Conclusion:** The knowledge of branching pattern of coronary artery is important for interpretation of the coronary angiography and surgical myocardial revascularization.

# 138. Ridge Patterns and Its Classification Among North Coastal Andhra Pradesh

*K. Neeraja, D. Ashalatha, K. Sushma, T. Surekha, S. Suneetha* Andhra Medical College, Visakhapatnam, Andhra Pradesh

It is not common for many people to have the same identical finger print classification. This is because of the fact that only three general patterns exist in the skin of finger print, count of loops whorls, and arches. This study is carried out on 200 undergraduate medical students, both male and female. Dermatoglyphic pattern is interpreted by using inkpad method described by Cummins and Midlo. Invertor Tpad, inkslab made of plain glass, white paper, and cyclostyle ink are used for obtaining prints.

#### **139. 'Atd' and 'Adt' Angles in Nepalese Students: A Quantitative Study** *Abhishek Poudel, D.R. Singh*

Nepalgunj Medical College, Chisapani, Banke, Nepal

Palmar prints of right and left hands of 90 male and 90 female undergraduate students studying at Nepalgunj Medical College, Nepal were taken by using horse black stamp pad. The three triradii: (i) A and D at the bases of the palmar aspect of the index and little fingers, respectively; and (ii) t-a little distal to the distal palmar crease were identified. These points were joined with each other for the measurements of the AtD and ADt angles. The observed data were analyzed to find out statistical difference, if any, in the two hands and also between the males and females. The average values of AtD angle in males were 40.54° and 40.89° in right and left hands, respectively. These values in females were 40.39° and 40.76°. The ADt angle in males was 81.38° and 80.49° in right and left hands, respectively. In females it was 82.63° and 81.48° in right and left hand respectively. Statistical analysis revealed significant difference in ADt angle of right hands of males and females. On the contrary, the angle had no sex difference in left hand. Further calculation of the probability of misclassification, revealed none of these angles to be of any practical utility for noticing the sexual dimorphism.

#### 140. Study of Lip Prints Among the Gujarati Population for Personal Identification

A. Astha, Maulik Jain, D. Patel, S.B. Shah, P.S. Shrimankarc, A. Pensi

B.J. Medical College, Ahmedabad, Gujarat

**Aim:** This study assesses the distribution of patterns of lip prints among males, females, and twins and evaluates the uniqueness of lip-print pattern.

**Materials:** A4 size white papers, dark colored lipsticks, and magnifying lens.

**Method:** This study was conducted on 200 undergraduate students of B.J. Medical College, Ahmedabad. The study group was divided into 5 groups (South Gujarat, North Gujarat, West Gujarat, Central Gujarat, and Kutch). Each group had 40 students. Person with congenital abnormalities of lip, trauma, and inflammation of lips were excluded from this study. Dark-colored lipstick was applied thoroughly on clean lips of the individuals and lip prints were taken on the A4 size white paper. Lip prints were studied by using magnifying lens and classified into 5 types according to Suzuki and Tsuchihashi classification.

**Results:** The results of the study revealed that the lip-print patterns for each individual were unique and there was no peculiar pattern distribution among male and female subjects. Most common single lip-print pattern was Type I (partial length groove running vertically) and Type IV (a reticular groove) was least common. No two lip prints were identical.

**Conclusion:** As the lip print patterns are unique, lip-print analysis can be considered as a tool for personal identification and we can set norms for the type of lip print that is more common in study region.

#### 141. Sexual Dimorphism in Foot Length and Its Comparison with Height and Weight

Sadiqali A. Syed, N.G. Herekar Government Medical College, Miraj, Sangli, Maharashtra

The human foot has a very complex structure formed by union of tarsals, metatarsals and phalanges. It has adapted its shape for bipedal locomotion. During evolution it has undergone extensive remodeling to its present form. Although sex differences in foot morphology have been studied by many authors, it shows marked difference in their conclusion. Baba (1975) documented that proportionate to stature, women have larger feet than men, but Ashizawa et al. (1997) concluded that proportionate to stature, women have smaller feet than men. The fact is that both these studies are done on relatively same population but with different conclusions. The study was carried out on MBBS students, 100 boys and 100 girls of Government Medical College, Miraj. Foot outlines of right and left foot were taken in standing position. Different parameters, such as foot length, foot width, tibial instep length, fibular instep length, 1st toe angle, 5th toe angle were measured from the foot sketch out. All these parameters were compared with height, weight, and gender.

### 142. Study of Patterns of Talar Articular Facets of Human Calcanei and Their Clinical Implications in Population of Rajasthan

*R. Garg, S. Shekhawat, S. Asthana, K. Mogra* SMS Medical College, Jaipur, Rajasthan

**Background:** Calcaneum is the longest and largest of the tarsal bones. Normally, there are three facets between calcaneum and talus, anterior, middle, and posterior. The anterior and the posterior facets are situated on the body and the middle is situated on the sustentaculum tali. There are considerable variations in the number and arrangement of these facets. Literature analysis revealed that 5 patterns of talar facets were found in the calcanei. These variations may predispose to the development of arthritic changes in the subtalar joint. Knowledge about the variations is essential for orthopedic surgeons while correcting foot deformities like pes planus.

**Aim:** To identify the patterns of the talar facets of calcanei and their clinical implications in the population of Rajasthan.

**Materials and Methods:** This study was conducted by utilizing 310 adult dry calcaneal bones at S.M.S. Medical College, Jaipur (Rajasthan). A sliding vernier calliper was used to measure the separation between the facets. **Results:** Pattern I was predominant (72.26%). It was followed by pattern II in 24.52% of bones. Rare cases of pattern III, IV, and pattern V were found in 1.3%, 1.6%, and 0.32%, respectively.

**Conclusion:** There is a dominance of pattern I calcanei in Indians as compared to the Europeans who commonly present pattern II. This fact necessitates the orthopedic surgeons in India to modify the surgical techniques when they perform calcaneal osteotomy.

# 143. Study of Dermatoglyphics in Diabetic Patients

Chalmeda Anandrao Sudagar

Institute of Medical Sciences, Bommakal, Karimnagar, Andhra Pradesh

#### Aim:

- To study the palmar dermatoglyphics patterns in diabetic patients.
- To compare the dermatoglyphic patterns of study group with the control group.
- To find out whether the specific dermatoglyphics trait exist in the diabetic patients and whether it is significant.
- is significant.

**Materials and Methods:** This study was carried out in the Department of Anatomy, Chalmeda Anandrao Institute of Medical Sciences, Karimnagar (AP) from July 2010 to June 2012. A total of 150 diabetic patients, 75 male and 75 female, of age group 30–70 were observed. Similarly, equal number of controls in the same age group, as that of diabetic patients, was taken, out of which 75 were male and 75 were female. Dermatoglyphic prints were taken by the 'Ink method' as described by Cummins (1936) and Cummins and Midlo (1961).

**Results:** The loop pattern is decreased in diabetic patients, but it is statistically significant (P < 0.032) only in diabetic females. The whorl pattern is increased in diabetic patients, but it is statistically significant (P < 0.0482) only in diabetic females. No significant increase in arches in diabetic patients. No significant difference in the mean value of TFRC between cases and controls. The mean value of AFRC is significant difference in the mean value of additional difference in the mean value of the mean value

**Conclusion:** From this study, it appears that there are variations in the dermatoglyphic patterns in diabetic patients with an advantage of being simple and economical 'ink' method. As the specific features of dermatoglyphic patterns are present in diabetic patients, it can be used for mass screening program to segregate the predicted diabetic patients in an early age.

# 144. Palmar Dermatoglyphic Patterns in Cases of Idiopathic Generalized Epilepsy

K. Khan, R.K. Rohatgi, S.L. Jethani, D. Goel Himalayan Institute of Medical Sciences, Jolly Grant, Dehradun, Uttarakhand

**Background:** Idiopathic generalized epilepsy (IGE) is a tendency to have seizures when there is no structural abnormality in the brain. Dermatoglyphics—the study of finger-prints—is constant and individualistic.

**Aim:** To establish a relation of dermatoglyphic patterns of palm in idiopathic epileptic and normal subjects.

**Materials and Methods:** This dermatoglyphic study was carried out on 16 patients of IGE and 16 normal subjects. Dermatoglyphics was obtained by printing ink method. Ink roller was used for spreading the ink. The dermatoglyphic patterns (whorls, loops, arches, composites) of both right and left hands were studied in control and cases of 15–50 years age group.

**Result:** There are variations in dermatoglyphic patterns between control and cases. The frequency patterns of loops, ulnar loops, and arches were increased; while whorls, radial loops, and composites frequencies were decreased in IGE patients in comparison to normal controls. The frequency of loops, ulnar loops, arches, whorls, radial loops and composites were 70.63%, 69.38%, 9.38%, 18.13%, 1.25%, 1.88% in cases and 63.13%, 60%, 3.75%, 28.75%, 3.13%, 4.38% in controls, respectively.

**Conclusion:** Owing to differences in dermatoglyphic patterns between cases and controls, the dermatoglyphic patterns may be used as a diagnostic tool for identifying cases at risk.

### 145. Indian Doctor Dissected His Father's Body: Awareness of Body Donation

Mahantesh Ramannavar

K.L.E. University, B.M.K. Ayurvedic Medical College, Belgaum, Karnataka

This is first in India and second in the World that a doctor dissected his own father's body. The first such thing was done by English physician Sir William Harvey in 17th century, in Kent, England, dissected his sister's body. After a long gap in India and second in the world a historical event in the field of medical science took place in Karnataka at Shri B.M.K. Ayurvedic Medical College, K.L.E. University, Belgaum. It was not a usual dissection. In this rare event, Dr. Mahantesh Ramannavar dissected embalmed body of his father, as per the written will of his father, to help and teach anatomy on November 13, 2010, i.e. on his second death anniversary. When Dr. Mahantesh Ramannavar was a child, his dad's chest was his playground. It bore the heart which gave him the love that made him a man. Yet, his hands did not

147. Study of Sacral Hiatus in Indian Population A.R. Desai, M.A. Doshi, M.P. Ambali, R.J. Patil, S.D. Jadhav\*,

Krishna Institute of Medical Sciences Deemed University, Karad, Maharashtra

\*Padmashri Dr. Vithalrao Vikhe Patil Medical College, Ahmednagar, Maharashtra

P.P. Patil

**Objective:** The opening present at the caudal end of sacral canal is known as sacral hiatus, which is formed due to the failure of fusion of laminae of the 5th sacral vertebra. It is used for administration of epidural anesthesia in obstetrics and orthopedic practice for treatment and diagnosis. The success of caudal epidural anesthesia depends on anatomical variations of sacral hiatus as observed by various researchers.

Aim: To study the variations of sacral hiatus.

Materials and Methods: For this study, 225 sacra of unknown sex were used. Each sacrum was studied for shape of hiatus, level of apex and base of hiatus, length of hiatus, width at the base of sacral hiatus, anteroposterior diameter of hiatus at apex and hiatal index. Measurements were taken with the help of caliper.

Results: We observed various types of shapes but more common were inverted U and V. Apex of hiatus was most commonly present at 4th sacral segment while base was at level of S5 vertebra but in some cases it was extended to coc-CYX.

#### 148. Study of Mandibular Foramen in Dry **Human Mandibles**

P.P. Patil\*, M.A. Doshi\*, S.D. Jadhav\*\*, M.P. Mball\*, R.J. Patil\*, S.D. Kadam \*Krishna Institute of Medical Sciences Deemed University, Karad, Maharashtra, \*\*Padmashri Dr. Vithalrao Vikhe Patil Medical College, Ahmednagar, Maharashtra

The mandibular foramen is an irregular foramen on the medial surface of the ramus, which is located near the center. The mandibular foramen leads to the mandibular canal. The inferior alveolar nerve and the vessels, after passing through the mandibular foramen, traverse the MC to supply the mandibular teeth. The inferior alveolar nerve block is the common local anesthetic technique that is used for anaesthetizing the lower jaw in dentistry. The success of this technique highly depends on the proximity of the needle tip to the mandibular foramen at the time of the anesthetic injection. For this reason, this technique must be based on the precise anatomical knowledge of the mandibular foramen. This study aims to locate the mandibular foramen in relation to the borders of the mandibular ramus. Two hundred and ten adult mandibles of unknown sex were used in this study. We noted the shape and distance from border of mandible.

shiver as he cut it open because he was doing it for the future of medical science. He was not doing this for any record. His intention was to inspire people to donate their body for the benefit of the budding doctors. He controlled his feelings and unflinchingly went about the dissection to fulfill his father's last wish that impacted general public for generous voluntary donation of their body, not single donor but whole family. This event had an impact on not only Belgaum district but on the entire Karnataka. It educated public for body donation. More than one thousand people have registered their bodies to various medical, Ayurvedic, and homeopathic college in Karnataka and outside Karnataka. For such noble work, lot of appreciation came from abroad. He was also awarded by the Central Health Minister, Shri Gulam Nabi Azad and Bengal Medical College, Kolkata. This event made headlines in all regional and national newspapers and was shown on BBC World News and on other leading TV channels.

#### 146. A Study of Lip-prints in Parents of Cleft-Lip **Children in Central Karnataka Region**

M. Smitha, A.V. Angadi, Shailaja. C. Math, A.R. Vatsala S.S. Institute of Medical Sciences and Research Center, Davangere, Karnataka

Aim: Many studies have been conducted on normal lipprint patterns, but hardly few studies are done on lip-print patterns in cleft lip. Hence, the study is undertaken to study the individualistic lip-print patterns and to compare lipprints of parents of cleft-lip children with controls.

Materials: Skin care cream, A4-sized white paper, fingerprint dusting powder, magnifying lens, measuring scale, and tissue paper.

Method: The study was conducted on 120 individualsboth parents of 30 cleft-lip children and both parents of 30 noncleft-lip children attending SSIMS and JIMMC Hospitals, Davangere. Individuals with injury or deformity of lips and family history of clefting were excluded from control group. Parents of children with cleft-lip with or without cleft-palate were included for cases. Cleaned and dried lips of each individual were smeared with skin care cream, after about 2 minutes, lips are pressed on white paper to obtain prints. Then lip-prints were visualized using fingerprint dusting powder and analyzed quadrant-wise by magnifying lens using Suzuki's classification.

**Results:** It was found that no two lip-prints matched with each other, establishing uniqueness of the lip-prints. Emergence of new type whorl (circular) pattern was seen in around 14% of the lip-prints of parents of children of cleft-lip with/without cleft-palate.

**Conclusion:** It can be concluded that no two lip-prints are alike and that lip-prints especially whorls might be inherited.

### 149. Patellar Shape, Nose Pattern, and Facet Configuration in 200 North Indian Males

*Gaurav Agnihotri, Gurdeep Singh Kalyan\*, Ramandeep Kaur\** Government Medical College, Amritsar, Punjab, \*Government Medical College, Patiala, Punjab

Patella, though small, is the largest sesamoid bone bestowed with morphology and morphometry having anthropological and clinical significance. The bone is involved in various methods of sitting and squatting and so the metric characteristics and shape is modified by the cultural environment of different races. The paucity of accessible literature regarding this bone and the fact that whatever is available is still mainly in the form of suggestion for future investigation prompted this study. The design of the study was conceived in the Department of Anatomy, Government Medical College, Patiala, and the patellae were obtained from male cadavers from medical collage of Punjab. The results indicate that: (1) The study describes the patellar shape pattern for the North Indian males. The most predominant shape pattern emerged to be Wiberg type 2 (with the left/right facet ratio 1.1–1.5) with normal nose (9-14 mm). (2) The study describes the position of the median ridge by proportion of medical facet width in whole width (0.34–0.35). There is a lateral facet prominence (facet ratio 1.3), but it is not as extreme as the "hunter'scap" patella. (3) There is considerable individual variation in the prominence of the secondary ridge (conspicuous in 12% cases), the secondary ridge runs obliquely in a generally longitudinal sense, being closer to the median ridge proximally than distally. (4) The patellar dimensions are smaller for North Indian population compared to other population. When the right and left side dimensions were compared, only the maximum breadth was found to be statistically significant (p = 0.05).

## 150. Study of Inca Bone and Its Variations in Vidarbha Region

Sanjay Walulkar, D.D. Ksheersagar N.K.P. Salve Institute of Medical Sciences and Research Center, Digdoh Hills, Nagpur, Maharashtra

Interparietal part of occipital bone develops basically from three pairs, one primary and two secondary pairs of ossification centers. Inca bones (interparietal bone) are formed by failure of fusion between the primary and secondary centers. The variation in frequency and its form was observed in major human population around the world. This study was undertaken to find gross incidence, variation in their formation, sizes, shapes, and number of fragments of nca bone. One hundred seventy-five cadaveric skulls belonging to both the genders were macroscopically observed with naked eye. Morphogenesis of Inca bone was discussed. The data was compiled and compared with the earlier studies from Vidarbha region data base to elaborate their significance in living anatomy in radiology, neuroantomist, forensic medicine, neurosurgeons, anthropologist, and morphologists.

#### **151.** Os Incae: Incidence and Variations

Bharati Yadav, Minati Patra, P.R. Tripathi, S.R. Mohanty K.I.M.S., Bhubaneswar, Odisha

The Inca bones are integral part of skull of various mammals and reptiles and formed from ossification centers behind parietal bones. In humans, a single ossification center in squamous part of occipital bone results in formation of interparietal bone that fuses later with supraoccipital segment. At times, the various patterns of os incae are encountered, which depicts the presence of multiple ossification centers and their incomplete fusion. Such presentations of interparietal bone, whenever noted, give a clear-cut evidence of their morphological significance. In this study, dry crania present in Dept. of Anatomy and Dept. of Forensic Medicine, K.I.M.S. and other nearby medical colleges, Dept. of Anthropology, Utkal University, are being examined for os incae. The incidence of Inca bones and their variations will be presented in oral presentation.

#### 152. Nutrient Foramina of the Dry Human Clavicle and Their Clinical Significance

Hetal Patel, Apurva Darji, Hitesh Chauh Shrimankar, C.A. Pensi

B.J. Medical College, Ahmedabad, Gujarat

**Aim of the Study:** To study the number, direction and position of the nutrient foramen of the dry human clavicle.

**Materials and Methods:** The study comprised 75 clavicles which were obtained from anatomy department of B.J. Medical College and grossly observed for the number, location, and direction of the nutrient foramina. The Foraminal Index was calculated for each clavicle by applying the Hughes formula, dividing the distance of the foramen from the medial end (D) by the total length of the bone (L), which was multiplied by hundred (F.I = D/L\*100). All the measurements were taken by vernier caliper.

**Results:** In our study the foramen was single in 56 (74.66%) clavicles, double in 11 (14.66%) clavicles, more than two in 6 (8%) clavicles, and absent in 2 (2.66%) clavicles. It was on inferior surface in 18 (24%), on posterior surface in 53 (70.66%) and on superior surface in 2 (2.66%) clavicles. Mean foraminal index was 66.52.

**Conclusion:** In this study we observed that most of the foramina were on posterior surface and on middle one-third (proved by Foraminal Index). Undoubtedly, all foramina were directed toward the acromial end, so nutrient foramina of clavicle follow the growing end theory. The knowledge from the present study will be helpful in certain surgical proce-

dures to preserve circulation, for bone grafting, surgical approach for internal fixation and coraco-clavicular ligament repair.

#### 153. Morphometric Study of Lumbar Pedicle in Rewa Region of Central India

Amrish Tiwari, D.C. Naik, P.G. Khanwalkar, Meghana Mishra, Bhaskar Reddy

Shyam Shah Medical College and Sanjay Gandhi Hospital, Rewa, Madhya Pradesh

A misplaced or misdirected pedicle screw may cause injuries to the pedicle cortex, nerve root, facet joint and adjacent vital structures. Thus, for safer pedicle screw placement, it is important to understand pedicle dimensions for the development of techniques and devices for spinal instrumentation. This study was conducted on 65 dry human lumbar vertebrae (20 atypical and 45 typical) obtained from the Department of Anatomy Shyam Shah Medical College, Rewa (Madhya Pradesh). In this study, the following measurements were taken with the help of a sliding vernier caliper: pedicle vertical height (h), pedicle width (w) and interpedicular distance (IPD) in dry human lumbar vertebrae. All measurements were done at three different sittings, and the mean of the values corrected to the nearest millimeter were recorded. According to this study, in Rewa region of central India, Steffee pedicle screw size that can be safely used for typical lumbar vertebrae is 4 mm and for atypical lumbar vertebrae is 15 mm.

#### 154. A Prediction of Height of Individual from Head Circumference

Dil Islam Mansur, M.K. Haque, Dilip Kumar Mehta, Kalpana Sharma

Kathmandu University, School of Medical Sciences, Chaukot, Kavre, Nepal

**Background:** Establishing personal identity is one of the main concerns in forensic investigation. In forensic anthropology, estimation of height from head circumference has a significant role in establishing personal identity.

**Objective:** The objective of this study was an attempt to understand the relationship between height and head circumference of an individual and to derive a regression formula to estimate the height from the head circumference.

**Materials and Methods:** This study consisted of 440 (258 male and 182 female) medical students of age group 17–25 years studying in Kathmandu University School of Medical Science, Dhullkhel, Nepal. Height and head circumference of an individual were measured in centimeter. Data was analyzed by using statistical software SPSS-16 and excel.

**Results:** The findings of this study had significant correlation between height and head circumference (r = 0.443, p < 0.01 for male, r = 0.302, p < 0.01 for female, and r = 0.398, p < 0.01 for both male and female). The regression equation for height and head circumference was found to be y = 1.734x + 70.36 for male, y = 0.916x + 106.8 for female, and y = 1.648x + 71.69 for both male female where y represents height of individual and x represents head circumference.

**Conclusions:** Head circumference showed significant positive correlation with height. Therefore, this study will help in medico-legal cases in establishing the identity of an individual and this would be useful for anatomists and anthropologists.

#### 155. Scapular Gap Defect: A Dry Bone Study

Arvind Kumar Pankaj, Navneet Kumar, R.K. Verma, Archana Rani, Anita Rani, Jyoti Chopra, A.K. Srivastava King George's Medical University, Lucknow, Uttar Pradesh

The scapular gaps are unossified areas usually in the body of scapula. The cartilaginous scapula is ossified by eight or more centers. The processes and thickened part of scapula has cancellous bone and supraspinous and infraspinous fossae have compact bone. Sometimes these fossae have unossified areas that appear as radiolucent patches in skiagrams. We studied 172 dried scapulae of unknown sex to see the different gaps in the body of scapula, collected from the osteology lab of the Department of Anatomy, K.G. Medical University, Lucknow. The number of scapulae which exhibited gaps was 13. The gaps were found to be single or multiple. The possible explanation for these gaps may be incomplete ossification of the scapula. The presence of such type of gaps should be differentiated from various types of tumors, bony pathology, and trauma. The identification of gaps is also of great significance to radiologists and orthopedicians.

# 156. Supratrochlear Foramen of Humerus: A Cadaveric Study

Rakesh Kumar Diwan, Archana Rani, Jyoti Chopra, Anita Rani

King George's Medical University, Lucknow, Uttar Pradesh

A thin translucent plate of bone usually separates coronoid and olecranon fossa of humerus. In some humerii this plate is perforated and gives rise to an aperture, known as supratrochlear foramen. Meckel (1825) for the first time reported the supratrochlear foramen in humerii. Supratrochlear foramen of humerus was studied in 72 humerii (right-36, left-36) of male cadaver and 12 humerii of female cadaver (right-6, left-6), in the Department of Anatomy of K.G. Medical University, Lucknow, to document its incidence in North Indian population. None of the cadaveric humerii exhibited supratrochlear foramen, but a membranous septum was always observed between coronoid and olecranon fossa.

#### 157. Study of Nutrient Foramen of Adult Humerus

Jyotsna Bhuyan, Hirak Das, Anuradha Baruah, Mukul Sharma, Roonmoni Deka Assam Medical College and Hospital, Dibrugarh, Assam

**Background:** Nutrient foramens are round passageways through which vessels enter the bones. In the long bones, they are located mostly in the diaphysis.

**Objective:** To study the variations in number, size, shape, location, and direction of nutrient foramen in adult humerus.

**Materials and Methods:** One hundred adult humeri were studied (50 male, 50 female) in the Department of Anatomy, Assam Medical College and Hospital, Dibrugarh. The parameters were measured by manual observation, measuring tape and Vernier calipers.

**Results:** The data obtained were recorded and tabulated. The data were compared with those of similar studies done by other authors.

**Conclusion:** The final outcome of this study is of great clinical significance for anatomists, surgeons, orthopedicians, and radiologists.

#### 158. Association Between Placental Growth Factor Levels in Early Onset Preeclampsia with the Occurrence of Postpartum Hemorrhage: A Prospective Cohort Study

Sanjib Kumar Ghosh, Shashi Raheja, Anita Tuli, Chitra Raghunandan\*, Sneh Agarwal

Department of Anatomy, Lady Hardinge Medical College, New Delhi, <sup>\*</sup>Department of Obstetrics and Gynecology, Lady Hardinge Medical College, New Delhi

**Aim:** To determine the association between PIGF (placental growth factor) estimation in early second trimester (22–24 weeks of gestation), with the occurrence of postpartum hemorrhage in pregnant women with early onset preeclampsia and whether the mode of delivery (cesarean or vaginal) has any association with increased risk of developing postpartum hemorrhage.

**Materials and Methods:** A prospective cohort study was conducted on 788 pregnant women with singleton pregnancies diagnosed with early onset preeclampsia. Maternal serum PIGF level estimation was done between 22 and 24 weeks of gestation and a cut-off value of <122 pg/ml was determined by receiver operating characteristic (ROC) curve analysis for identifying those at risk of developing postpartum hemorrhage. Association between serum PIGF level <122 pg/ml and cesarean deliveries with the risk of developing postpartum hemorrhage was analyzed by logistic regression analysis and odds ratio, which were computed. The results were considered statistically significant when P value < 0.05.

**Results:** Logistic regression analysis showed the association of serum PIGF <122 pg/ml at 22–24 weeks (odds ratio 8.9516; 95% CI, 5.0728–15.7963) and that of cesarean delivery (odds ratio 2.4252; 95% CI, 1.4573–4.0360) with the risk of developing postpartum hemorrhage. Both the associations were found to be statistically significant.

**Conclusion:** Maternal serum PIGF level <122 pg/ml at 22–24 weeks of gestation and cesarean delivery are both strongly associated with the risk of developing postpartum hemorrhage in pregnant women with early onset preeclampsia.

#### **159. Effect of Prenatal Isotretinoin Exposure on Neuronal Population of Frontal Cortex in Rats**

Divya Premchandran, Jai Aditya, Sudhanshu Sahu, Teresa Joy, Sampath Madhyastha

Kasturba Medical College, Mangalore, Karnataka

**Aim:** The isotretinoin, a 13-*cis*-retinoic acid is used in the most severe acne. In humans, isotretinoin treatment is known to cause psychiatric side effects, such as depression. It is also known to be teratogenic resulting in reduced IQ scores in children who are exposed to isotretinoin during prenatal development. In animal model studies, it is known to cause craniofacial deformities including cleft palate. This is attributed to the role of retinoic acid receptors in patterning of skeletal elements of pharyngeal arch derived from neural crest cells. Retinoid signaling plays a well-established role in neuronal differentiation in the developing brain. Isotretinoin is known to affect the adult neurogenesis, but there are no studies indicating the teratogenic effect of isotretinoin on neurogenesis. Hence in the present study we investigate teratogenic effect on neuronal population of frontal cortex.

**Methods:** Pregnant Wistar rats were exposed to either 8 or 16 mg/kg dose of body weight of isotretinoin during day 0–5 or day 6–9 of pregnancy. Pups were sacrificed at postnatal day 7 or day 21, brains were removed and processed for histological studies using cresyl violet staining. Neuronal population of the frontal cortex was quantified in 50 × 50 square micron areas.

**Results:** Isotretinoin treatment during early or late gestational period did not have any significant effect on gestational length, litter size, and early physical developments, but had 10% mortality at birth in day 6–9 treatment schedule. The results of the neuronal assay are yet to be analyzed statistically.

**160. Sex Chromatin in Newborn Females** *Usha Verma, D.S. Chowdhary\*, Sudha Chhabra* PGIMS, Rohtak, Haryana, \*M.G. Medical College, Jaipur, Rajasthan

This study has been conducted on normal 100 newborn females. The aim of the study was to find out frequency of sex chromatin positive cells in buccal smear of normal newborn females and their relation with the birth weight. The slides were prepared from the buccal smears and stained by the Carbol Fuschin method by Carr, 1961. The sex chromatin bodies were present in range of 3-11% with an average of  $6.5\% \pm 0.3\%$ . There was no relation found between the number of sex chromatin positive cells and the birth weight of newborn females.

## 161. Effects of Prenatal Alcohol Exposure on Behavior of Swiss Mice

*U. Shrestha, M. Singh, A. Mishra, S. Shrestha* Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh

Alcohol is a potent teratogen inducing a massive wave of apoptosis in the developing brain as well as oxidative stress and activation of caspase-3 effecter proteases. It readily crosses the placental barrier. The fetus cannot easily metabolize alcohol due to low activity of hepatic alcohol dehydrogenase; therefore, the removal of alcohol from the fetus becomes delayed. It affects certain region of brain including cerebellum and hippocampus resulting into motor and cognitive deficits. The objective of this study was to examine the effects of prenatal exposure to ethanol on motor performance, depression, learning, and memory in young (8–9 weeks) mice. Ethanol was delivered to the pregnant dams orally, throughout gestation days (GD) 6–15, at the dose of 6 g/kg/ day. The dams were allowed to deliver their offspring naturally and until weaning the pups remained with their natural mother. At the age of 8-9 weeks, they were subjected to a battery of various behavioral tests. The alcohol exposed dams showed decreased motor activity in open field test and decreased exploration in elevated maze test. In Moris water maze test, the alcohol exposed mice took longer swim latency during acquisition and reversed acquisition training and spent less time in target quadrant during probe trial. In behavior despair test and tail suspension test the experimental mice showed sign of depression as compared to control. This shows that exposure to alcohol in utero produces long lasting effect on the developing pharmacological character of brain affecting postnatal behavioral expressions.

#### 162. Chromosomal Anomalies in Turner Syndrome and Clinical Relevance of Detection of Y-Cell Line

Debasis Bandopadhyay, Anshul Sharma, Tripti Grover, Sushil Kumari, Ranjan Gupta, Arundhati Sharma All India Institute of Medical Sciences, New Delhi

Turner syndrome is one of the most common chromosomal aneuploidy with an incidence of about 1:2000 newborns. Approximately 60% of the patients with Turner syndrome have a 45, X karyotype while the remaining show

various X chromosome abnormalities such as deletion of long or short arm, isochromosome or ring chromosome formation. About 6-9% cases also show presence of Y chromosome or Y derived sequences. AIIMS is a tertiary referral center with patients coming from different parts of north India. We present the results of cytogenetic analysis undertaken from January to August 2012. A total of 55 cases were referred with primary/secondary amenorrhea, severe short stature and/or Turner syndrome. Of these, 60% cases revealed 46, XX, 11% cases had 45, X karyotype, 11% cases had a Y-cell line and the remaining cases showed presence of Xq deletion and X isochromosome. The detection of Y-cell line is important in view of about 10–30% higher risk of developing gonadal tumors. Prophylactic gonadectomy is recommended to patients of Turner syndrome with Y-chromosome mosaicism and ovarian dysgenesis. The study reiterates the importance of ruling out presence of Y-cell line in Turner syndrome cases using cytogenetic and/or molecular methods.

#### 163. Turner Syndrome and Its Variants

Shailaja C. Math, Jayaram S. Kadandale S.S. Institute of Medical Sciences and Research Center, Davangere, Karnataka

**Background:** Turner syndrome is characterized by short stature, gonadal dysgenesis and a variety of other clinical features. About 50% of the patients have a 45,X karyotype, while the remaining have structurally abnormal sex chromosomes or mosaicism including mos 45,X/46,XY. 45,X/46,XY mosaic patients exhibit a wide phenotypic spectrum, ranging from normal females, females with Turner syndrome and normal males with mild hypospadias, to male or female pseudo-hermaphroditism. Those with Y chromosomal material are at risk for developing gonadoblastoma or dysgerminoma later in life.

**Materials and Methods:** In our institution (Department of Anatomy, SSIMS & RC Davangere, Karnataka), we had three cases of Turner's syndrome of 42 patients who underwent cytogenetic evaluation to investigate uncertain chromosomal anomaly.

**Discussion and Results:** Of these three cases, two had classic type of Turner's syndrome (45,X) while one case, a baby of two days old deserved special attention as it presented with ambiguous genitalia, and was suspected for CAH. Chromosome analysis revealed mosaic 45, X [63%]/46, XY [37%] karyotype, ultrasonographic findings revealed presence of uterus and absence of testis, kidney, and adrenal glands were normal.

**Conclusion:** It was thus concluded from these findings that the child could be reared as a female with surgical corrections of external genitalia. The follow-up of the child is essential to monitor her growth and pubertal life and the possibility of developing gonadoblastoma later in life. The other two cases would do well with hormonal therapy and follow-up.

#### 164. Study of Down Syndrome and Its Variants

Gaurishankar Ganga, Shailaja. C. Math

S.S. Institute of Medical Sciences and Research Center, Davangere, Karnataka

**Aim:** To study the karyotypes in the Down syndrome and its variants with different predominant features.

**Result:** Karyotypes of 21 trisomy and 21 translocation were studied. The degree of difference in dermatoglyphics, mental capability, low set ears, epicanthal fold, poor muscle tone, furrowed tongue and high palatal arch are discussed.

**Conclusion:** There is degree of difference in characteristics in 21 trisomy and 21 translocation.

# 165. Modification in Antigen Retrieval Technique for Immunohistochemistry

Neeru Goyal, Madhur Gupta\*

Christian Medical College, Ludhiana, Punjab, \*Swami Devi Dayal Dental College and Hospital, Golpura, Barwala, Haryana

Antigen unmasking or retrieval is an important step in immunohistochemistry (IHC) of formalin-fixed paraffin sections. The technique usually involves proteolytic enzyme digestion or heat-mediated antigen retrieval. Heat-based antigen retrieval methods have brought a great improvement in the quality and reproducibility of IHC. Out of heat-mediated antigen retrieval techniques, use of domestic pressure cooker is most preferable as pressure cooking is more uniform and large number of slides accommodated in a 5-liter pressure cooker. In this paper, a modification in the technique of pressure cooker antigen retrieval is discussed. Such modification, if carefully evaluated, may help in better result in antigen retrieval.

## 166. Analysis of Growth of Prenatal Mandible with the Help of Different Parameters

Sarita R. Margam, Anjali G. Gosavi Ashwini Rural Medical College, Hospital and Research Center, Kumbhari, Solapur, Maharashtra

**Aim:** To compare different parameters of fetal mandible and correlate them with their age in lunar months.

**Materials and Methods:** Sixty-four hemimandibles (32 mandibles) are collected from aborted fetuses of 4th to 7th lunar month after maceration. Fetal right and left hemimandibles are collected. Following measurements are taken by sliding caliper: Condyle-Coronoid process (Co-Cp), Gonion-Coronoid process (Go-Cp), Gonion-Gnathion (Go-Gn), Condyle-Gnathion (Co-Gn), Symphyseal height (SH), and Mandibular angle (MA). Data obtained is analyzed with SPSS software programme. A *t*-test was performed.

**Results:** Statistically, highly significant positive correlation is found between CR length and Co-Cp, Go-Cp, Go-Gn, Co-Gn,

SH. Negative correlation is found between CR length and MA of both sides. The regression equation is derived.

**Conclusion:** We conclude that the growth of different dimensions of fetal mandibles has positive correlation with increase in CR length. As the CR length increases, all the dimensions of mandible increase except mandibular angle. It is possible to predict the fetal age before birth from the measurements of certain dimensions of hemimandible.

### 167. Study of Genial Tubercles in Indian Dry Mandible

S.D. Kadami, M.A. Doshi, M.P. Ambal, R.J. Patil, S.D. Jadhav\*, A.R. Desai

Krishna Institute of Medical Sciences Deemed University, Karad, Maharashtra,

\*Padmashri Dr. Vithalrao Vikhe Patil Medical College, Ahmednagar, Maharashtra

Mandible is the largest and strongest bone of the skull. It is the main articulating segment of skull. Mandible depicts morphological changes in relation to age. Morphological changes such as alteration in size and shape of certain bony process of mandible, e.g., lingula, genial tubercles, and coronoid process, forms an interesting line of investigation from clinical and medicolegal point of view. Genial tubercles may be of different size, shape, and structure. The size of each tubercle may indicate quantum of muscle activity exerted on it. The changes in the morphology of genial tubercle may obscure the vicinity of lingual foramina causing difficulty in the reading of radiograph, there is great deal of contradiction regarding radio-opacity surrounding lingual foramina in intra oral radiograph. This study was undertaken in 210 dry human mandibles. In this study different types of tubercles have been observed.

#### 168. Vertebral Morphometeric Parameters in Subaxial Vertebral Column in North Indian Population

Vishal Verma, Dinesh Kumar, Neelam Vasudeva Maulana Azad Medical College, New Delhi

**Aim:** To measure various parameters in different regions of vertebral column.

**Materials and Methods:** A total 150 dry human vertebrae of cervical (subaxial), thoracic and lumbar were studied for morphometeric evaluation using vernier callipers and goniometer.

**Results:** The vertebral column displayed craniocaudal trends from cervical to lumbar region.

*Cervical region vertebral body morphometry*: Mean AP diameter gradually increased while maximum transverse diameter increased down the column showing a marked increase at C6 vertebral. The vertebral height (anterior) showed an in-

crease from C3 to C5 and height (posterior) decreased from C3 to C6 and increased thereafter at C7. *Thoracic region vertebral morphometry*: The AP diameter increased from T1 to T3. Maximum transverse diameter decreased from T1 to T4 vertebral pedicle morphometry. Transverse isthmus width decreased from T1 to T8 and thereafter increased to T12 on either side. Pedicle angle---right and left pedicle angle remained the same from T4 to T11 and at T12 showed an increase. *Lumbar region vertebral body morphometry*: The mean AP diameter increased from L1 to L3, abruptly increasing at L5. Transverse diameter was more than AP diameter at all lumbar vertebral levels. The anterior height was more than posterior height at all levels. Pedicle morphometry and pedicle angle: The pedicle height and angle gradually increased from L1 to L3.

**Conclusion:** Vertebral morphometric parameters are critical for spinal fixation surgeries to pinpoint the exact location and angle of the screw in the pedicle.

## 169. Morphometry and Sex Determination of Radius in South Indian Population

D. Dinesh Kumar, S. Sundarapandian, R. Arun Kumar SRM Medical College, Tamil Nadu

**Aim:** Diameter of radial head can be used to identify the sex of human remains with high degree of accuracy. This study deals with the measurement of radial head circumference, distal end width and transverse diameter at mid-shaft region that is taken as discriminative factors for the sex in South Indian population. This study also deals with the assessment of morphometric parameters, such as angle of radial inclination and distal end width of radius, which play an important role in clinical orthopedic settings during distal radius fracture reduction, designing distal radius prosthesis and in restoration of kinematics of wrist joint.

#### **Materials:**

- 1. 200 dry human radii of unknown sex collected from the Department of Anatomy, SRM Medical College, Chennai.
- 2. Sliding vernier caliper.
- 3. Long-armed goniometer.
- 4. Inch tape.

**Methods:** Diameter of radial head measured by using vernier caliper. Radial head circumference, mid-shaft circumference and distal end width measured with inch tape. Angle of radial inclination measured with long arm goniometer.

**Results and Conclusion:** The diameter of radial head can be used to determine the sex accurately than other method currently in use, which provides a reliable alternative method for sex determination under forensic or anthropologic conditions. The knowledge of angle of inclination, distal end width of radius will provide a better understanding in orthopedic settings like distal radius fracture reduction and distal radius prosthesis designing.

#### 170. A Study on the Vascular Foramina at the End of the Ulna and the Nutrient Foramen on the Ulna

Harish A. Wankhede, P.B. Hosmani, M.M. Baig Dr. V.M. Government Medical College, Solapur, Maharashtra

**Aim:** Nutrient arteries are responsible for two-thirds of blood supply of the diaphysis and one-third of supply to each of the metaphyses. Epiphyseal and metaphyseal arteries exceed the diaphyseal supply when the nutrient artery is destroyed. Most of the studies on the vascular supply of long bones are done on the nutrient foramen, but very few on the vascular foramina at the ends of the long bone. Present study is carried out to study the vascular foramina and the nutrient foramen on the ulna.

**Materials and Methods:** A total 220 dried human adult ulnas were studied. Age and sex were not defined. Length was measured on the osteometric board. The vascular foramina at the upper and lower ends of the ulna were observed and numbered, and those foramina which admitted a metal wire of diameter 0.5 mm were designated as large and other as small. The nutrient foramina were identified by the presence of a well-marked groove and slightly raised edge at the commencement of the canal.

**Conclusion:** Number of vascular foramina at upper end of ulna is more and the nutrient foramen also directed upwards and lies closer to the upper end. This indicates that the upper end of ulna has got more blood supply than the lower end. Therefore, the incidences of delayed and nonunion are more at distal end of ulna than proximal end.

**171. Morphological and Morphometric Study of Mental Foramen in Dry Adult Human Mandibles** *A. Nimje Dipti, P.B. Hosmani, M.M. Baig* Dr. V.M. Government Medical College, Solapur, Maharashtra

**Background:** The mental foramen is an oval or circular opening on the anterolateral surface of the mandible; through which mental neurovascular bundle exits and innervates ipsilateral chin, lower lip, and gingiva. The knowledge of anatomical morphometry of mental foramen is important for dental surgeons in nerve block and surgical procedures in mental region of mandible to avoid injury to the neurovascular bundles.

**Aims and Objective:** To elucidate the morphological features and precise anatomical position of the mental foramen with reference to surrounding anatomical landmarks on the 100 adult mandibles.

**Materials and Methods:** This study was done on 100 dried adult human mandibles of unknown sex in the Department of Anatomy, VMGMC, Solapur, Maharashtra, India. Measurements were obtained by using Vernier caliper. Distance from symphysis menti, alveolar margin, inferior border of mandible, posterior border of ramus to the mental foramen were measured. Diameter of mental foramen also taken and position of mental foramen in related to tooth socket was also observed.

**Conclusion:** The knowledge about the exact location of this foramen is important for clinicians and surgeons to avoid any injury to mental neurovascular bundle.

#### 172. Variation in Talar Facets on Calcaneum and Their Clinical Implications

Nisha R. Yadav, K.V. Patil, C.V. Diwan Government Medical College, Aurangabad, Maharashtra

**Aim:** Calcaneus is the largest tarsal bone and forms prominence of heel and articulates superiorly with talus to form subtalar joint. However, it is claimed by research workers that certain pattern of talar facets predispose to subtalar arthritis. Knowledge about variation is important for orthopedicians while correcting foot deformities, such as pes planus. The aim of study was to identify patterns of talar facets on calcaneum and their clinical implication.

**Materials and Methods:** In this work, 70 calcanei were studied irrespective of sex and side. Pattern of talar articular facets on calcaneus were observed with naked eye. Sliding vernier caliper was used to measure inter facet distance. Literature describes five patterns of calcaneal facets for the talus.

**Result:** Observation showed 4 patterns. Out of 70 calcanei, 48 were of pattern I (68.5%), 15 were of pattern II (21.4%), and in pattern II subtype A (66.6%) more common with <5 mm separation and 5 were of pattern III (7.1%), 2 were of pattern IV (2.8%), none were of pattern V.

**Conclusion:** Pattern I is predominant in this study. Therefore, knowledge of variation of talar facets on calcaneum has practical importance for orthopedicians, forensic scientist, and anthropologist.

173. Morphometry of Tentorial Notch in North Indian Population During Medicolegal Autopsies

Chhabra S. Ashima\*, B. Sirohiwal\*\*, S. Das\*\*\*

Department of Anatomy, SHKM GMC Mewat, Haryana, \*Pt. BD Sharma PGIMS Rohtak, Haryana, \*\*Department of Forensic Medicine, Pt. BD Sharma PGIMS, Rohtak, Haryana, \*\*\*Department of Physiology SHKM GMC, Mewat, Haryana

**Aim:** The anatomical study of tentorial notch is clinically important because variations in the morphometry of tentorial notch may help in explaining the different patterns of transtentorial herniations, brain concussion and inertial injury.

**Materials and Methods:** This study was done in the department of anatomy in collaboration with the department of forensic medicine, BDS PGIMS, Rohtak, during medicolegal autopsies in North Indian population. The brain stem was cut at the level of tentorial notch following the contour of the tentorial edge in forty adult human cadavers' age ranging from 20 to 65 years. Measurement of tentorial notch was taken *in situ* by spring divider: 1. anterior notch width (ANW), 2. maximum notch width (MNW), and 3. notch length (NL).

**Result:** Quartile groups defined by NL (57.98 ± 4.5 mm) were termed as short (25%), mid-range (50%) and long (25%). Quartile groups defined by MNW (29.77 ± 2.26 mm) were termed as narrow (25%), midrange (50%), and wide (25%). Combining these groups into a matrix formation resulted in the classification of the tentorial notch into the following eight types: 1) narrow (7.5%); 2) wide (12.5%); 3) short (8%); 4) long (7.5%); 5) typical (30%); 6) large (5%); 7) small (5%); and 8) mixed (20%).

**Conclusion:** This study is providing a baseline data for the interpretation of the tentorial notch on CT and MRI which may influence the neurosurgical decision regarding the treatment of patients with intracranial pathological conditions.

#### 174. Morphometric Study of Lister's Tubercle in Relation to Musculoskeletal and Neurovascular Markings: Its Surgical Importance

Linaben Dilipbhai Patel, A. Tuli, P. Shrivastava, S. Raheja Lady Hardinge Medical College, New Delhi

One of the most common fractures encountered in orthopedic outpatient department is the distal end of radius fracture. When treated by closed reduction and immobilization, it led to extensor pollicis longus (EPL) tendon irritation and rupture. The close proximity between the screws and plates used during internal fixation and the EPL tendon leads to unacceptable tendon complications. This study was undertaken in North Indian population to measure the size, shape of Lister's tubercle and the depth of EPL groove that will help surgeons to have a better insight in the region of distal radius. There were variations in the shape, size of the Lister's tubercle and the depth of EPL groove which varied between 1 to 8 mm. The relationship between the musculoskeletal and neurovascular markings was also observed.

#### 175. A Study of Nutrient Foramina in Typical Long Bones of Upper Limb

*Apurva Darji, Hetal Patel, Swati Aterkar, C.A. Pensi* B.J. Medical College, Ahmedabad, Gujarat

**Aim:** To study the common location, number and direction of nutrient foramina with reference to the growing end of the bone.

**Materials and Methods:** The study included 50 humeri (27 left and 23 right), 50 radii (25 left and 25 right) and 50 ulnae (29 left and 21 right) collected from the Department of

Anatomy, B.J. Medical College, Ahmedabad. The nutrient foramen was identified by the presence of a well-marked groove and raised edge at the commencement of the canal. Two known exact location of the nutrient foramina, foramen index was calculated by measuring the whole length of the bone and the length between proximal end of the bone and nutrient foramina with the help of the vernier caliper.

**Results:** Single-nutrient foramen was found in 48 humeri, 45 ulnae, and 49 radii. Double-nutrient foramen was found in 1 humerus and 3 ulnae. Absence of nutrient foramen was found in 1 humerus, 2 ulnae, and 1 radii. In humerus, majority (40) of nutrient foramina was found in anteromedial surface. Thirty-nine ulnae and 40 radii showed nutrient foramina on their anterior surface. Mean Foramina Index was 56.8% for humerus, 37.9% for ulna, and 35.7% for radius.

**Conclusion:** Variations in number and location were found in humerus, radius, and ulna. Its knowledge is of importance in medicolegal aspect and for placement of internal fixation devices.

### 176. Variation of Suprascapular Notch of the Scapula

K.D. Pawar, S.K. Chavan, R.N. Wabale RMC PIMS, Loni, New Delhi

The study was undertaken to see the variation of the suprascapular notch. The notch is present on the superior border of the scapula near the root of coracoid process. It is roofed by the superior transverse ligament and is converted into foramen for the passage of suprascapular nerve. The study was carried out on 150 scapulas in the Department of Anatomy, RMC, Loni, Ahmednagar. These scapulas were collected from the first year M.B.B.S. and first year B.Ph.T students. The parameters studied included, presence or absence of notch, shape of notch, transverse length of the notch, the edge of the notch, ossification of transverse ligament and other findings were also noted. The parameters were measured by vernier scale and appropriate statistical test were applied.

**177. Variations in External Morphology of Liver** *Rajesh Dehankar, D.D. Ksheersagar* 

NKP Salve Institute of Medical Sciences and Research Center, Digdoh Hills, Nagpur, Maharashtra

Variations in the external features of liver are commonly encountered during surgery or autopsy. This study was carried out with an aim to determine the external morphology of the liver, which is obtained from 50 embalmed cadavers. Variations are seen in various parameters related to the liver, such as length, breadth, thickness, weight, variations in the left lobe and sizes of caudate and quadrate lobes, etc. Variations are usually due to aberration or arrest in normal embryological development. Such variations are useful and important from the point of various diseases of liver and the invasive techniques which are used in the treatment of liver.

# 178. An Innovative Approach for Middle Ear Dissection

Kamal Singh, Aarti, Sudha Chhabra, Gopal Gupta Pt. B.D. Sharma PGIMS, Rohtak, Haryana

The temporal bone is one of the most complicated bones of the skull. Out of the very few methods of dissecting the ear described in the text books of anatomy and ENT, one method is the piece-meal removal of the bone to expose the tympanic antrum and opening the middle ear cavity, which requires a lot of time and expertise. Here we have devised a new and a very simple method to dissect the temporal bone with the help of a single chisel cut (Cobbler's cut) by which the middle ear can be exposed quickly for the procurement of the ear ossicles. The intact temporal bone is taken out from the skull and then a chisel is passed through the petrous and squamous parts of the temporal bone. The middle ear is divided into two parts, one with the tympanic membrane and two ossicles (malleus and incus) on one side and medial wall obliquely with the third ossicle (stapes) on the other side. This method was performed in about 100 cases (bilaterally) to evaluate the mechanism and it was found to be successful in almost all cases for the easy availability of the ear ossicles for the research purposes. It had also proved to be the fastest method among all the previous ones for exploring the middle ear cavity and mastoid air cells, making the understanding of the subject better and also preparing museum specimens.

## 179. Study of Human Fetal Liver and Gall Bladder

Anamika Jaiswal, D.N Sinha, A.K. Singh Government Medical College, Haldwani, Uttarakhand

The study of the human fetal liver and gall bladder study was conducted in 19 foetuses, both male and female, obtained from Obstetrics and Gyaenocology Department of Dr. Sushila Tiwari Memorial Hospital, Govt. Medical College, Haldwani. Various morphological measurements of liver and gall bladder were recorded and histological studies were also done to observe the change during fetogenesis. We observed histological organization of liver in way to emphasis the hemopoitic nature of liver. A marked histo-differentiation in the infrastructural organization of liver was observed. Histological structure of gall bladder depicted the various changes in the musculature and lining epithelium.

### 180. Types of Intestinal Atresia: A Case Reports

Payal Kasat, S. Jaiswal, Pritha S. Bhuiyan Seth G.S. Medical College and K.E.M. Hospital, Parel, Mumbai, Maharashtra

An atresia is a complete obstruction. Multiple theories regarding the etiology of jejunoileal atresias have been studied in animal models. Studies in mouse models suggest that some forms of atresia may be hereditary and result from deregulation of proliferation and apoptosis of the developing intestine through the fibroblast growth factor pathways. To date, the most accepted theory regarding the etiology of jejunoileal atresia is that of an intrauterine vascular accident resulting in necrosis of the affected segment, with subsequent restoration. Unlike other intestinal atresias, duodenal atresias are associated with other congenital anomalies. Four types of jejunoileal atresias are described. Each type represents a spectrum of severity, from a simple web to full atresia with loss of bowel length. This classification system generally guides prognosis and therapy of intestinal atresia. Stenosis in a neonate is difficult to diagnose and it may not manifest for some time. The clinical presentation is dependent on the severity of disease, and these patients have a history of intermittent emesis and failure to thrive. Clinically, a normal or scaphoid-like abdomen in a neonate with bilious emesis within hours should usually be considered indicative of a proximal obstruction. In distal lesions, abdominal distension is more pronounced and vomiting may take longer to begin. We presented the intra-operative findings in the four types of jejunoileal atresia found in the pediatric patients.

#### 181. Determination of Ossification Center of Long Bones of Aborted Human Fetuses Using Alizarin Red-S Stain and Comparison of Its Histogenesis by H&E and Other Special Stains

Arpan Haldar, Geetanjali Arora, Amitav Panigrahi, Mohammed Shafique, A.K. Nanda Hi-Tech Medical College and Hospital, Bhubaneswar and Rourkela, Odisha

Aims and Objectives: Several studies were done by many worldwide and nationwide researchers in small vertebrates to demonstrate the ossification center in long bones. This study on long bones in aborted fetuses by Alizarin Red-S stain will enrich the studies done by the previous researchers. The bone transparency technique is unique from the previous haematoxylin and eosin (H&E) stain used by workers in their studies. Study of long bones in this geographical eastern part of India, in Odisha, can tell the mother's nutritional status, steroid use in pregnant mothers, and any endocrinopathies like hypopituitarism or hypothyroidism in mothers. The study on fetuses can correlate the work done by previous workers by the common H&E stain in small vertebrates.

**Materials and Methods:** 20–30 aborted fetuses approx. from 5–32 weeks with no obvious congenital abnormality,

within 6 hours of delivery by spontaneous miscarriages and therapeutic legal abortions were collected from Obstetrics and Gyaenocology Department of the Hi-Tech Medical College and Hospital, Bhubaneswar. They were immediately fixed in 10% formalin and then in 95% alcohol. Then 1% KOH was added to the specimen so that the specimen becomes transparent, then bones by Alizarin Red-S stains. Then the fetuses in formalin were decalcified by nitric acid and stained by H&E and special stains like Van Geyson's and Masson's Trichome etc.

**Observations:** Earlier histological studies in small vertebrates by different workers worldwide showed the degree of ossification centers of long bones in small vertebrates. However, no data is currently available for the human fetuses growth of humerus. Tibia and fibula were more on the left side in contrast to growth of femur, which was more on the right side. Ossified length (OL) is better than total length (TL). Both OL and TL grew faster in lower limb bones than the upper limb bones with greatest growth rate for OL in lower limb.

**Summary and Conclusion:** In earlier studies the specimen were fixed in 95% alcohol directly without fixing in 10% formalin, which results in early maceration of tissues, while in our study specimens were first fixed in 10% formalin and then in 95% alcohol, to avoid early maceration of tissues. These specimens can be used for anatomy museum by placing them in glycerin and adding thymol as preservative for anatomy students (Dry Mount Technique). This study can have application in forensic science to determine feticide. Connective tissue and skeletal disorders can be studied from this study of ossification centers.

#### 182. A Study on Variations of Origin and Course of Cystic Artery and Its Relation to the Calot's Triangle

Rohan A. Gawali, M. Natarajan, L. Rajgopal, P.S. Bhuiyan Seth G.S. Medical College and K.E.M. Hospital, Parel, Mumbai, Maharashtra

**Background:** The cystic artery is a branch of right hepatic artery. It runs across the triangle formed by the liver, common hepatic duct, and cystic duct (Calot's triangle), to reach the gallbladder. It may arise from the main trunk of the hepatic artery, from the left hepatic artery or from the gastroduodenal artery, and it may pass in front of the cystic and bile ducts. Knowledge of the variations in the origin, course, and relation of artery to the Calot's triangle is important for surgeons during cholecystectomy, for radiologists to perform angiogram, arterial embolization, and chemoperfusion during hepatobiliary surgery. The aim of the study is to assess variations in the origin of cystic artery and its relation to the Calot's triangle, cystic, and common hepatic ducts in 30 embalmed cadavers.

**Aims and Objectives:** 1. To note the origin of cystic artery. 2. To note the number of cystic arteries. 3. Relation of the cystic artery to the Calot's triangle. 4. Study the relation of the cystic artery to the cystic duct. 5. Relation of the cystic artery to the common hepatic duct.

#### **183. Zaltoprofen Induced Histological Changes** in Liver of Albino Rats

*R. Shalini, S.S. Rajasekar, K.V.P. Suriyakumari* Sri Manakula Vinayagar Medical College and Hospital, Puducherry, Tamil Nadu

**Background:** Nonsteroidal anti-inflammatory drugs (NSAIDs) are among the most common drugs associated with drug-induced liver injury with an estimated incidence between 3 and 23 per 100,000 patients every year. The hepatic injury associated with NSAIDs was found to be variable ranging from mild cholestasis to severe hepatocellular injury. Zaltoprofen is a NSAID used commonly as an analgesic in the treatment of painful disorders.

**Aim:** To determine the histological changes in the liver of albino rats after 7 and 14 days of oral Zaltoprofen administration.

**Materials:** Twenty-four adult male albino Wistar rats and the drug Zaltoprofen in a dose of 40 mg/kg body weight of Albino rats.

**Methodology:** Groups A1 and B1—each group comprising 6 rats served as control groups and was treated with distilled water, orally via an orogastric tube, for 7 and 14 days, respectively. Groups A2 and B2—each group comprising 6 rats served as the experimental group and was treated with the drug Zaltoprofen orally via an orogastric tube, for 7 and 14 days, respectively. The rats were sacrificed and their liver was collected. The livers were preserved in neutral buffered formalin, processed and stained with eosin and hematoxylin stains.

**Conclusion:** Zaltoprofen caused histological changes in liver of albino rats.

#### 184. Effect of Monosodium Glutamate on Thyroid Gland of Adult Wistar Albino Rat: A Histomorphometric Study

Pooja Rani\* Kamlesh Khatri\*\* Renu Chauhan\* \*University College of Medical Science and GTB Hospital, Delhi \*\*School of Medical Sciences and Research, Sharda University, Greater Noida, Uttar Pradesh

**Background:** Monosodium glutamate (MSG), commonly used as a flavor enhancer throughout the world, contains glutamic acid, sodium, and water. Glutamic acid serves as a neurotransmitter in many parts of the central nervous system and in excess it may cause neurotoxicity leading to endocrinal disorders. **Aim:** This study was conducted to evaluate the histomorphometric effects of monosodium glutamate on the thyroid gland of adult albino rat.

**Materials and Methods:** The experimental group, consisting of ten animals, was given 4 mg/g body weight of monosodium glutamate intraperitoneally for seven days. After 30 days of the last dose, all the animals were sacrificed, their thyroid glands sections were stained with haematoxylin and eosin (H&E) and periodic acid schiff (PAS) and examined for histomorphometry under Zeiss light microscope and Image Pro-Express Analyzer.

**Results:** The results of this study showed a significant increase in the body weight of the MSG treated animals. A significant increase in the size of the follicles accompanied by an increase in the mean height and area of the follicular cells was observed. Some of the follicles showed lightly stained colloid.

**Conclusions:** MSG can lead to obesity and disturbances in thyroid gland function as amply demonstrated by the histopathological changes in this study. Therefore, it is suggested that MSG should be included in the diet cautiously.

#### 185. Effect of Ethephon on Liver in Albino Rats: A Histomorphometric Study

Pooja Bhadoria, M. Nagar, V. Bharihoke University College of Medical Science and GTB Hospital, Delhi

**Aim:** Chemicals that are used for artificial ripening and increasing the shelf lives of fruits and vegetables include ethylene, ethane, calcium carbide, and ethephon. This study was conducted to study the effect of ethephon on the morphometry of rat liver.

**Materials and Methods:** Ethephon was administered by oral gavage in adult Wistar albino rats in the dose of 200 mg/ kg body weight/day for 14 days. Controls were maintained. The animals were sacrificed within 24 hours of the last dose by perfusion with formal saline under anaesthesia. Liver was dissected and processed for paraffin embedding. Histomorphometric studies were done on randomly selected sections of liver and the data obtained was tabulated and statistically analyzed.

**Results:** In the experimental rats, the hepatocytes had a mean long and short diameter of  $15.02 \pm 4.20$  and  $12.08 \pm 3.02 \mu$ m, respectively. In the control animals, the mean long and short diameter was measured to be  $16.5 \pm 3.59 \mu$ m and  $13.9 \pm 3.59 \mu$ m, respectively. The nucleus of the hepatocytes had a mean long and short diameter of  $5.08 \pm 1.93$  and  $5.08 \pm 1.93 \mu$ m in the ethephon-treated rats and  $6.15 \pm 1.72$  and  $6.05 \pm 1.68 \mu$ m in the control animals. The decrease in diameters of the hepatocytes and their nucleus was statistically significant. At sites the parenchyma showed pyknotic nucleus and inflammatory infiltrations. There was a statistically significant increase in the diameters of the central vein and sinusoids. Dilatation of the bile canaliculi was seen in between the hepatocytes.

**Conclusion:** The plant growth regulator, insecticide, and fruit ripener, ethephon caused inflammatory and degenerative changes in the liver with associated cholestasis, probably suggestive of toxic hepatitis.

#### 186. Cytoplasmic Droplets (CD), Sperm Deformity Index (SDI), and Teratozoospermic Index (TZI): Which is a Better Marker for Oxidative Sperm Damage?

Dinesh Kumar\*, Kishlay Kumar\*, Swetasmita Mishra\*, Rajeev Kumar\*\*, Rima Dada\*

\*Laboratory of Molecular Reproduction and Genetics, Department of Anatomy, All India Institute of Medical Sciences, New Delhi, \*\*Department of Urology, All India Institute of Medical Sciences, New Delhi

**Background:** Oxidative stress has been considered to be one of the major causes of morphological sperm damage. Cytoplasmic droplet was once considered to be a telltale sign of oxidative sperm damage. With the development of new researches and guidelines, the presence of cytoplasmic droplet is still reliable to validate oxidative damage. In the era of ART it is necessary to group the sperm morphologically and to understand the pathogenic mechanism behind the morphological defects by ROS.

**Aim:** To correlate various intermorphological defects with oxidative stress in idiopathic infertile men.

**Methods:** A pilot cross-sectional study was done in 40 infertile men. Standard semen analysis was performed according to WHO, 2010 guidelines. Sperm intermorphological defects were evaluated in 100 sperms per sample by H&E staining. ROS in spermatozoa was measured by the chemiluminescence assay.

**Results:** No significant association was found between the cytoplasmic droplets and ROS levels and a positive but no significant association was found between the sperm deformity index (SDI), teratozoospermic index (TZI), and ROS levels.

**Conclusion:** The pathogenic mechanism for formation of cytoplasmic droplets is still under debate and the usage of the less strict WHO criteria has to be validated by large RCTs and meta-analysis. By identifying the better marker, we can turn it into a useful tool for identifying infertile men with high seminal ROS in infertility clinics where facilities for measuring level of seminal ROS are not available.

### 187. Corrosion Cast Preparation Using PVC Solution: A New Technique

Sabita Mishra, J.M. Kaul, Ranjana Verma, Anita Mahajan, Rakhee Sharma

Maulana Azad Medical College, New Delhi

**Background:** Corrosion casts are an established technique to study the three-dimensional structure of blood vessels,

ductal systems, and cavities of organs and tissues. A wellprepared cast provides an excellent tool to have in-depth knowledge of the organ and tissue studied as they replicate the vasculature and ductal system. In the 16th century, Lenardo Da Vinci was the first to prepare casts by using wax. Later with the advances in the chemistry of low-viscosity resins, they became an ideal medium for making corrosion casts.

**Aim:** To prepare corrosion casts for teaching and research purposes by using PVC solutions.

**Materials and Methods:** Recently, in the Department of Anatomy, Maulana Azad Medical College, we used PVC solutions commercially available in the plastic industry to prepare corrosion casts of placenta. The desired color codes were made by adding colored resins to PVC solution. The casts were incubated after injecting the solutions with the resins and corroded with HCl.

**Result:** The casts formed were of excellent quality and were not dry and brittle as seen with the CAB granules used for making casts.

**Conclusion:** This is an extremely simple procedure and easily available, found to be ideal for teaching and research of vasculature of a viscera.

#### 188. Transnasal Localization of Sphenopalatine Foramen: A Cadaveric Study

Anjali Aggarwal, Tulika Gupta, Daisy Sahni Postgraduate Institute of Medical Education & Research, Chandigarh, Punjab

**Aim:** Anatomical variations of sphenopalatine foramen (SPF) may account for failure of sphenopalatine artery ligation. The study was aimed to investigate the variations of anatomy of SPF with reference to endonasal sphenopalatine artery localization.

**Materials:** The study material consisted of 32 sagitally sectioned adult cadaveric heads. Cases with history of nasal trauma or any endonasal surgery were excluded from the study.

**Methods:** Vertical incision in lateral nasal wall mucosa extending upward from posterior end of inferior turbinate to sphenoid sinus was given. Musosa flap was elevated until sphenopalatine foramen was identified. Numerical variations and localization of SPF in relation to easily identifiable intranasal landmarks were analyzed.

**Results:** The SPF was single in 56%, double in 37.5%, and triple in 6.25% of specimens. Accessory foramina were smaller than the main SPF. The most frequent localization of foramen was at the transition of middle and superior meatus. The SPF was located at mean distance of 60.70 mm  $\pm$  4.80 mm from anterior nasal spine; 22.37 mm  $\pm$  3.35 mm from the floor of nasal cavity and 7.03 mm  $\pm$  1.51 mm anterior to posterior end of middle turbinate. Mean angle of elevation of SPF from nasal floor was 24p  $\pm$  3.35p.

**Conclusions:** This data could be used to facilitate intraoperative localization of sphenopalatine foramen and as distance reference for ligation or endonasal cauterization of branches of sphenopalatine artery thus preventing possible errors and complications.

#### 189. The Human Cerebral Ventricular System: Preparation of a Life Size Cast

M. Gopalan

School of Medicine, Amrita Institute of Medical Sciences, Kochi, Kerala

In studying the gross anatomy of the external and interior aspects of the ventricles in brain, we often find it difficult to visualize the 3D organization challenged with the spatial orientation of the surrounding structures of these cavities. This is made easy by developing a cast of the cerebral ventricular system. This cast prepared using silicon rubber is dry, nontoxic, and flexible, the exact replica of the interior design of the brain ventricular system. This compared with the normal ventriculography pictures has helped to analyze the morphometry of the ventricles as well as to decide the maximum diameter and the optimal length of neuroendoscopes.

The CSF spaces/ventricles increase in size in various clinical conditions. The normal anatomical parameters are very important to plan and do the minimally invasive neuroendoscopic surgeries to restore the patients with minimal brain tissue damage. The cast is very well accepted by the anatomy teachers, Neurophysicians and surgeons as a powerful teaching aid for learning and teaching the undergraduates/PG students in anatomy.

# 190. Variations of Foramen Transversarium in the Cervical Vertebrae

A. Arunkumar, I. Jayaraj Madras Medical College, Chennai, Tamil Nadu

**Aim:** To study the variations of foramen transversarium in cervical vertebrae and to analyze them morphologically with emphasize on their embryological and surgical importance.

**Material and Methods:** The study included human cervical vertebrae that were procured from the bone collections of the Department of Anatomy, Madras Medical College. The age and sex were not known. The foramen transversariun was observed macroscopically on both sides of all the vertebras. Shape of all foramen transversarium was noted. Size comparisons in both the foramen of same vertebrae were noted.

**Results:** Significant number of bones with shape variations, size variations, and many accessory foramen transversarium were found. The incidence of accessory foramen transversarium appears to be very high. No incidence of three foramens and absence of foramen were observed. **Conclusion:** For neurosurgeons and radiologists, the surgical anatomy of these variations is important for interpreting the CT and MRI scans and essential while performing complex surgical procedures. Their morphological knowledge is clinically important because the course of the second part of vertebral artery may be distorted. These variations may be one of the causes for complaints such as headache, migraine, and fainting episodes due to vertebral artery compression.

#### 191. Study of Congenital Anomalies of Lower Limbs

Arun Kumar Bilodi, \*M.R. Gangadhar Mahatma Gandhi Medical College, Puducherry, Tamil Nadu \*Department of Anthropology, University of Mysore, Mysore, Karnataka

**Aim:** To know the various types of congenital anomalies of the lower limbs that came across.

Place of Study: In districts of Bengaluru and Kolar.

**Period of Study:** During the year 2008–2009.

**Materials and Methods:** About 1200 subjects were examined for the presence of any congenital anomalies of the lower limbs in the above two districts of Karnataka. A detailed history of drug intake, any bad obstetric history (e.g., hydramnios, stillbirths, and repeated abortions) exposure to X-rays during first trimester followed by history of consanguineous marriages, history of similar congenital anomalies in the past were taken. Relevant investigations were done to confirm the diagnosis.

**Results:** Anomalies that were observed were classified into three groups. They are polydactyl of toes, club foot, and overriding of toes. They were more in age below five years. Newborn with anomalies were more in male children (68%). About 35% cases were children of consanguineous couples. Over-riding of toes was observed in one of the subject age 17 years. Polydactyl of toes were in four cases. Three were unilateral one was bilateral There were 61% of cases club foot mainly seen in newborn.

**Conclusion:** This study is of clinical importance, especially to orthopedic surgeon. This knowledge of lower limbs anomalies may be helpful to orthopedic surgeons for the corrections of cases surgically.

#### 192. Morphometric Study of Kidney in Still Born Human Fetuses

V. Sunitha, B. Narasinga Rao Maharajah's Institute of Medical Sciences, Nellimarla, Andhra Pradesh

**Aim:** This work is an attempt to analyze the growth pattern of kidney in human fetuses of Indian origin. It may prove useful in defining the fetal kidney diseases, such as agenesis, hypolpasia, multicystic kidney, polycystic kidney etc. **Background:** Kidney size is presumably influenced both by genetic and environmental factors. The number of glomeruli at birth is presumably genetically determined. The size of kidneys is dependent on the number and size of nephrons. According to Behrman and Almeida, the retardation of renal development, as occurs in individuals of low birth weight, gives rise to increased postnatal risk of systemic and glomerular hypertension, as well as enhanced risk of expression of renal diseases such as aplasia, hypoplasia, cystic disease or renal agenesis.

**Materials and Methods:** In this study, 50 fetuses of 1st, 2nd and 3rd trimesters obtained from local hospitals have been subjected to protocol of dissection. Fetuses were dissected and kidneys were removed and fixed in 10% formalin. The morphometric data, i.e., length and width were taken by slide calipers. The weights of both kidneys were taken and the volume of each kidney was measured by Archimedes principle (water displacement method).

**Observations:** A steep increase in weight of kidneys was noted at 22nd week. A gradual increase in the volume of kidney was noted.

#### 193. Morphological Changes of Human Testes in Different Age Groups

*Gautam Chandra Das, H. Bayan* Gauhati Medical College, Guwahati, Assam

**Background:** The testes are the primary reproductive organs or gonads in the male, which play an important role in the continuation of human species. They are ovoid, mobile reproductive and endocrine organs responsible for production of sperm and testosterone. The left testis usually lies lower than the right testis.

The size and shape of the testes varies from species to species due to adaptive changes that occur as evolutionary development.

**Aim:** To study the biometry and morphological changes of testes in different age groups.

**Materials and Methods:** The specimens (testes) are collected from the Department of Forensic Medicine, Department of Anatomy and Department of Obstetrics and Gynaecology (from still born infants), Gauhati Medical College and Hospital, Guwahati, Assam. After collection of specimens from different age groups, the length, breadth, thickness and weight are measured with the help of vernier callipers and analytical balance.

**Conclusion:** Testicular tumors and infertility are usually seen in aged population. Therefore, detailed morphological knowledge of testis is essential for proper diagnosis and management of testicular disease.

# 194. Histomorphogenesis of Kidneys in Human Fetuses

Sidharth Sankar Maharana, B. Narasinga Rao, P.C. Maharana KIMS and RF, Amalapuram, Andhra Pradesh

Metanephric kidney is an essential organ of vital function, which draws the attention of researchers. It begins to appear in the lumborsacral region in the caudal part of the nephrogenic cord during 9th week of intrauterine life and persists as the permanent kidney in higher forms of vertebrates including human. In this study, 30 dead human fetuses between 10 and 40 weeks of gestational age without obvious congenital anomalies were obtained from government and private hospitals with prior permission of ethical committee of K.I.M.S. and R.F., Amalapuram (E.G.), A.P., and consent of parents. After embalmed with 10% formalin through umbilical vessels, the kidneys were removed and seven external parameters were measured. For microscopic study, serial sections were noted under high and low power light microscope. The details of appearance of various histological elements of kidney in relation with gestational age were presented and discussed to arrive at a definite conclusion.

#### 195. Morphological Study on Pronator Quadratus Muscle

V. Shrikant, A.S. Yogesh\*, M. Goyal, C. Banerjee Department of Anatomy, Pt. J.N.M. Medical College, Raipur, Chhattisgarh

\*Department of Anatomy, Shri Aurobindo Institute of Medical Sciences, Indore, Madhya Pradesh

Pronator quadratus is an important, square-shaped muscle on the distal forearm that acts to pronate the hand. From the earlier investigations using electromyographic examination, it has been shown that pronator quadratus is the prime mover of the forearm pronation in all the positions of the elbow flexion and extension. There are very few anomalies of this muscle described in the literature. In this study, morphology of the pronator quadrates muscle was studied in 30 upper limbs. The points noted regarding the muscle were shape, presence of pad of fat separating the pronator quadrates muscle from other flexor muscles, thickness of pad of fat, length of the muscle at the midpoint of width, width of the muscle at midpoint of length, nerve supply of muscle, direction of fibers, angle between the long axis of ulna and direction of the muscle fibers, presence of the deep stratum and way of insertion. Detailed findings will be discussed at the time of presentation. The knowledge of the morphology of pronator quadrates is essential for anatomists, surgeons, orthopedicians, and physiotherapists.

#### 196. Histomorphological Study of Human Kidney in Different Age Groups

Chiman Kumari, Joydev Sarma, K.L. Talukdar, Rup Sekhar Deka Gauhati Medical College, Guwahati, Assam

**Aim:** To determine the histomorphological changes of human kidney in different age groups.

**Materials and Methods:** A total 102 specimens were studied. Morphological parameters included length, breadth, thickness, and weight, while glomerular diameter was measured histologically. Three age groups were taken as Groups A (0–14 years), B (15–50 years) and C (more than 50 years) and were named pediatric, adult, and geriatric age group, respectively.

**Results and Conclusions:** Changes were noted on the measured parameters. There was gradual increase in length, breadth and weight until adult age group and then decrease in geriatric age group while the thickness and glomerular diameter were gradually increasing with age. Knowledge of the changes in the renal structure with age is important for better understanding of the normal anatomy and its correlation with the pathological conditions.

## 197. Hepatotoxic Effects of Silver Nanoparticles in Mice

Brigesh R. Shahare, Madhu Yashpal\*, Gajendra Singh\* Gajaraja Medical College, Gwalior, Madhya Pradesh \*Electron Microscopic Facility, Department of Anatomy, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh

Today, use of silver nanoparticles is increasing day by day. It is used in medicine, toothpaste, paint, food preservative, washing machine, etc. Therefore, its consumption by oral route also increases. Despite its multiple uses, toxicity of silver nanoparticles in liver is not well known. In order to determine its toxicity, silver nanoparticles were injected into mice by its oral route. Total 50, 8-10 weeks old, Swiss albino male mice weighing  $25 \pm 5$  g were chosen for experiment. Silver nanoparticles were given to the mice at doses of 5, 10, 15, and 20 mg/kg for 14 and 21 days while deionized water given to the control group. After 14 and 21 days, weights of the individual mice were noted. Mice were sacrificed by cervical dislocation and abdominal cavity was opened by midline abdominal incision. The liver was removed, soaked on blotting paper and weight of the liver noted. The liver was kept in Aq. Bouin's for further preparation.

It was observed that weights of mice were decreased and liver somatic index also decreased. The light microscopic changes indicated that hepatotoxic changes occurred in liver.

### 198. Effect of Monosodium Glutamate on Liver in Albino Rat: A Histomorphometric Study

Renu Chauhan\*, Pooja Rani\*, Kamlesh Khatri\*\*

\*University College of Medical Sciences and GTB Hospital, Delhi \*\*School of Medical Sciences and Research, Sharda University, Greater Noida, Uttar Pradesh

Monosodium glutamate (MSG) is a sodium salt of glutamic acid and is found in nature and constitutes one of the main components of food proteins. It is known as *Ajinomoto* and is used as a flavor enhancer. Its harmful effects include its brain damaging effect, alteration in skeletal development, behavioral changes, and neuroendocrine disorders. As liver is the major site of metabolism and since there is paucity of literature available on the effects of MSG on the histomorphometry of liver, therefore this study was proposed.

Adult Wistar albino rats were procured from the animal house of University College of Medical Science, Dilshad Garden, Delhi, and were divided into experimental and control groups of 5 animals each. In the experimental group, MSG was injected intaperitoneally, in the dose of 4 mg/g/day for 7 days. Same amount of normal saline was injected intraperitoneally for the same duration in the control animals. After completion of the experiment, animals were sacrificed after 30 days.

The liver was dissected and 7-µm-thick paraffin sections were cut and stained with hematoxylin and eosin (H&E), Masson's trichrome and peroxidase acid-Schiff (PAS). In the experimental animals, liver tissue was seen to be infiltrated with inflammatory cells. Mild vacuolation of the cytoplasm of hepatocytes was seen and the central veins were enlarged and congested in H&E stained slides. The glycogen content of the hepatocytes was seen to be increased in PAS stained sections. The connective tissue was seen to be increased in the periportal region in sections stained with Masson's trichrome. It was concluded that MSG has damaging effects on the liver and should be ingested with caution.

### 199. Cytogenetic Analysis from Mid-trimester Amniotic Fluid Culture: Technical Aspect

Sonali S. Vidhale, Saroj V. Kotwaliwale MGM Medical College, Mumbai, Maharashtra

**Aim:** To analyze mid-trimester amniotic fluid samples and to find out the difference between the results with and without using CO<sub>2</sub>.

**Materials and Method:** Clinical history of the patient was recorded after informed and written consent. Samples were obtained from high-risk pregnancy group. Physical parameters of the amniotic fluid were studied. Then the cultures were obtained by standard protocol that included planting, harvesting, banding, and screening. Chromosomes were studied by scanning. Data was analyzed statistically and results were obtained.

**Result:** Adequate culture growth was observed in all 50 samples. No significant difference was observed in the number of days required for the culture to grow with or without the using  $CO_2$ . The number of days required for adequate growth of the culture increased with the advancing gestational age. A case with abnormal ultrasonographic findings from the age group (41–45 years) and was found to be trisomy of 18 (47, +18), suggesting increased susceptibility to chromosomal abnormality with advance maternal age.

**Conclusion:** Amniotic fluid cultures can be grown adequately even without using CO<sub>2</sub>, which not only makes the technique cost effective but also simpler for implementation even at district level. Therefore, the delay due to transfer of sample to bigger cities can be reduced and will help in genetic counseling and primary prevention of nondisjunction or structural aberration by prenatal diagnosis.

### 200. Restitution of Ceric Sulphate: Induced Sterility in Male Rats by Ionidium Suffruticosum

B. Senthil Kumar, J. Vijaya Kumar, R. Selvaraj VMKV Medical College, Salem, Tamil Nadu

**Background:** With the growth of the chemical industry, a number of new compounds are attaining wide use. Some of them have been found to have deleterious effects on the reproductive organs. Cerium is attaining wide application in ceramic and glass industries, medicine, as catalytic agent and in nuclear technology. The presentation of our reports shows some interesting results on the effect of ceric sulplate on the fertility of male albino rats.

**Materials and Methods:** A total of 20 young male albino rats were selected and about 1 ml of 1 M solution of ceric sulphate was administered subcutaneously for 7 days. The testicular tissues were collected by biopsy and histological examination was done to confirm sterility. After rest period

lonidium suffruticosum powder were administered orally to the sterile experimental albino rats (n = 10) and compared to the control albino rats (n = 10) using various parameters such as weight of animals, dimension of testes, hormonal analysis, semen analysis, histological analysis of testes, histomorphometry of testes diameter of seminiferous tubules and the drug's efficacy was proved by the restitution of fertility.

**Results:** The administration of the drug showed significant improvement of all the parameters in experimental rats when compared to control rats. Data were analyzed using student's *t*-test and found to be statistically significant.

**Conclusion:** The herb was found to be effective on the gonads of sterile male albino rats.

**201. Histogenesis of Human Fetal Pancreas** *Swati Patil, T. Vijay Sagar, Rajan Bhatnagar* Armed Forces Medical College, Pune, Maharashtra

**Background:** The pancreas is a large digestive gland having both exocrine and endocrine functions. The exocrine part secretes enzymes involved in digestion whereas endocrine part of pancreas is concerned with glucose homeostasis.

**Aim:** To study sequence of histogenesis of exocrine and endocrine component of human fetal pancreas.

**Materials and Methods:** Thirty aborted fetuses were obtained from the Department of Obstetrics and Gyaenocology of our hospital. Gestational age was estimated using CR length. Fetuses were divided into two groups: Group A with 12–18 weeks and Group B with 18.1–24 weeks gestation. Careful dissection was done in each fetus and pancreas were taken out and fixed in 10% formalin. Serial sections were taken at right angle to long axis of pancreas and stained with H&E.

**Results and Conclusion:** In fetuses of group A with age group 12–13 weeks, parenchyma consisted of mesenchymal tissue into which branched tubules with wide lumen were embedded. Budding of these tubules were seen to form primitive acini and islets. The islets were small, with aggregation of cells in center as cluster. Alpha cells (eosinophilic) were more in number than Beta cells (basophilic). In older fetuses with same age group (13.1–18 weeks), the size of islets had increased with more evenly distributed cells, prominent vascularization, and a distinct capsule.

In group B (18.1–24 weeks), well-organized parenchyma was seen. The islets were larger and well encapsulated and cells were closely packed. Both Alpha and Beta cells had increased in number as well as size. However, after 20 weeks, Beta cells were distinctly more in number than Alpha cells.

#### 202. Hepatoprotective Activity of Plumeria Alba Extract Against Paracetamol Induced Hepato Toxicity in Rats

Arudyuti Chowdhury, \*Bedabati Dasgupta, \*Jogen Kalita \*SRM Medical College, Chennai, Tamil Nadu Department of Life Sciences, Gauhati University, Guwahati, Assam

The methonal extract (MLE) at different doses (100,200 and 400 mg/kg b.w.) of the plant *Plumeria alba* syn. *Plumeria acatifolia* were tested for its efficacy against paracetamol (acetaminothenon) induced hepatic damage in *Wilstar* rats. The plant was collected from Guwahati (Assam). After identification, barks were peeled out from the branches, dried, powdered and extracted in methanol. Rats were divided into 6 groups with 6 animals per group and paracetamol was administered (p.o.) at a dose of 2 g/kg. The rats were monitored for biochemical changes of serum GOT, GPT, GGT, ALP and for

histopathological changes. The biochemical results showed marked increase in all parameters and histological observations provided supportive evidence for the biochemical analysis. Paracetamol, most commonly used analgesic and antipyritic drug overdose is a leading cause of liver failure. From the experimental result it was proved that the plant possess hepato-protective potency in a dose-dependent manner and the dose 400 mg/kg has significant effect in reducing the damage caused by paracetamol, which was highly comparable to the protective effect of Silymarin (100 mg/kg, b.w.). The local inhabitants use this plant from prehistoric times for treating ulcers but this study firmly established that the plant *Plumeria Alba* syn. *Plumeria Acatifolia* methanolic extract possess active hepatoprotective activity.

#### 203. Histomorphometric Characteristics of Human Vermiform Appendix with Special Reference to Lymphoid Tissue

Gopal Gupta, S.K. Srivastava, S.K. Mathur, Veena Gupta Pt. B.D. Sharma PGIMS, Rohtak, Haryana

The luminal diameter, largest lymphoid follicular diameter, and serosal-mucosal circumference (wall thickness) of the vermiform appendix were measured in micrometers from the base, middle of the appendix and near to tip and their relationship analyzed and plotted. There is a strong relationship between the diameters, especially between lymphoid follicle diameter and mucosal serosal circumference (wall thickness) on the one hand and that between luminal diameter and largest lymphoid follicle diameter on the other. There is decrease in the luminal diameter, when either wall thickness or the largest lymphoid follicle diameter increase in size, suggesting that obstruction can occur at these sites with the resulting histological and histomorphometric changes that can occur to bear in normal subjects. These profiles also explain the basis and common sites of obstruction in appendicitis.

#### **204.** Does the Intrauterine Portion of Fallopian Tube Possess an Anatomical Sphincter? A Study on Forty Five Specimens of Uterus

Lt. Col. M.S. Ahuja<sup>,</sup> R.K. Zargar, Rajan Bhatnagar Armed Forces Medical College, Pune, Maharashtra

**Background:** The histological structure of fallopian tube as described in textbooks is of the ampullary part of extramural tube. The muscular stratum of this part of fallopian tube is described as having an external longitudinal and internal circular muscle layer. The composition of this stratum in the intramural and adjoining isthmic portions is not well known, and could have clinical ramifications. **Aim:** To study the musculature of intrauterine fallopian tube, especially with regard to possible presence of an anatomical sphincter or sphincter-mechanism in this part of the uterine tube.

**Materials and Methods:** Forty-five uteri with adnexa were collected for study. The microstructure of the intramural fallopian tube and adjacent isthmus was studied through serial sections. Serial sections 5  $\mu$  thick were then taken from each segment and every tenth section was stained by Hematoxylin and Eosin and examined under light microscope.

**Results and Conclusion:** 1) Only one-third of the specimens show three muscle layers in the intramural fallopian tube, with the addition of a longitudinal layer internal to the circular muscle layer. 2) The circular muscle layer is the bulkiest and quite vascular. 3) The observations on the musculature of the uterotubal junction do not support the possibility of an anatomical sphincter in this part of the female genital tract. 4) The additional longitudinal muscle layer can be the cause of narrowing/blockage of this part of the fallopian tube, thereby contributing to the "unexplained infertility" seen in many women.

### 205. Cytogenetic Effects of Exposure to Formalin Vapors in Buccal and Nasal Mucosae: A Study in the Students of Anatomy and Embalmers

S. Shekhawat, S. Chauhan, R. Garg, K. Mogra S.M.S. Medical College, Jaipur, Rajasthan

**Background:** Formaldehyde has been classified as group I carcinogen to the human population by International Agency for Research on Cancer, as its exposure has been associated with the nasal, nasopharyngeal, buccal carcinoma, and leukemia. Formaldehyde on reaching DNA forms DNA--protein crosslinks thereby causing chromosomal mutations and micronuclei formation. The micronucleus assay provides information of cytogenetic damage in tissues by these carcinogens.

**Aim:** To find out local genotoxic and cytotoxic effects of formalin on buccal and nasal mucosae and evaluate and correlate the genocytotoxicity on the basis of duration of exposure by assessing micronucleus and other cytological changes and compare the effects of formalin used on buccal and nasal mucosae.

**Materials and Methods:** In this study, the samples from buccal and nasal mucosae of 25 exposed and 25 nonexposed individuals were taken with the help of wooden spatula and cytopathology brush, respectively. These samples were immediately smeared on the microscopic slides and fixed with ethyl alcohol and then stained with the Papanicolaou stain. After staining, slides were studied by the light microscope under 400× and 1000× magnification for the micronuclei and other effects causing genocytotoxicity.

#### **206. Histological Study of Mammalian Major Salivary Glands** *Malabika Debi* FAAMC, Barpeta, Assam

**Background:** The "salivary glands" are the small glands responsible for production of saliva, a highly important link in the digestive chain. Human major salivary glands include three pairs—parotid, submandibular, and sublingual. Major salivary glands of domestic farm animals comprise three pairs of well-defined glands, namely, parotid, mandibular (or submaxillary) and sublingual. Saliva produced by these glands serves many important functions and thus a normal salivary flow is essential for normal bodily metabolism and is also essential to prevent undesirable pathophysiologic changes in other tissues/organs. Functions of the salivary glands can be best appreciated with a precise knowledge of its anatomy, histology, and histomorphology, in particular.

**Aim:** This study is undertaken to observe interspecies variation of mammalian salivary glands with respect to their histological features.

**Materials and Methods:** For the study, the three mammalian species selected were human, pig, and goat, were categorized into 3 groups, I, II, and III respectively (6 to 7 nos. in each group). All the three species under study were selected in the adult age range.

**Results and Observations:** The histological features of the three major salivary glands in the three different species were studied under light microscope with emphasis on type of acini, ductal structure and myoepithelial cells.

## 207. Gross Anatomical Features of Left Atrial Appendages

G. Pardhi, S.S. Joshi, S.D. Joshi

SAIMS Medical College and Postgraduate Institute, Indore, Madhya Pradesh

Left auricle has unique developmental, anatomical, and physiological properties. Although, in past, it has been considered to be a relatively insignificant portion of cardiac anatomy, it assumes great significance as it is a common site of thrombus formation, its dislodgement and its sequelae in thrombo-embolic phenomenon including strokes. The left atrial appendage (LAA) can be evaluated by Trans-Esophageal-Echocardiography, MRI and Color Doppler Techniques. The first detailed description of the varied morphology of LAA was given by Ernst et al (1995). The LAA lies within the fixed, relatively immobile confines of pericardium. Not much literature is available on morphology of LAA including its shape, lobulation, size, size of opening in left atrium and the metrical data. In this study average length of LAA was 4.5 cm and maximum width was 1.8 cm. The orifice opening into the left atrium was mostly found to be oval or elliptical in shape. The inferior margin showed lobulations. In some cases a well-defined pouch was seen. The apex of the left auricle in majority of the cases was kinked and turned inferiorly.

# 208. Anatomy of Distal Biceps Tendon and its Footprint: A Cadaveric Study

*Thuslima M. Anjali, R. Yogitha, R. Roopa* St. John's Medical College, Bengaluru, Karnataka

**Aim:** Rupture of distal biceps tendon is common and there is little information in the literature describing its anatomy. The purpose of this study was to map the footprint of the biceps tendon insertion on the bicipital tuberosity and to report on the relevant anatomy of distal biceps tendon to assist surgeons with correct tendon orientation during surgical repair. Following parameters were estimated:

- 1) Length, width, and area of footprint of biceps tendon insertion.
- 2) Length and width of distal biceps tendon.
- 3) Side and gender differences in above parameters.

**Materials:** Cross-sectional analytical study was done on 24 embalmed adult cadaveric upper limbs of known gender (14 males and 10 females).

**Methods:** Cadavers were carefully dissected. Length and width were measured using Vernier calipers of 0.01 mm accuracy. Area of footprint was measured using graph sheet. Statistical analysis was done using SPSS.

**Results:** The mean length, width, and area of footprint of biceps tendon were  $19.82 \pm 1.44$  mm,  $8.97 \pm 0.95$  mm, and  $135.62 \pm 12.38$  mm<sup>2</sup>, respectively. The mean length and width of distal biceps tendon was  $61.13 \pm 12.89$  mm and  $12.49 \pm 1.75$  mm, respectively. There was no significant difference between right and left sides. There was significant difference in length of footprint between male and female cadavers.

**Conclusion:** Values of this study are comparable with previous studies. There was significant difference in values of length of footprint between male and female cadavers. This parameter should be considered before doing surgical repair of biceps tendon.

### 209. Muscular Composition of First Extensor Compartment of the Wrist: A Cadaveric Study

Saroj Lata, C.S. Chandel, Sangita Chauhan, Dhiraj Saxena SMS Medical College, Jaipur, Rajasthan

**Aim:** To study the variations in composition of musculature of the first extensor compartment of the wrist.

**Background:** Muscular content of the first dorsal compartment of the thumb has important role in the movement of thumb. Multiplicity of tendons of abductor pollicis longus, and extensor pollicis brevis has a significant role in the etiology of De Quervian's stenosing tenosynovitis. Due to the thickening and inflammation of the tendons of APL and EPB, a movement of thumb or compression of the first dorsal compartment of wrist causes pain and swelling.

**Materials and Methods:** This study was undertaken in the Department of Anatomy, SMS Medical College on 42 hands of the embalmed cadavers. Back of forearm, dorsum of wrist, and thumb were carefully dissected. The tendons of abductor pollicis longus and extensor pollicis brevis were carefully exposed up to their proximal and distal attachments and variations were seen.

**Conclusion:** It is a well known fact that the anomalies of the APL and EPB tendons are associated with De Quervian Tenosynovitis. During dissection of one right limb, we have seen the fused single belly of these two muscles. The tendon of this belly is divided into 6 slips and these slips are attached to the abductor pollicis brevis, 2 slips to the anterolateral aspect of the base of the first metacarpal, Trapezium, base of proximal phalanx of thumb and dorsal digital expansion of thumb. Thus, knowledge of this complexity of muscular fusion and their attachments is very important for a surgeon before any reconstructive surgery or surgical correction in tendinopathies.

# 210. Cadaveric Dissection of Suprahyoid Fascial Spaces

H.A. Buch, Vipul I. Shah

Faculty of Dental Science, Dharmsinh Desai University, Nadiad, Gujarat

Facial spaces in head and neck are extremely important in the spread of infections and neoplasm. The suprahyoid spaces (SHS) are mostly interconnected and may transmit even to the mediastinum. CT scan and MRI have made the diagnosis of their involvement simpler.

This study used the combined extraoral and intraoral approach to demonstrate the SHS. The intraoral approach alone could not be used as the formalin-treated cadavers did not permit adequate opening of the mouth for further dissection. At first, extraoral deep dissection of the face and upper anterior triangle was completed; the masseter and the temporalis were reflected examining spaces in their relations, and the temporo-mandibular joint was also dissected so that the mandible could be lowered to open the mouth. The cheek was divided from the angle of the mouth horizontally backwards after demonstrating the buccal space. The mandible was cut in the midline with the Gigli saw detaching the platysma, digastric and genial muscles, and half of the bone was gradually swung laterally for intraoral exposure. A mucosal incision exposed the mylohyoid muscle (MHM) separating sublingual from sub mental and submandibular spaces. As the MHM was cut and the mandible was further swung laterally, extension of the dissection exposed both the pterygoid muscles defining pterygomandibular, Para pharyngeal, and the infra-temporal spaces. Subsequently, the paratonsillar space, retropharyngeal, and prevertebral spaces were dissected.

It may be appreciated that most of the SHS are perimandibular making the mandible as the bone with maximum such spaces in its relation.

#### 211. Prevalance and Morphometric Study of Palmaris Longus Muscle in South Indian Population

P. Ramesh, Jhon Pal Judson, T.K. Balaji, S. Manickam, K. Suba Ananthi

Chettinad Hospital and Research Institute, Kelambakkam, Tamil Nadu

**Aim:** To determine the frequency of agenesis of Palmaris longus and its association with sex, side of limb, handedness in South Indian population and its morphometric measurements in cadavers.

**Materials and Methods:** The prevalence of Palmaris longus was clinically determined in 250 normal South Indian subjects of both sexes (125 males and 125 females), aged between 18 and 65 years, using the Schaeffer's test. Hand dominance of the subjects was also recorded. The morphometric measurements of Palmaris longus muscle were studied in 40 dissected upper limb specimens of the anatomy department of CHRI.

**Result:** Overall agenesis of muscle in both sexes was 24% (16% in males and 32% in females). The agenesis was unilateral in 71.6% and bilateral in 28.3%. The agenesis on left side is 58.13% and the right side is 41.86%. Agenesis of Palmaris longus was more common on nondominant limb. Measurements of Palmaris longus tendon in cadavers showed a mean length and width of 13.52 cm and 0.54 cm, respectively, and the mean length, width and circumference of belly were 10.12 cm, 1.34 cm, and 3.03 cm, respectively.

**Conclusion:** The agenesis of Palmaris longus was more common in nondominant limb and in females. The absence was commonly unilateral and to the left side. The study shows the length of Palmaris longus tendon is below the required length of 15 cm for standard tendon graft surgeries.

#### 212. A Study of Insertions of Extra Ocular Muscles

S.A. Athavale, S. Kotgirwar AIIMS, Bhopal, Madhya Pradesh

With the improvement in surgical techniques, the ocular surgeries have become more common. Surgeries for congenital or acquired squint require precise knowledge of insertions of recti and obliqui. Available studies on insertions of recti is scant, dates back to 19th or early 20th century, insertions of recti are done on very small number of cases and are done on white populations. This study attempts to study the insertions of recti and obliqii in Indian population. Forty-two eyeballs were utilized for this study. The eyeballs along with the recti were removed from the orbit and were cleaned off the periocular connective tissue. The insertions of the recti and obliqui were cleaned. The eyeballs were infused with normal saline to reclaim the shape. Following observations were recorded:

(i) Distance of insertions of the recti from the limbus, (ii) width of insertions of the recti, (iii) distance between the insertions of the adjacent recti, and (iv) length of aponeurosis of the recti. Following observations were recorded on the insertions of the obliqui: (i) width of insertions, (ii) minimum distance between the insertions of the two obliqui.

#### 213. Bifurcation of Brachial Artery: A Fetal Study

Ambath D. Momin, N. Damayanti Devi Regional Institute of Medical Sciences, Imphal, Manipur

**Aim:** Variation in the level of bifurcation of brachial artery into radial and ulnar artery is not uncommon. Therefore, this study is undertaken to observe the bifurcation pattern of the above mention artery.

**Materials and Methods:** Thirty-six fetuses of different gestational ages, a product of terminated pregnancy under MTP act of India, 1971 and stillbirths were collected from the department of Obstetrics and Gynaecololgy, RIMS, Imphal, with a prior permission from the ethical committee RIMS, Imphal. The upper limbs of the fetuses were dissected bilaterally to see the level of bifurcation of the brachial artery.

**Results:** During dissection some variation in the level of bifurcation is observed.

**Conclusion:** Knowledge of variation in the bifurcation is important for the surgeons and anatomists. These variations may complicate the surgical procedure. Preoperative angiographic evaluation is recommended.

#### 214. Multiple Renal Arteries from Abdominal Aorta: An Anatomical Study

S.K. Srivastava, Shilpa Bathla Pt. B.D. Sharma PGIMS, Rohtak, Haryana

Multiple renal artery variations are of great clinical significance to radiologists, nephrologists, surgeons, and urologists in imaging, urological and vascular procedures, and renal transplantations. Variations in renal arteries have been reported as early as 1958 by Merklin and Michel. Large numbers of studies have been reported regarding the incidences of accessory and aberrant renal arteries arising from different sources. Most of these reports are from different populations but very few in Indian populations. Accessory renal arteries in Indian population have been reported by Satyapal et al (2001) as 17.5%, Budhiraja et al (2011) as 10.7%, and Gupta et al (2011) as 28.3% cases. There were several case reports of multiple renal arteries reported in the available literature. This study was conducted on 32 cadavers in the department. Only in 1 cadaver (3.12%), a single accessory renal artery arising from abdominal aorta was found only on the right side. On the left side, there was single renal artery arising from abdominal aorta. The accessory renal artery was entering into the kidney through the hilum. These findings were discussed with other cases reported in the literature for Indian population.

## 215. A Study on Arterial Supply of Thyroid Gland and Its Variations

P. Swetha, P.V. Chandirka, K.S.N. Prasad Siddhartha Medical College, Vijayawada, Andhra Pradesh

Ligation of thyroid arteries is essential to ensure proper homeostasis, and their intimate relationship with the nerves should be kept in mind while ligating the vessels. According to Campos et al. (1999), the right recurrent laryngeal nerve is in between branches of inferior thyroid arteries in 47.30% males and 42.80% females, anterior to inferior thyroid arteries in 27.90% males and 28.60% females, posterior to inferior thyroid arteries 24.03% males and 28.60% females. This study was taken on 40 adult cadavers. Superior thyroid arteries and inferior thyroid arteries were dissected throughout its course including branches of thyroidea in arteries. In 97.5% cases (39 out of 40) superior thyroid artery is arising from anteromedial aspect, 1 cm above the origin of external carotid artery and supplying the thyroid gland from the apex. In one of the dissections, right superior thyroid artery arising from external carotid artery in close proximity to common carotid artery bifurcation. In another dissection, there is no change in the origin of superior thyroid artery but its right glandular branches to thyroid gland are arising from external carotid artery. Inferior thyroid artery is arising from thyrocervical trunk in 97.5% cases (39 out of 40) as a regular course. In one of the dissection, left inferior thyroid artery is arising from vertebral artery, i.e., 2.5% cases. In view of the sample size, it is not prudent to compare the work.

#### 216. A Study of Facial Artery on Face

Arathy Babu, Antony Sylvan D'souza, Lydia S. Quadros Kasturba Medical College, Manipal University, Manipal, Karnataka

**Background:** Facial artery contributes the major arterial supply to the face. The named branches on the face are inferior labial, superior labial, lateral nasal, and angular arteries.

**Aim:** To study the variations of the named branches of facial artery on the face.

**Materials and Methods:** Twenty-eight hemi-faces of embalmed adult cadavers of both sexes were dissected meticulously. The course, branches and termination of facial artery on the face were noted and photographed. The diameter of the facial artery was noted at two points using fine microcaliper. **Results:** In this study, we found that the major percentage of facial arteries was normal in both sexes. The variations were all grouped under different categories. The diameter of the facial artery was also measured at different levels and found to be more in males when compared to females. Details of the results were discussed during the conference.

**Conclusion:** Facial artery is of clinical importance for performing intraarterial chemotherapy for head and neck and for the plastic surgeons in various cosmetic facial surgeries.

#### 217. Anatomy of Superficial Branches of Femoral Artery for Graft Procedures

D. Chaitra, Antony Sylvan D'souza, L.C. Prasanna Kasturba Medical College, Manipal University, Manipal, Karnataka

**Background:** Since the advent of plastic surgery, the groin region has always been a loyal provider of abundant well-perfused tissue. The superficial branches of femoral artery provide ample skin and subcutaneous fat with minimal donor site morbidity without breaching the abdomino-perineal musculature.

**Materials and Methods:** Anatomic dissection was performed on 15 adult human cadavers to analyze the vascular pedicels of the superficial external pudendal artery, deep external pudendal artery, superficial inferior epigastric artery and circumflex femoral arteries and their relations to certain anatomic landmarks were determined. The study also focused on the branching pattern and internal diameters of each artery.

**Conclusion:** Our study provides an accurate knowledge of the vascular basis of perineogenital skin that may allow easier understanding and reliable design and management of flaps in various reconstructive surgeries.

## 218. A Cadaveric Study of Branching Pattern of Axillary Artery

Maulik D. Patel, Astha A. Jain, V.B. Kariya, H.R. Shah, S.H. Aterkar, C.A. Pensi

B.J. Medical College, Ahmedabad, Gujarat

**Aim:** To study the branching pattern of axillary artery and to detect the abnormalities in the branching pattern of axillary artery.

**Materials and Methods:** The study was conducted in the Anatomy Department at B.J. Medical College, Civil Hospital, Ahmedabad. A total of hundred axilla were dissected (50 cadavers bilaterally) and branches of axillary artery were observed from their point of origin from axillary artery and traced to their termination.

**Result:** Results of this study showed that out of 100 upper limbs 80 had normal branching pattern and 20 had variations in branching pattern of axillary artery. We found variations showing that common trunk arising from the 2nd part of the axillary artery from which lateral thoracic artery, anterior and posterior circumflex humeral artery and subscapular artery were arising in four cadavers bilaterally and three cadavers unilaterally. Common trunk for anterior and posterior circumflex humeral artery arose from 3rd part of the axillary artery in 6 cadavers unilaterally. Common trunk arose from 2nd part of the axillary artery from which anterior and posterior circumflex humeral artery and subscapular artery were arising in one cadaver bilaterally and one cadaver unilaterally.

**Conclusion:** Awareness about details and topographic anatomy of variations of the axillary artery may serve as a useful guide for both radiologist and vascular surgeons. It may help to prevent diagnostic errors and to avoid complications during any surgery of the axillary region.

### 219. A Study of Variations in the Branching Pattern of Brachial Artery

Ratna Prabha Pinnamaneni

Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, Chinnaavutapalli, Andhra Pradesh

**Background:** Vascular variants particularly arterial variations of upper extremities are important for radiologists, plastic surgeons and orthopedic surgeons. In higher bifurcation of brachial artery, the ulnar and radial arteries are placed superficially and made them vulnerable to trauma. With this clinical significance, the following study is carried out.

**Aim:** The aim of the study is to observe the variations in the branching pattern of brachial artery.

**Materials and Methods:** This study was carried out in 30 human cadavers (60 upper limbs) during routine dissection of upper limb in the Department of Anatomy, Dr. PSIMS and R.F., Chinavutapalli.

**Observations:** Variations in the branching pattern of brachial artery were observed in seven cadavers (six unilateral, one bilateral). According to standard description, brachial artery is a continuation of axillary artery at the distal border of teres major and ends at the level of neck of radius by dividing into radial and ulnar arteries. In this study, trifurcation at the level of neck of radius was observed in four cadavers (unilateral), higher bifurcation in two cadavers (unilateral) and superficial brachial artery in one cadaver (bilateral). Detailed description of the observation of variations were presented and discussed.

# 220. A Study of Variations in Branching Pattern of Axillary Artery

D. Anusha

Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, Chinnaavutapalli, Andhra Pradesh

**Background:** Axillary artery is continuation of subclavian artery at the outer border of the first rib and ends at the lower

border of tendon of teres major muscle, where it continues as brachial artery. Pectoralis minor muscle crosses in front of artery and divides into three parts. The first part is proximal to muscle, the second part is behind the muscle, and the third part is distal to the muscle. Branches from 1st part are superior thoracic artery. Branches from 2nd part are thoracoacromial and lateral thoracic. Branches from 3rd part are subscapular, anterior circumflex humeral artery, and posterior circumflex humeral artery.

**Objective:** The large percentage of variations in branching pattern of axillary artery is making it worthwhile to take any anomaly into consideration. The type and frequency of these vascular variations should be well understood. The objective of this study is to observe variations in axillary artery branches in human cadavers.

**Materials and Methods:** During routine dissection of axillary region in 15 cadavers (30 limbs), variations in branching pattern of axillary artery were observed. Most common variation was common trunk for subscapular artery and posterior circumflex humeral artery.

#### 221. Microsurgical Anatomy of Proximal Segment of Middle Cerebral Artery with Special Emphasis on its Perforators

Harsimran Jit Singh, Anjali Aggarwal, Tulika Gupta, Daisy Sahni

PGIMER, Chandigarh, Punjab

**Aim:** To study microsurgical anatomy of proximal segment of middle cerebral artery (MCA) with special emphasis on its perforators.

**Materials:** Sixty MCAs in formalin-fixed adult brain without any evidence of brain pathology and trauma were selected for study.

**Methods:** Proximal segment of MCA was explored under magnoscope. Length and outer diameter at the origin and course of M1 segment were studied. Course, number, length, outer diameter of perforators, and distance of first perforator from the ICA bifurcation was measured under operating microscope.

**Results:** Mean outer diameter of proximal segment was 3.04 mm and length from origin to genu was 28.13 mm  $\pm$  3.40. Proximal segment showed bifurcation in 93% and trifurcation in 7% cases. Average length of perforator free area of MCA after its origin was 2.07 mm  $\pm$  2.59. Number of perforators arising directly from trunk of MCA ranged from 0 to 14.

**Conclusion:** Detailed data presented in this study may be useful while planning and performing cerebrovascular interventional procedures and also during performing aneurysms surgery.

# 222. An Anatomical Study of Testicular Vessel and Its Clinical Importance

Devendra Singh, Tulika Gupta, Anjali Aggarwal, Daisy Sahni Postgraduate Institute of Medical Education and Research, Chandigarh, Punjab

**Aim:** With the advent of intra-abdominal operative and laparoscopic techniques, ligation of testicular artery in orchiopexy, herniorrhaphy, and varicocele, the anatomy of testicular vessels has gained much more importance. The testicular vessels may vary at their origin, course, relation and may also be multiple and/or accessory. Therefore, this study was designed to assess the normal and aberrant origin and course of testicular vessels.

**Materials:** The study was conducted on 15 male cadavers belonging to north-west Indian population available in the department of anatomy PGIMER, Chandigarh.

**Methods:** The abdomen was dissected by standard procedure and retroperitoneal structures were exposed. Testicular vessels were exposed throughout their length. Site and diameter of origin of testicular artery and its distance from the superior mesenteric artery were noted. Drainage site for testicular vein was observed. The course, relation, and variations were studied for testicular vessels. All measurements were done with the help of digital vernier caliper with the accuracy of 0.02 mm.

**Results:** The results and their clinical implications were discussed at the time of the presentation.

#### 223. Anatomical Variation of Human Suprarenal Vessels: A Cadaveric Study

Megha Rapotra, Anjali Aggarwal, Tulika Gupta, Daisy Sahni Postgraduate Institute of Medical Education and Research, Chandigarh, Punjab

**Aim:** Variations of vascular anatomy of suprarenal gland are significant for radiological and surgical interventions. Hence, we aimed to study vascular supply of suprarenal gland.

**Materials:** Material of study comprised 18 well-embalmed human cadavers (36 suprarenal glands).

**Methods:** The abdominal cavity was opened by a cruciform incision passing through whole thickness of anterior abdominal wall. Flaps were reflected and abdominal viscera were systemically removed to expose suprarenal glands on posterior abdominal wall. The suprarenal arteries were identified and traced from their origin to the gland. They were studied for variations in number, origin, diameter, length, relationship with surrounding structures, such as veins, and site of entry into the gland. Length and diameter of the vessels were measured with digital caliper (accuracy of 0.02 mm). Venous drainage of the gland was also studied.

### 224. Variant Arteries at the Base of the Brain

Vaibhav Sande, S.P. Wanajri Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha, Maharashtra

**Aim:** To study the formation of circle of Willis in cadavers. To note variations in configuration or branching pattern of circle of Willis.

**Materials and Methods:** During routine dissection in the Department of Anatomy, Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha, 15 specimens of brain were removed from cadavers and studied for arterial pattern and related variations of circle of Willis.

**Result:** In this study, the circle was complete in 13 cases (86.66%) and incomplete in two cases (13.33%). Out of the 13 complete circles, five circles (33.33%) were symmetric and eight circles (53.33%) were asymmetric. Anterior communicating artery (ACoA) was present in 13 cases and absent in two cases. Posterior communicating artery (PCoA) was present and normal in origin and size in 13 cases and absent in two cases. P1-R (right posterior cerebral artery before PCoA) was absent in one case while P1-L was absent in one case.

**Conclusion:** Knowledge of anatomical variations is of vital importance in surgery, the aim is to preserve arteries in unusual locations, which if injured can determine invalidating sequelae. Therefore, a detailed knowledge on various configurations of the circle of Willis is an important factor affecting the results of surgical interventions.

#### 225. A Study on Obturator Artery

*M. Sakthivel, T.K. Balaji, Jhon Pal Judson* Chettinad Hospital and Research Institute, Kelambakkam, Tamil Nadu

**Background:** Obturator artery, a branch from the anterior division of internal iliac artery, supplies hip joint and muscles of adductor compartment of thigh. Within the pelvis, it gives branches to urinary bladder and twigs to ilium and pubis. Knowledge regarding the variations of obturator artery is essential during surgeries and fracture of pubic ramus.

**Aim:** To study any variation in the origin, course, and branching pattern of obturator artery.

**Materials and Methods:** This study was conducted on 30 formalin-fixed pelvic halves in the Anatomy Department of CHRI. The origin, course, and branching pattern of the obturator artery were observed and noted.

**Results:** In 65% of the specimens, the obturator artery was found to originate from internal iliac artery. It branched off individually or with other branches at different levels either from the anterior division or from the posterior division. In 35% of the cases, the obturator artery branched off from the external iliac artery as a separate branch or with the inferior epigastric artery.

**Conclusion:** Knowledge regarding the variations of obturator artery is useful during surgeries of direct or indirect inguinal, femoral or obturator hernia. The surgeon must be aware of the artery's close proximity to the femoral ring.

#### 226. Anatomical Evaluation of Anterior C1–C2 Vertebrae

Poonam Patnaik, Mohit Singh Dalvinder

Santosh Medical College and Hospital, Jamia Millia Islamia, New Delhi

**Background:** Odontoid process of axis forms the median atlantoaxial joint with anterior arch of atlas. The anterior arch of C1 must be drilled out to reach the odontoid process for transoral odontoidectomy, which is an effective surgical procedure for direct decompression of ventral cervicomedullary junction.

**Aim:** To evaluate the dimensions of anterior part of atlas and axis vertebrae quantatively and discuss its clinical importance.

**Materials and Methods:** Forty macerated dried atlas and axis vertebrae kept in the museum of the Department of Anatomy, JMI and KDC were studied with the help of fixable manual caliper and vernier caliper.

**Results:** The mean anterior arch width of C1 was 15.83 mm  $\pm$  2.72 mm. The mean anterior arch thickness of C1 was 5.81 mm  $\pm$  1.19 mm. The mean width of dens of axis was 10.68 mm  $\pm$  1.4 mm and the mean height of dens of axis was 15.26  $\pm$  2.5.

**Conclusion:** Based on this study, a set of anatomical data on dimensions of anterior aspect of atlas and axis were presented.

#### 227. A Morphological Study on Human Umbilical Cord

Gunamani Rabha, K.L. Talukdar Gauhati Medical College, Guwahati, Assam

Aim: To study the morphology of human umbilical cord.

**Materials and Methods:** In this study, a total number of 100 umbilical cord attached to placenta were collected from the Dept. of Obstetrics and Gynaecology, GMCH and studied in the Dept. of Anatomy, GMCH. The various parameters such as length and thickness were measured. The attachment site of the cord with placenta was noted, helical pattern studied, and photographed.

**Results and Observations:** The length, thickness, helical pattern, and attachment to placenta were studied. The results and data were analyzed using statistical package and were presented in tubular form.

**Conclusion:** The umbilical cord is a very important structure in determining the future health of the baby. An umbilical cord accident occurs when umbilical venous or umbilical arterial blood flow is compromised to a degree that it leads to fetal injury or death. Though its direct relationship with fetal outcomes is not yet proved, its effects on fetus always raise questions in mind. Although many studies have been done on the umbilical cord, yet many facts have to be revealed.

#### 228. Desvenlafaxine-Induced Behavioral and Histological Changes in Swiss Albino Mice

Amrita Kumari, Mandavi Singh, Anshuman Trigunayat\* Department of Anatomy, \*Department of Pharmacology, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh

Desvenlafaxine, a serotonin and norepinephrine reuptake inhibitor, is an atypical antidepressant used in various mood disorders. In this study, desvenlafaxine was given to female Swiss albino mice in the dose of 80 mg/kg/body wt from day 1–6 of gestation by oral gavage. Control groups were similarly treated with equivalent amount of tap water by same route. The animals of both treated and control groups were divided into two groups. One half of the animals were sacrificed on day 19th of gestation by deep ether anesthesia, fetuses were collected and fixed in 10% neutral formalin. After fixation the brain of the fetuses were dissected out and further processed for histological observations. Half of the animals from both control and treated groups were allowed to deliver and subjected to various behavioral tests at the age of 8-10 weeks approximately. In open field test, the offspring of the treated mice showed significant increase in ambulation, rearing, selfgrooming but other parameters, such as immobility time, and fecal pellets did not show any significant changes. The behavioral changes were correlated well with histological changes associated with hippocampus. The hippocampal cortex showed typical trilaminar arrangement and only slight reduction in thickness was observed in comparison to control group.

#### 229. Histological Effects of Orlistat on Large Intestine of Albino Rats Administered for Acute and Subacute Durations

Nidhi Singh, S.I. Jethani, R.K. Rohatgi, Juhi Kalra Department of Anatomy, HIMS, Jolly Grant, Dehradun, Uttarakhand

**Background:** Orlistat, a hydrogenated derivative of lipstatin (tetrahydrolipstatin), is a potent irreversible inhibitor of gastric, pancreatic, and carboxylester lipase, promotes loss of weight by preventing the digestion and absorption of fat in food.

**Aim:** This study was carried out to see the histopathological effects of orlistat on the large intestine of albino rat.

**Methods:** Sixty albino rats were divided into two groups: control and experimental. Orlistat was administered orally to

the experimental group in single (5.14 mg) and double doses (10.28 mg) for a period of one week and three weeks, while the control group was given an equal amount of vehicle (normal saline) for the same period. At the end of treatment period, rats were sacrificed after ether anesthesia. Tissues were processed, stained with H&E and PAS stains and observed under the light microscope.

**Results:** An increase in the thickness of epithelium, Type I and II Aberrant crypts, multilobed crypts, and increased number of goblet cells were observed.

**Conclusions:** This histological study confirms the previous reports about orlistat, which lead to the degeneration of the lining epithelium of the gastrointestinal tract. Deleterious effects of the drug from simple erosions to aberrant crypts in the mucosal lining of the gastrointestinal tract were noted.

# **230.** Mounting of Wet Specimen and Establishing Virtual Gallery in Museum

A. Mahajan, R. Verma, Suraj Bindusar, N. Vasudeva Maulana Azad Medical College, New Delhi

**Background:** Museum is the place for preserving and maintaining medical specimens, models, and records in original form to facilitate teaching learning process. To overcome the limited study time, increasing number of students and the scarcity of cadavers and staff, we need to facilitate and ease the use of museum specimens as teaching learning tool and as ready reference for self-directed study. We have encouraged the use of neatly and layer-wise dissected wet specimens apart from the use of routine cadaveric dissection to provide good visual memory tool for enhancing the retention ability of the student.

**Aim:** To prepare and display mounted wet specimen as teaching material for medical students, allied science students and for the clinical departments.

**Materials and Methods:** Neatly dissected specimens were procured from the dissection hall, formalin-fixed, and mounted in perspex jars in appropriate mounting medium, properly sealed, and displayed in the museum. Each specimen was photographed; a brief description of each specimen was documented and subsequently a computerized catalogue was compiled. These wet specimens were introduced to the student prior to cadaveric dissection for three-dimensional orientation of the region.

**Results:** Use of mounted wet museum specimens for region-wise teaching in series has been found to be a very effective teaching modality in inculcating self-learning process in medical students. Virtual gallery also has been found very effective in making the museum user friendly.

**Conclusion:** For teaching learning tools, use of museum specimens should be encouraged as it is very useful and effective for medical and allied science students and a ready reference for the clinicians. Also, this comes at no additional cost, neither labor intensive, and a self-learning tool, and it is the best possible usage of the cadavers that are becoming scarce every passing year.

### 231. Experimentation on Animals: A Basic Scientific Research Work and Its Restriction

Th. Naranbabu Singh

Regional Institute of Medical Sciences (RIMS), Imphal, Manipur

Dissection and experimentation on animals is no more permissible in the medical school. It has to be replaced by simulous effect programs that are equally effective in teaching. However, experimentation on animals still played the pivotal role in medical research. However, we have to follow a strict protocol for conducting experimentation on animals and treat these laboratory animals with love and care.

#### 232. Situs Inversus Totalis: A Cadaveric Study

Gautam Chandra Das, Joydev Sarma, Gunamoni Rabha Gauhati Medical College, Guwahati, Assam

**Background:** Situs inversus is a congenital condition in which the major organs of the chest and abdomen are reversed or mirrored from their normal position. The normal arrangement is known as *situs solitus*. The heart is located on the right side of thorax, stomach, and spleen on the right side of the abdomen and liver and gallbladder on the left side.

**Aim:** To study the various abnormal positions of the thoracic and abdominal organs in comparison with their normal anatomical positions.

**Materials and Methods:** During the routine cadaveric dissection for teaching purpose, a cadaver was found with situs inversus totalis in the Department of Anatomy, Guwahati Medical College, Guwahati, Assam. The cadaver was dissected to see the abnormal positions of the thoracic and abdominal organs and photographs were taken for the study.

**Discussion:** Situs inversus was first described by Aristotle in animals and by Fabricius in humans. Each incidence has been reported to vary widely between one in 4000 and 20000 live births. The exact etiology is not known but it has been inherited in different ways in different families. Autosomal recessive and X-linked inheritance have been reported. Situs inversus can also occur in association with syndrome such as Kartagener syndrome or primary ciliary dyskinesia (PCD).

**233.** Morphogenesis of Spleen in Human Fetuses Mrinmoy Pal, Ch. Rajendra Singh, Th. Naranbabu Singh Regional Institute of Medical Sciences (RIMS), Imphal, Manipur

**Background:** The spleen, largest of the lymphoid organ, lies under the diaphragm on the left side of the abdomen and performs reservoir, filtering, and immunological function. Spleen appears about the sixth gestational week (GW) as a localized thickening of the celomic epithelium of dorsal mesogastrium near its cranial end. The proliferating cells invade

the underlying angiogenetic mesenchyme that becomes condensed and vascularized.

**Materials and Methods:** Seventy-four fetuses without any gross abnormality of different GW, ranging from 10th to 40th GW were collected from RIMS Hospital, Imphal, which were the products of terminated pregnancy under the MTP act of India.

Time of appearance of primordium of the spleen in fetuses and to study the morphology of developing spleen in terms of its position, color, shape, size, weight, volume, notches, accessory spleen, and peritoneal relation and also its relation with the neighboring viscera.

**Summary:** The weight, volume, and all the dimensions of spleen were found to be increased with increasing GW. It was wedge shaped in 49%, tetrahedron in 42% and triangular in 9% of the fetuses and accessory spleen was found in 9.5% fetuses of this study.

#### 234. Oligodontia

R.R. Fulzele, P.R. Fulzele\* J.N.M.C, \*S.P.D.C, DMIMS (DU), Sawangi (Meghe), Wardha, Maharashtra

Oligodonta is a rare, genetic disorder, defined as a congenital absence of teeth. It is developmental disturbance in number of teeth. It is an uncommon condition with variety of expressions. Partial absence of dental germs is a congenital defect and may be hereditary. A tooth is said to be developmentally missing when it cannot be discerned clinically and radiographically, and there is no history of extraction. Congenital absence of tooth germ is due to true failure of odontogenesis. Absence of all teeth is called complete anodontia. Absence of half the number of tooth germ is oligodontia. Radiographic findings showed few radiopacities in the posterior region of both maxilla and mandible, corresponding to the calcified crowns of the teeth. The roots of these teeth cannot be appreciated in the radiographs as they are very short. There is a close correlation between congenitally missing deciduous teeth and their permanent successors, suggesting a genetic factor. This may present as a rare hereditary, dental disorder encountered in a pure form without any associated abnormalities or syndrome.

#### 235. Right-Sided Descending and Sigmoid Colon: Its Clinical Implications

Preeti Shrivastava, Anita Tuli, Sohinder Kaur, Shashi Raheja Lady Hardinge Medical College and SSK Hospital, New Delhi

Sigmoid colon has always been described in our textbooks of anatomy as viscera with a constant morphology but variable lengths. Around 82 cadavers were dissected and observed in the Department of Anatomy, Lady Hardinge Medical College and SSK Hospital, New Delhi. Out of which one cadaver showed an abnormally located sigmoid colon with an abnormal attachment of sigmoid mesocolon. The cecum was also not in its normal location, it was lumbar in position. So was the case with the descending colon which was not in the left paracolic gutter, instead was located in the umbilical quadrant along the root of the mesentery, having an independent mesentery of its own. This probably occurred during rotation and fixation of gut.

#### 236. Morphometric Parameters of Developing Liver in Relation with Gestational Age

Kanchan Kapoor, Mandeep Kaur, Anshu Sharma, Anju Huria\*

Department of Anatomy,\* Department of Obstetrics and Gynaecology, Government Medical College and Hospital, Chandigarh, Punjab

The objective of this study is to create a normal reference table of fetal liver parameters with increasing gestational age. In this study, 40 fetal liver specimens were dissected from formalin-fixed aborted fetuses. The gestational age ranged from 11 weeks to 28 weeks. Various measurements of liver including length at different points, width, and height were taken. In addition, the presence of accessory lobes, position, and attachment of gall bladder was also noted. These parameters were correlated with the gestational age, BPD, head and abdominal circumferences. Statistical analysis of the results showed a highly significant correlation between liver parameters and above mentioned fetal parameters. The data was compared with other studies done by ultrasound, MRI, or at autopsy. The study is a useful tool as a reference table for estimation of gestational age as well as for the assessment of some fetal pathological conditions.

#### 237. A Comparison Between Fetal Transcerebellar Diameter and Femoral Length for Prediction of Gestational Age: An Ultrasonographic Study

Shashank B. Vedpathak, Dhanaji S. Jadhav, Swati M. Belsare, Swati Raje

MIMER, Pune, Maharashtra

**Aim:** Estimation of fetal gestational age by using transverse cerebellar diameter and femur length as the biometric parameters. To compare the efficacy of transverse cerebellar diameter and femur length throughout the gestational period.

**Background:** Prediction of gestational age based on sonographic fetal parameters is the cornerstone in modern obstetrics especially in the management of pregnancies with fetal growth disturbances. Conventional biometric indices for dating pregnancies are the fetal biparietal diameter, head circumference, abdominal circumference, and femoral length. Fetal transcerebellar diameter (TCD) has evolved as a superior parameter in predicting gestational age. The fetal cerebellum is surrounded by dense petrous temporal and occipital bones, which can resist deformation and there is relative preservation of normal cerebellar growth in growth-restricted fetuses. This study compares the efficacy of transcerebellar diameter against femoral length for predicting gestational age.

**Materials and Methods:** This study was conducted in the Department of Anatomy in association with Department of Radiodiagnosis of MIMER Medical College, Talegaon Dabhade. About 100 pregnant women between 14 and 40 weeks with known last menstrual period attending the antenatal clinic for routine ultrasound examination were selected for the study. The gestational age was calculated by using all conventional biometric parameters and accordingly patients were divided into 5 groups. In each group, FL and TCD were correlated with gestational age and the results were compared.

**Conclusion:** The study found that TCD correlates with gestational age in first 2 groups only but FL correlates with it in all 5 groups indicating that FL is more effective parameter than TCD in estimating gestational age.

#### **238. Umbilical Cord Care Practices Among the Newborns of the Gadaba and Konda Dora Tribes** *K.B. Swamy*

Kuala Terengganu, Malaysia

**Research Question:** How the cord care was provided to the Gadaba and Konda Dora newborns?

**Settings and Design:** A cross-sectional study was conducted on Gadaba and Konda Dora tribal populations at random from 95 tribal villages in Vizianagaram district of Andhra Pradesh.

**Materials and Methods:** Data were collected from 300 lactating women from each tribe, age ranges between 15 and 45 years through in-depth interview method.

**Results:** Nearly one-fifth (18.0–20.0%) of the present tribal women reported that the umbilical cord was cut after the delivery of the placenta, and majority were not sure/ unaware the time of removing the umbilical cord. Most of the Gadaba (80.3%) and Konda Dora (82.3%) tribes used the new shaving blade to cut the umbilical cord. After cutting the umbilical cord, new thread was tied to the stump to arrest the blood flow in 80.3% of Gadaba and 83.0% of Konda Dora newborns. About 96.0% of Gadaba and 95.3% of Konda Dora newborns were applied with variety of oils or ash of vegetative origins and also different powders.

**Conclusion:** Some of these studies in tribal women have adopted certain unhygienic practices in cutting the umbilical cord with unsterilized instruments, tying with available material and also applying the cord stump with different substances that are considered to be unhealthy practices.

#### 239. Deciphering Caudal Embryonic Defects: Embryological Analysis and Insights into Pathogenesis

S.A. Athavale

All India Institute of Medical Sciences, Bhopal, Madhya Pradesh

A number of syndromes/associations involving the caudal region have been described in the literature. Each of them is characterized by a set of morphological features. Reports on difficulties in delineation and an ever increasing constellation of defects in recent past calls for a comprehensive study into the morphologic presentations and pathogenesis of caudal embryonic defects. Literature search was performed and morphologic presentations, as described in the literature, of all syndromes and associations affecting the caudal region of the embryo have been compared. Morphologic presentations were analyzed embryologically. The syndromes/associations included in the study were OEIS, VATER, SIRENOMELIA, LBWC, and URSMS. A remarkable overlap of symptom complex was observed. Embryological analysis of the phenotypic presentations of all these syndromes point toward a common pathogenesis, early in the embryonic life. The embryologic analysis suggests that these defects are a result of defects in proliferation, migration or subsequent differentiation of any of the three subdivisions of intra-embryonic mesoderm. The process of formation migration and differentiation of intraembryonic mesoderm is called gastrulation. The syndromes/ associations analyzed should be preferably categorized as gastrulation errors. A new hypothesis for the causation is proposed. It suggests that a local internal environmental imbalance, at the site of implantation, can cause nutritional insult to the embryo during gastrulation, during the 3rd and the early 4th week of embryonic life.

# 240. Congenital Malformations in Multiple Births

Sharada Menasinkai Mysore Medical College and Research Institute, Mysore, Karnataka

This study was performed to know the incidence of congenital malformations in singleton and multiple births. Data collected from parturition register during the period from January 2008 to December 2011 (4 years) from Cheluvamba Hospital attached to Mysore Medical College. Total number of the live births, stillbirths, and abortions >20 weeks were collected. Details of multiple births such as gestational age, sex of the babies, birth weight, and USG reports of congenital anomalies were noted. The total number singleton births were 48,700 and number of babies who had congenital malformations were 235 (48.25/10,000 births). Total number multiple births were 579 including 10 triplets and number of babies who had congenital anomalies were 11 and 2 among the triplets (189.98/10,000). Monozygotic twins

were more frequently affected with congenital anomalies. In this study, zygosity was noted among babies with congenital anomalies and sex of the babies was noted in all multiple births. Among 579 multiple births 404 were of the same sex and 165 were of opposite sex in twins and 6 were of the same sex and 4 of opposite sex in triplets. According to Weinberg formula, 50% of same sex twins are monozygotic and 50% dizygotic twins. Among the 11 babies with congenital anomalies, 4 monozygotic twins had anomalies related to twinning such as Acardia with TRAP sequence (3 twins), and thoracophagus (one twins). Five babies had CNS anomalies, 1 with cystic hygroma, one baby with multiple system affected. To conclude, the incidence of birth defects is more in multiple births, especially in monozygotic twins. The present day increase in twin's rate due to advanced maternal age, hereditary factors, use of ovulation inducing drugs resulting prematurity, and low birth weight babies are factor for the higher incidence of birth defects.

### 241. The Morphometric Measurements of Humerus Segments in South Indian Population

*S. Vijayakumar, Melani Rajendran, S. Ramesh Kumar* Sri Ramachandra Medical College and Research Institute, Sri Ramachandra University, Chennai, Tamil Nadu

The estimation of stature from bones plays an important role in identifying unknown bodies, parts of bodies or skeletal remains. Converting bone segments to long bone length to estimate stature provides important information. This study was conducted to estimate the length of humerus by measuring its proximal and distal segments in south Indian population. One hundred and seventy-four humerus (right-83, left-74) devoid of gross pathology was collected. Measurements were taken both in its proximal and distal segments along the vertical and transverse axis using an electronic digital caliper. Simple linear regression equations for both sides were obtained to determine the length of the humerus. The result showed positive values for right humerus, two segments along the vertical axis, one segment along the transverse axis in the proximal end and one segment along the transverse axis in the distal end. This information will be essential for forensic and anthropology investigations and orthopedic surgeries.

**242. Study of Spectrum of Developmental Anomalies Affecting Tympanic Plate: With Special Reference to Foramen of Huschke** *Phalguni Srimani, Enakshi Ghosh, Pranab Mukherjee* R.G. Kar Medical College and Hospital, Kolkata, West Bengal

During the development of tympanic plate of temporal bone, gaps or Foramen of Huschke may affect its surface. Such bony gaps can lead to herniation of temporomandibular joint into the external auditory canal or vice versa. Small gaps may be the site for spreading infection from one space to another. Modern endoscopic procedures may find out a false passage causing injury or fistula. Keeping all these facts in mind, a study has been conducted to find out such developmental deficiencies. Seventy-eight adult dry human skulls are studied, having 156 tympanic plates from the Department of Anatomy,

R.G. Kar Medical College and Hospital, Kolkata. Meticulous examination reveals 14.10% of tympanic plates having gaps or foramina or deficiencies ranging from a size of pinhead to moderate/large passages affecting its surface or its margin. Shapes, sizes, and numbers of deficiencies, including its unilateral or bilateral presence are also noted. Statistical analysis of the result was done. Time-consuming search for similar types of study reveals case reports and tomographic studies, which were also reviewed. This kind of study may be helpful in the field of developmental anatomy as well as in modern endoscopic instrumental procedures for diagnosis and treatment of temporomandibular joint and external ear pathology.

#### 244. Morphometric Analysis of Innominate Bone Based on Acetabulum Pubis Index

S. Kanimozhi, S. Sathiyanarayanamurthy SRMMCH and RC, Potheri, Tamil Nadu

Accurate determination of sex in skeletal remains is a vital part of any medicolegal investigation and is a great challenge to physical anthropologists. Standards of morphological and morphometric sex differences in the skeleton may differ with the population sample involved. In this study, innominate bones of south Indian origin were considered for acetabulum pubis index (AP index). Two variables of the acetabulum pubis index are: acetabular diameter (AD) and distance between pubic symphysis and acetabular rim (PS-A). Measurements required for AP index are more easily defined and, therefore, will reduce the chance of observer error. Sexing a bone metrically is more reliable than observing its morphological features as the observer may be subjective. Bones were measured using digital calliper and digital planimeter. Statistical data were analyzed with the help of SPSS software.

### 243. Differences Between Upper and Lower Limb: A Phylogenetic Evolutionary Concept

N. Damayanti Devi

Regional Institute of Medical Sciences, Imphal, Manipur

Two limbs of the human body are phylogenically homologues of the forelimbs and hind limbs of the quadrupeds. In primates such as apes and monkeys (forelimbs lifted off the grounds for reaching of the objects, eating, carrying some objects, etc. whereas the hind limb remains for locomotion and weight bearing). This is the beginning of deviation of the two limbs as there is diversity of the functions, gradually it is closely followed by evolution of these two limbs leading to morphological differences in these two limbs in human. Since inception of anatomy as basic medical subject, the accepted anatomical position is to keep the palm looking forward with the thumb on the lateral side while in lower limb the homologous big toe is on the medial side. This anatomical position in upper limb is not normal comfortable position; it is kept in this position with axial rotation and resulted to bring out the differences in the direction of surfaces. In newborn, when the foot is off the ground, before weight bearing the sole of the newborn faces interiorly with the big toe on lateral side. As newborn grows up and starts putting the feet on ground the axial rotation starts and crossing of the preaxial and postaxial borders occurs. This paper thoroughly aims the new concept and ideas relating to changes in adaptation from quadrupeds to bipedal form in human during last stage of evolution.

#### 245. Fetal Lower Limb Morphometry for Estimation of Gestational Age: An Autopsy Study

Vidhu Dhawan, Kanchan Kapoor\*, Mahesh Sharma\*, Balbir Singh\*\*, Alka Sehgal\*\*\*

All India Institute of Medical Sciences, New Delhi \*Govt. Medical College and Hospital, Chandigarh \*\* Chattisgarh Ayush and Health Sciences University, Raipur \*\*\*Department of Obstetrics and Gynaecology, Government Medical College and Hospital, Chandigarh, Punjab

The evaluation of morphometric parameters of fetal long bones carries immense importance for its use in the estimation of fetal gestational age, detection of skeletal growth anomalies including various congenital malformations, and also in certain medicolegal cases of abortions. Previously, many studies were conducted on femoral morphometry, but little work was done on evaluation of tibia and fibula.

This study was conducted in the Department of Anatomy, Government Medical College and Hospital, Chandigarh, with the aim of collecting the morphometric parameters of the long bones of lower limb and its correlation with increasing gestational ages. The work was done on 30 fetuses from 12 to 30 weeks of gestation provided by the Department of Obstetrics and Gynaecology of the same institute. The morphometric parameters included in the study were: Length, width of proximal and distal ends, mid shaft transverse diameters of all bones as well as CRL. The obtained data were statistically analyzed using ANOVA and Pearson's correlation coefficients were assessed. 246. Stature Estimation by Interacromial Length

Poonam Kumari, Chandni Gupta, Antony Sylvan D'souza Kasturba Medical College, Manipal University, Manipal, Karnataka

**Objective:** In medicolegal autopsies, establishing personal identity of the diseased is often necessary. Assessment of stature from extremities plays a vital part in identifying the dead in forensic examinations. Therefore, the aim of this study was to derive a regression equation for estimating stature from the interacromial length.

**Materials and Methods:** In this study, 200 normal subjects between the ages of 16 and 20 years were observed. The stature and interacromial distances were measured with a measuring tape. The statistical analysis was done and a regression equation for estimating stature from the interacromial length was derived for both males and females.

**Conclusion:** In forensic investigations, some difficulties are being experienced in the stature and gender assessment of bodies injured in mass destruction. Therefore, this study may be helpful for forensic experts in identifying the stature from fragmentary remnants of thorax whenever such a thing is recovered.

#### 247. Morphometric and Morphlogical Study of Glenoid Cavity in the Population of Rayalaseema Zone of Andhra Pradesh

*G. Manoj Kumar Reddy, Ch. Jayamma, S. Gangabhavani* Kurnool Medical College, Kurnool, Andhra Pradesh

**Background:** Glenoid cavity is the expanded lateral angle of scapula, articulating with the head of the humerus forming shoulder joint. A notch on its anterior margin, arbitrarily divides it into upper and lower segments having different transverse measurements. Three different shapes are described for glenoid cavity, pear-shaped, inverted commashaped, and oval-shaped.

**Aim:** This study calculates three dimensions, vertical diameter, horizontal diameter of the upper segment and horizontal diameter of the lower segment of the glenoid cavity and describes the incidence of its different shapes.

**Methods:** In a total of 124 dried unpaired scapulae, the abovementioned 3 diameters are measured using Vernier calipers and the mean dimensions are calculated, morphological variations are studied, and the incidence of different shapes is noted.

**Results:** The average vertical diameter on the right side is  $34.45 \pm 2.32$  mm, left side is  $34.67 \pm 2.72$  mm, the average horizontal diameter of the upper segment on the right side is  $16.84 \pm 2.64$  mm, left side is  $16.45 \pm 2.34$  mm, of the lower segment on the right side is  $24.25 \pm 2.21$  mm, left side is  $23.94 \pm 2.81$  mm. Pear-shaped glenoid cavity has higher incidence, 54% compared to the other types.

**Conclusion:** Dimensions and shape of glenoid cavity are associated with ostoeoarthritis and recurrent dislocation of the joint, the knowledge of the above said variations of glenoid cavity is important in manufacturing the glenoid component of shoulder prosthesis, repair of Bankart's lesion, procedures like posterior glenoid osteomy.

#### 248. Morphometric Study of Proximal Humerus: A Useful Tool for Determining the Retroversion of Prosthetic Humeral Head in Shoulder Arthroplasty

Rachana R. Kulkarni, Chitra Prakash Rao, R. Roopa A.J. Institute of Medical Sciences (AJIMS), Mangalore, Karnataka

**Aim:** To study the position of bony landmarks of proximal humerus in relation to the transepicondylar line in dry humerus for setting up the head retroversion in shoulder arthroplasty.

**Materials and Methods:** This study was done on 70 dry humerus bones from the Department of Anatomy, AJIMS, Mangalore. Angular relationships between the humeral head axis and the greater tuberosity, lesser tuberosity, and bicipital groove were evaluated with respect to the intramedullary axis of humeral shaft. Goniometer was used for angular measurements. The obtained data was recorded and statistically analyzed.

**Results:** At the level of humeral head, statistically significant correlation was found in the angle between humeral head axis and the medial margin of greater tuberosity, the lateral margin of lesser tuberosity, and the bicipital groove.

#### 249. Studies of X Cells of Wilkin in Antepartum Haemorrhagic Placenta

Maitrayee Mondal, R. Ghosh, H. Sengupta, A. Dey R.G. Kar Medical College, Kolkata, West Bengal

In the basal plate (Deciduas) of human placenta, genetically dissimilar cells coexisted. The aim of this study is to find the location and morphological characteristics of these cells in the placenta of APH mothers and compare with the histological fetuses of normal placenta. Fifty placenta of each group were taken. Biopsy was taken 1.5 cm in diameter, which included the basal plate. The tissues were cut into small pieces and fixed in 10% formalin for seven days and processed for embedding paraffin wax. After tissue processing sections were cut 7 µ in thickness and stained with H&E and PAS stain and histological features studied under light microscope for qualitative difference. A definite increase of these X cells was noted in the APH group. One of the modifiable changes leading to poor perfusion of villi was hyperplasia of these cells producing major basic portion, which was a probable cause of a poor pregnancy outcome.

# 250. Effects of Pregnancy-induced Hypertension on Human Placenta

*M. Rohini, Yogesh Sontakke*<sup>\*</sup>, *M. Goyal*<sup>\*\*</sup>, *C. Banerjee*<sup>\*\*</sup> All India Institute of Medical Sciences, New Delhi. \*Sri Aurobindo Medical College, Indore, Madhya Pradesh, \*\*Pt. J.N.M. Medical College, Raipur, Madhya Pradesh

Placenta in mammals is one of the most important first growing organs responsible for bonding between mother and fetus. Pregnancy-induced hypertension is a well-recognized obstetric hazard and observed more frequently in developing countries. This study was undertaken to analyze placental changes in the pregnancy-induced hypertension. Thirty placentas of mothers with uncomplicated pregnancy as control group and 30 with pregnancy-induced hypertension as study group were studied. Gross examination revealed presence of smaller placenta with foci of calcification and infarction in study group. On light microscopic examination, the striking villous abnormalities were observed in the study group, which included increased syncytial knots formation, stromal fibrosis, fibrinoid necrosis, altered villous vascularity (hypovascularity), cytotrophoblastic cell proliferation, endarteritis obliterans, intervillous haemorrhage, and basement membrane thickening. These changes may be attributed to the reduced uteroplacental blood flow which occurs in toxaemic cases. Details of the findings were discussed in the presentation. This study is of particular importance for pathologists, embryologists, and gyaenecologists.

## 251. A Morphological Study of Superficial Palmar Arch in Fetus of Manipuri Origin

G.T.N. Sangma, Ambath D. Momin, Purnabati Soraisam, N. Damayanti Devi

Regional Institute of Medical Sciences, Imphal, Manipur

**Background and Aim:** Superficial palmar arch is an arterial arcade between the superficial branch of the ulnar artery and superficial branch of the radial artery and lies across the center of the palm and is the predominant blood supply to the palm. However, variations in their pattern are frequently encountered and so awareness and identification is crucial. Most of the studies in the past were on adults; hence this study on fetus was carried out seeing its increasing importance in surgeries.

**Materials and Methods:** A total 40 palms of 20 fetuses that were free from any gross malformations involving hand were dissected. The study was carried out in RIMS, Imphal. The anatomy of the arcade was noted and photographs were taken.

**Results and Conclusions:** The details of the study were discussed and compared with other workers at the time of presentation.

# 252. Congenital Diaphragmatic Hernia and Associated Anomalies: A Case Series

Hima Bindu Nalluri, Sunil Jaiman\*, Suseela Vavilala\*\* Bhaskar Medical College, Moinabad, R.R. Dist, Andhra Pradesh \*Anatomical Pathology, Fernandez Hospitals, Hyderabad, Andhra Pradesh

\*\*Fernandez Hospitals, Hyderabad, Andhra Pradesh

Congenital diaphragmatic hernia is a most common congenital malformation and accounts for 8% of all major congenital anomalies. We report 8 cases of congenital diaphragmatic hernia (CDH) studied over a period of 7 years at Fernandez hospitals, Hyderabad. Among them, 3 were bilateral and 5 were unilateral. All cases were aborted fetuses and evaluated for congenital malformations. All unilateral diaphragmatic hernia cases were left sided. In one case there was complete agenesis of diaphragm. All these cases were associated with multiple congenital anomalies like right-sided aortic arch, tracheo-esophageal fistula, polycystic kidneys, omphalocele, and pulmonary hypoplasia. Bilateral diaphragmatic agenesis is a rare and severe form of CDH with poor prognosis. High mortality of CDH is due to pulmonary hypoplasia.

#### 253. Histomorphometry of Preterm and Term Human Placentas

Mohd Arshad, M. Tariq Zaidi, S.M. Vasenwala\*, Nafis A Faruqi, Aijaz. A. Khan, Sumbul Khan\* JNMC, AMU, Aligarh, \*Department of Pathology, JNMC, AMU, Aligarh, \*\*Family Hospital, Aligarh, Uttar Pradesh

The intrauterine existence of fetus is dependent on placenta, a major organ of nutrition and homeostasis. This study was carried out to compare morphometric and histological changes in preterm and term human placentas. Eighty placentas collected from the Department of Obstetrics and Gynecology, JNMCH, AMU, Aligarh, were divided into groups. First group of preterm placentas up to 36 weeks (n = 30) and second group of full term placentas, i.e., 37-40 weeks (n = 50), respectively. The samples were fixed in 10% formol-saline solution. The gross morphological variables of placentas were studied. There was a significant increase in the placental weight, decidual area, and umbilical cord diameter of term placenta as compared to that of the preterm ones. From each placenta whole thickness tissue blocks were taken and processed for paraffin sectioning. Five-µm-thick sections were stained with Hematoxylin Gieosn and Van Gieson stains and processed for light microscopy. A total of 200 villi were studied in each sample under high power field and occurrence of different features was expressed as percentages for each parameter. The appearance of microvilli and syncytial bud on the syncytium were almost absent in the villi of term placentas. It was concluded that with increasing gestational age there was a gradual increase in the number of capillaries in villi from preterm to term placenta. There was a significant increase in syncytial knot count, fibrinoid necrosis, vasculosyncytial membrane, and decrease in the percentage of villi showing cytotrophoblastic cells and number of Hofbauer cells in term group as compared to preterm group.

#### 254. Gross Morphometry and Histological Findings of Placenta in PET

Manisha Biswas, Hasi Dasgupta, Sharmila Pal, Suranjana Sur Mukherjee\*

Department of Anatomy, NRS Medical College, Kolkata,

West Bengal

\*Department of Physiology, NRS Medical College, Kolkata, West Bengal

**Background:** Mother and fetus are the two important ends of reproduction. The intrauterine existence of fetus is dependent on one vital organ—placenta. Pathological examination of the placenta is probably the most underutilized pathologic assessment of any human tissue. The placenta provides a wealth of information retrospectively about the fetus and prospectively regarding the infant.

**Aim:** To observe and study the morphological and histological changes in placenta both in normal and severe preeclampsia and eclampsia, to compare our results with previous works, and to correlate any incidental fetal or maternal complications to any of the histological and morphological features.

**Materials and Methods:** This study was conducted on 50 placentae of severely hypertensive mother and 50 placentae of normal term pregnancy. In both groups, detailed histological and morphological studies were undertaken.

**Results:** It was found that in majority of cases that the severely hypertensive placentae were scarred by calcification, smaller in diameter, of lesser weight and marked by infarcts. Histological findings were marked by increased number of syncytial knots, chorangiosis, infarctions, fibrinoid necrosis, villous avascularity, and microscopic calcification.

**Conclusion:** These changes were due to severe hypertension in placentae and corroborate with previous studies in this field.

#### 255. Morphometric Study of Human Placentae: A Hospital Based Study

Anil Kumar Gupta, D.R. Singh Nepalgunj Medical College, Chisapani, Banke, Nepal

The main objective of this study was to study the morphometric analysis of the placentae and to correlate the thicknesses of placentae at the levels of umbilical cord attachment and near the periphery to its diameter. Twenty placentae were undertaken for study. The average value obtained for central thickness of placentae was  $25.65 \pm 2.870$  mm and that for the peripheral thickness  $15.05 \pm 2.605$  mm. The average value of placental diameter was  $183.30 \pm 19.024$  mm. No significant correlation was found, either between thickness at the site of attachment of umbilical cord and the diameter of the placenta or between the peripheral thickness and the diameter, with p = 0.570 and 0.103, respectively.

#### 256. Prenatal Efavirenz Induced Placental Changes in Swiss Albino Mice

Ananda Mishra, Mandavi Singh, Samsher Shrestha, Uttam Shrestha

Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh

Efavirenz is a non-nucleoside reverse transcriptase inhibitor (NNRTI), which binds reverse transcriptase resulting in allosteric inhibition of RNA- and DNA-dependent DNA polymerase. It acts as a noncompetitive inhibitor and is effective only against HIV-1. Efavirenz is a known teratogen and has been shown to cause neural tube defects. In this study, its effect on placenta is to be ascertained. Pregnant Swiss albino mice was given Efavirenz in dose of 50 mg/kg and 100 mg/kg from day 6-15 of gestation and the fetuses and placenta were collected after uterotomy. The placenta was subjected to histological examination after staining with H&E. The placenta of the treated specimen showed large spongiotrophoblastic cell, pyknotic nuclei, increased cellular debris in the reticular zone. In the trabecular zone there was increase in thickness of placental barrier in a dose-dependent manner due to failure of extraembryonic mesenchyme to disappear. This shows that Efavirenz has an adverse impact on placenta of mice causing hindrance in the transport of oxygen and micronutrient to the fetus.

# 257. Valproic Acid Induced Placental Changes in Mice

S. Shrestha, M. Singh, A. Mishra, S.P. Mishra<sup>\*</sup>, U. Shrestha Department of Anatomy, <sup>\*</sup>Department of Biochemistry, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh

Valproic acid (VPA) is an antiepileptic drug that is widely used in humans. This is also a well-known teratogenic agent when used during pregnancy. In this study, it was administered orally to Swiss albino mice in the dose of 400 mg/kg body weight from gestational day (GD) 6–11. The fetuses with placenta were collected on GD 18 after uterotomy. The placenta was subjected to histological studies after gross examination. On examination, marked degenerative changes were observed in comparison to the control placenta. The trophoblast showed pyknotic nuclei with marked cellular debris. Glycogen cells were blotted up. Many cells were broken and their cellular contents were spread in a web-like pattern. Clumps of cells were surrounded by lymphocytes. In trabecular zone the density of giant cells was increased and the parenchyma was invaded by trophoblastic clumps. The villi showed hyalinised masses. It was also lined by large cells, hence markedly increasing the placental barrier.

#### 258. Histological and Behavioral Observations after the Transplantation of Human Amniotic Epithelial (HAE) Cells in 6-OHDA Lesioned Corpus Striatum of Wistar Albino Rats

P. Ravisankar, R. Muthusamy\*

Tagore Medical College and Hospital, Chennai, Tamil Nadu \*S.R.M. Dental College, SRM Deemed University, Chennai, Tamil Nadu

Parkinson's disease (PD) is a major neurological condition of the motor system, which is characterized by degeneration of dopaminergic neurons in the substantia nigra. It is named after James Parkinson, the English physician who described the shaking palsy in 1817. Substantia nigra (SN) is the main source of dopamine, which has a great functional significance. Corpus striatum receives the terminal end of nigrostriatal pathway. When the SN and Caudate putamen (CPu) are lesioned, the ipsilateral dopaminergic fibers are lost. In response to this loss, the denervated striatum becomes more sensitive to dopamine. In rats, this super sensitivity produces a functional deficit that can be measured by observing the numbers of rotation of the head performed by the animals following administration of the dopamine agonist (Apomorphine and SKF) and antagonist (Amphetamine). No standard criteria exist for the neuropathologic diagnosis of PD, as the specificity and sensitivity of the characteristic findings have not been established clearly. In this work, we have studied the behavioral and histological observation after the transplantation of human amniotic epithelial (HAE) cells in 6-OHDA lesioned wistar albino rats. The data suggest that the unilateral rat model of PD resembles key features of human Parkinsonian behavioral changes and that asymmetric descending input may underlie the observed changes in behavioral patterns. As animal models are employed to study various human diseases, it is important to discern these fundamental limitations and characteristics of the model in order to relate the findings to human conditions. The HAE cells transplanted animals showed significant improvement in their behavioral observation and clearly demonstrated the host-graft interaction in the host brain.

## 259. Histomorphometric Study of Placenta of Preeclampsia

Anup Shyamal, A.M. Tarnekar, M.R. Shende Calcutta National Medical College, Kolkata, West Bengal

**Background:** Placenta is vital link between mother and fetus. The organ for pregnancy serves as exchange membrane

and hormone synthesizing apparatus for both mother and fetus. All physiological processes occurring in fetus or mother are reflected on placenta. Pregnancy-induced hypertension is such a comorbid condition which affects mother and fetus, as well as placenta.

**Aim:** To study the desired histomorphometrical parameters in control and experimental (PIH) group of placentae after staining with hematoxylin and eosin (H/E) and Masson's trichrome to find out the statistical relevance of the comparative findings.

**Materials and Methods:** Forty (40) control and 40 experimental placentae (PIH) were collected and processed for routine histological techniques. Paraffin sections were stained with routine H/E and Masson's trichrome stain. Light microscopy for histological and histomorphometrical study was performed to obtain volume proportion of fibrinoid degeneration and microscopic calcification.

**Observation:** Volume proportion of fibrinoid degeneration and microscopic calcification were significantly increased in PIH cases in comparison to control.

**Conclusion:** Similar to other diseases, the PIH also affects the structural and functional unit of placenta. The changes are likely to be compensatory to hypoxia and altered metabolism.

#### 260. Review of MD (Anatomy) Theory Examination Pattern and Its Implications

Pooja Jain, Shashi Raheja, Anita Tuli, Preeti Shrivastava Lady Hardinge Medical College and SSK Hospital, New Delhi

Medical education forms the cornerstone on which infrastructure of the society is laid down, this puts an emphasis on the need for an evaluation system that can determine whether predetermined educational objectives have been achieved. An ideal evaluation system is inseparable from the education system. As an exercise, past 10 years annual MD question papers (anatomy) of University of Delhi were given to the residents and the postgraduate students of the Anatomy Department, Lady Hardinge Medical College, New Delhi. The analysis of question papers reflected that the emphasis on different parts of the syllabi was not uniform. All questions were of long and short essay type. Multiple choice questions that are based on recall and problem-solving attitude of the students were not at all included. Evaluation is an important asset in the medical education system. There is a need to revise the pattern in which question are being asked, which will develop cognitive skills and problem-solving attitude among students. An ideal question paper should give equal weightage to different content areas/topics and it should include all analytical, objectives, long- and short-answer-type questions with a uniform marking scheme for all students. When it comes to medical education, evaluation becomes very important to bring out the best doctor among the best.
#### 261. Orientation in Gross Anatomy

M. Natarajan Seth G.S. Medical College and K.E.M. Hospital, Parel, Mumbai, Maharashtra

Any illustration in gross anatomy is positively facilitated by an adjoining representation of orientation. Generally, illustrations have bidirectional orientation as they are two-dimensional pictures. The third dimension is usually part of the legend of the illustration. This presentation highlights the importance of the representation of the third dimension and also the mode of expressing the third dimension. As in a geography atlas where directions are indicated by the side, a similar modality can be standardized for gross anatomy. As for the third dimension, the intersecting point of the lines indicating the two dimensions can be thickened and labeled as direction from which the picture is being observed.

The purpose of presenting this topic in Odisha is twofold. First, this being our 60th conference, we should suggest to the world a new standard of representation of orientation and second, to associate Oriya with orientation. Orient means east and Odisha (Oriya) is in the East of India.

# **262.** Scope for Utility of Knowledge and Practice of Yoga: An Anatomical Correlation Deepsikha Thengal, Anuradha Baruah

Assam Medical College, Dibrugarh, Assam

The concept of Yoga has been formulated by the ancient Rishis. Yoga therapy has been practiced by the ancient Indians since many centuries B.C. The Yoga sutras of the great sage Patanjali (2nd century B.C.) give an account of the manner in which a healthy body can be prepared for higher state of mental function. Yogic exercises exert profound influence to prevent and cure some form of chronic diseases affecting the mankind. Of the various types of Yoga, Hatha Yoga can guide a person to lead a healthy life. Hatha Yoga is also known as "Classic Yoga," which includes the practice of physical postures, especially by controlling the breath through pranayam. The aim of this presentation is a humble attempt to show some aspects of Hatha Yoga from an anatomical point of view. An analysis is done to see how far it is feasible to incorporate Yoga in the teaching curriculum of medical sciences and the subsequent scope for paving a scientific path for its utility as a preventive and therapeutic tool for the benefit of mankind.

#### 263. Structured Evaluation of Presentations of Postgraduate Students: Key to Faculty Development

Medha Puranik

Bharati Vidyapeeth Deemed University, Medical College, Pune, Maharashtra

**Aim:** To assist postgraduate students (PGs) in the Department of Anatomy to develop as a good faculty.

**Objectives:** To prepare a structured evaluation format (checklist) and evaluate the presentations of postgraduate students in the department. Also, to judge the improvement in performance of the students.

**Background:** A student pursuing postgraduation in a preclinical subject, such as anatomy, has a teaching career ahead. Postgraduates can develop excellent teaching skills in this postgraduate tenure with some guidelines.

**Materials and Methods:** In the year 2011–2012 postgraduate microteaching/seminar presentations were conducted in two different ways: 1) In the first round of presentations, the PG students presented their work without any specific instructions. Senior faculty assessed these PGs with the help of structured evaluation checklist and 2) In the successive presentations, the PG students were informed about a structured evaluation checklist and the points under which they will be assessed. Peer evaluation and self-evaluation was carried out after each presentation. Descriptive feedback (oral) was given to the presenter immediately. Evaluative feedback (analysis of the structured checklist) was given at the time of last presentation.

**Conclusion:** Evaluative as well as descriptive feedback helps in improvement of performance of the postgraduate students.

#### 264. Student Compliance about Different Lecture Delivery Methods

Sharmisthabiswas, Rudradevmeyur\*, Bananimitra\* N.R.S. Medical College, Kolkata, West Bengal \*R.G. Kar Medical College, Kolkata, West Bengal

Medical teachers use different audiovisual (AV) aids of teaching in their classes to make the subject more interesting and understandable. To assess the impact of three common lecture delivery methods, namely blackboard (BB), transparency and over-head projector (OHP), and PowerPoint presentation (PP), a questionnaire-based study was carried out among first year MBBS students of R.G. Kar Medical College, Kolkata. One hundred and forty students of the academic session 2010-2011 were exposed to different aids of teaching, namely blackboard (BB), over-head projector (OHP), and PowerPoint presentation (PP) for ten months. They were taught anatomy by different teachers who used all the three AV aids in their lectures. Then they were asked to respond to a questionnaire regarding these three AV aids of teaching. The students preferred BB teaching over OHP and result was statistically significant (p value < 0.0001). BB teaching was also preferred over PP presentations (p < 0.02). But in comparison to OHP, students preferred PP, though the difference is not statistically significant (p < 0.10). Most of the students still prefer BB teaching to other modern AV aids, such as OHP and PP. For better understanding of the subject by students and improvement of their performance, a teacher should match the lectures with preferred AV aids and use the AV aids prudently.

#### 265. Assessment of Knowledge, Attitude and Practice of the First Year MBBS Students in a Medical College in Kolkata, Regarding the Different Methods of Learning Anatomy: A Cross-Sectional Study

Ishita Ghosh, Alpana De (Bose), Gairik Sengupta\* R.G. Kar Medical College and Hospital, Kolkata, West Bengal \*Department of Pharmacology, College of Medicine and Sagore Dutta Hospital, Kamarhati, Kolkata, West Bengal

**Aim:** To assess the knowledge, attitude, and practice of the first year MBBS students regarding different methods of learning anatomy.

**Materials and Methods:** A structured multiple choice questionnaire administered anonymously. The questionnaire was distributed among the consenting the first year MBBS students of R.G. Kar Medical College, Kolkata at one point of time and the responses obtained were analyzed statistically by SPSS (version 16).

**Results:** A total 167 completed questionnaire were analyzed—106 from male and 61 from female respondents; 54.5 % were from urban, 28.1% semiurban and 17.4% from rural background. 78.4% students study anatomy >3 days/week, 41.3% are familiar with dissection instruments and 80.3% use Atlas regularly. 65.3% find dissection and 23.4% histology the most difficult aspect of anatomy. 31.2% of the girls and 21.7% of boys regularly carry dissection handbooks to the class (p = 0.04) and 73.7% prepare rough notes and diagrams of dissected regions. 57.4% of girls and 27.4% of boys prefer development of concept over memorizing only (p = 0.003). 32.3% students do not come with prior preparation to the class and 93.4% find regular assessment helpful for learning. 45.5% of students have some idea about computer assisted learning in anatomy and 35.4% use images from Internet for learning.

**Conclusion:** Most of the students study anatomy regularly, use atlas, prepare notes and want regular internal assessments. Female respondents preferred development of concept over memorizing in significantly greater proportion. No significant difference between students from different residential background was observed.

#### 266. Escalating Student Concentration and Propensity Using Multimedia Problem Based Learning—The Teachers Perspective

Gaurav Agnihotri, Ravikant Sharma, Anterpreet Kaur Arora\* Government Medical College, Amritsar, Punjab \*Sri Guru Ramdas Institute of Medical Sciences, Amritsar, Punjab

Teachers are builders of society, and students of today will determine our tomorrow. The methodology utilized for anatomy teaching is a vital tool for imparting knowledge. This study provides an insight into teacher perspective regarding the two teaching methodologies in vogue, i.e., use of multimedia and problem based learning. A structured questionnaire with ten items and nineteen subitems was given to 300 anatomy teachers of both sexes (204 males and 96 females) in the age group of 35–70 years with a 5-point Likert scale. These teachers had a mean age of 48 years and were established faculty members in reputed medical colleges having anatomy teaching experience of at least five years. The results indicate:

- 1. They unanimously root for a combination approach (100%), i.e., traditional lecture supplemented by multimedia/problem-based learning (PBL) approach.
- 2. They preferred multimedia approach (76.6%) vis-a-vis PBL, although majority felt that student eagerness/participation increased more with PBL as compared to multimedia.
- 3. It emerged that most teachers preferred ADAM's software (56%) and Grays Anatomy CD/DVD format (51.3%) for visual demonstration and application of structures.
- 4. Although they do not prefer PBL to multimedia as it is time consuming with difficulty in topic coverage (40%), they agree that classes are not repetitive and monotonous with PBL.
- 5. The views of teachers can be utilized in effective curriculum planning and execution. This will lead to good learning and definitely contribute to an effectors education system.

#### 267. Quantitative Evaluation of Medical Students Perception and Satisfaction in Learning Anatomy

S. Saravana Kumar, S. Sundarapandian, A. Sharmila, Christilda Felicia SRM Medical College Hospital and Research Center, Potheri, Tamil Nadu

Medical career starts with dissection of human cadavers. The initial exposure to a dead body causes emotional shock to the students, though gradually they adopt a professional attitude and accept dissection as an aid to study the body structure. The study of gross anatomy provides an opportunity for reflection in the intrinsic values of life and creates empathy for future patients. Therefore, it is in the first year of medical college that a positive approach toward the subject can be built. It has been studied that the inclination toward a particular specialty is determined by complex interacting variables, quality of teaching in medical college, clinical competence, etc. This study was designed to evaluate the opinion of medical students regarding anatomy as a subject and application in various clinical fields.

## 268. Importance of Clinical Anatomy for Postgraduate Students

D.R. Singh King George's Medical University, Lucknow, Uttar Pradesh

Close scrutiny of the interest to revise the anatomy course by the postgraduates preparing to compete for the PGME test led me to attempt a complete reappraisal of content, approach, and format involved in a great broadening of the subject. The richness of modern anatomy in its various aspects merits consideration. A fresher medical student does not completely understand the importance of any given organ/tissue/cell under study during his/her stay in the preclinical subjects. The main reason for this is constraint of time together with rapidly growing subject knowledge. As a result, after completion of the MBBS course, majority of students forget more than 75% of descriptive anatomy that was taught to them. For pursuing any postgraduate discipline, knowledge of basic anatomy becomes inseparable from other subjects, particularly physiology, embryology, biochemistry, and so forth. All functions occur in structures and the basic medical discipline, anatomy, necessarily provides a basis for all functional studies. It is difficult to imagine investigation of structure without a concomitant desire to elucidate function, development or any other aspect of structure. Detached anatomical detail may often, but not always, serve the needs of surgeons and physicians and other clinical workers as well; and this may lead to such spurious concepts as "surgical anatomy," "radiological anatomy," and the like. It is noteworthy that clinical anatomy makes the anatomy more interesting. It creates a much greater desire among postgraduates to revise the required anatomical details as related with their disciplines.

269. Development and Evaluation of a Computer-Based Training Module for Gross Anatomy of the Head and Neck Region

P. Haresh Kumar, Sushil Kumar, M.S. Ahuja Armed Forces Medical College, Pune, Maharashtra

**Aim:** To develop and evaluate interactive structured software for self-study for gross anatomy of the head and neck.

**Background:** Traditionally, gross anatomy has been taught by didactic lectures, using blackboard, dissections and short group teaching for osteology and soft parts. Students and teachers had adequate time to complete the course as specified. However, with the introduction of the reduced time frame in the curriculum, traditional teaching methods though time tested were found inadequate. This is where educators sought the help of modern teaching aids.

**Outline:** The Department of Anatomy, Armed Forces Medical College, has developed a computer-based teaching module for gross anatomy of head and neck. This program is being used by students in addition to the normal course. The paper outlines the development and evaluation of this program.

### 270. The Contribution of Multimedia Tools in Anatomy Teaching

Mamata Panigrahi, Kalpana Purohit, K. Ramarao Kalinga Institute of Medical Sciences, Bhubaneswar, Odisha

The extraordinary development in information technologies led to enormous changes in university teaching. In the past years, many initiatives have been taken to link the new needs in anatomic knowledge with these emerging facilities offered by electronic media such as laptops, android, Blackberry, etc. The use of multimedia materials makes the subject much more appealing for the new generation of students, who are multimedia users. This study explores how students and teachers view their multimedia learning/teaching experience with an objective to decide whether multimedia have a valid place in anatomy teaching or we should stick to our traditional method of teaching in both theoretical and practical interactions. Data are collected by a survey using questionnaire distributed among the medical students and faculties. The questionnaire explored the student's most-preferred techniques for learning anatomy, their examination preferences and their perceived level of learning anatomy. In addition, the results of student's viewpoint were analyzed with their final grades in order to find a correlation between them. The results and conclusion drawn will be discussed during the presentation.

#### 271. Student's Feedback on the Utility of Gross Anatomy Manual in Learning Anatomy

Archana Rani, Anita Rani, Jyoti Chopra, R.K. Diwan, A.K. Pankaj, R.K. Verma King George's Medical University, Lucknow, Uttar Pradesh

Gross anatomy manual is a mandatory activity in most of the medical schools in India and abroad. As large part of anatomy is the spatial relationship between various parts of human body, drawing can be very useful tool in learning complex anatomical facts or relation. The objective behind initiating this activity was that students will observe the particular area carefully and then reproduce the 2D image of the same. This will help in integrating the knowledge more effectively and also reinforcing information and performing better during their examinations. In our department, diagrams drawn in gross anatomy manual are evaluated and the scores are an essential component of formative assessment of the students. A survey of 236 students of the first year MBBS was carried out to know whether our students perceive the role of gross anatomy manual in the similar manner. Analysis of the results depicted that 71.61% of students accepted that drawing diagrams help them in understanding the spatial relationship of anatomical facts while 28.39% of students were of the opinion that it is a worthless activity. Few students also suggested some other possibilities to improve existing trend.

#### **272. Plastination: A New Facet to Anatomy Classrooms** *Kanchan S. Nagdev*

Government Medical College, Baroda, Gujarat

**Background:** Human anatomy is a science of facts about structures and their variations. It is required for an undergraduate student to obtain a 3D image of a structure, its morphometry and relations. This precise anatomical information understood well during preclinical year of undergraduate study can be utilized for a better clinical implication. Luminal gel casting using silicone gel is one of the methods of plastination to obtain the mould of a structure, e.g., tracheobronchial tree. These casts are better 3D visual models for teaching anatomical facts that may not be appreciated by the naked eye or general imagination. Such models are easily portable, light weight, durable, and user-friendly. Moreover, they can be used in clinics for patient education for preoperative counseling.

**Aim:** To evaluate the use of plastinated models to create a better understanding of the 3D anatomy of the tracheobronchia.

**Methods and Materials:** Silicon gel cast of tracheobronchial was made from a fresh specimen procured from a fresh cadaver. This cast was used in this study for demonstrating the anatomy of the tracheobronchial tree to one group (Group A) of 90 students of the first year MBBS, along with the conventional lecture and the other group of 90 students (Group B) of the same class was taught by conventional lecture and demonstration of specimens. Both the groups were blind to the aim of the study. Both the groups were subjected to a test after the lecture and the difference studied.

#### 273. Analytical Study of Written Examination Papers of Undergraduate Anatomy: Focus on its Content Validity

*R. Garg, S. Shekhawat, S. Babuta, K. Mogra* S.M.S. Medical College, Jaipur, Rajasthan

**Objective:** The "Question Paper" in the form of written examination forms the most important instrument of assessment. Content validity refers to the extent to which a test actually measures the intended content area. Adequate coverage of the course content is necessary for the validity of assessment. The content of the first professional written examination was given in curriculum, but the weightage of different subdivision of anatomy is not mentioned. Therefore, this study was done to see the content validity of different subdivisions of anatomy in written examinations.

Methods: It was the question-paper-analysis-based study.

**Results:** It is evident from the questions paper analysis that different subdivisions of anatomy are usually not given proper weightage in the anatomy written examinations. There are some subdivisions of anatomy that are usually cov-

ered less than required. These include genetics, general anatomy, histology, etc. Some subdivisions of anatomy remained uncovered in some question papers. For example, questions from genetics were found in the question papers of only one session out of twenty sessions examined.

**Conclusion:** Increasing the sample of objectives and content areas included in any given test will improve the validity of test; and for further improvement of assessment system of anatomy, content validity is needed to be established.

#### 274. Learning Anatomy by Use of Physical Model: Jigsaw Puzzle and Use of Animation: An Innovative Approach

S.N. Kazi, Arudyuti Chaudhary, Purshottam Rao Manvikar\* S.R.M. Medical College, Kattankulathur, Chennai, Tamil Nadu \*Dr. D.Y. Patil Medical College, Pimpri, Pune, Maharashtra

Making anatomy easy and appealing to students is a continuous process. Learning is more effective by applying the mind to a particular topic. This is achieved by handling the model in the form of puzzle. A design of ascending aorta and its branches are made in CATIA (computer-aided threedimensional interactive application) software. The design was then submitted to Rapid Prototyping Machine, using Acrylo Butadiene Styrene (ABS), a common thermoplastic as the base material. Animation was used to demonstrate the course, branches, and distribution of branches of the right and left coronary arteries. The effect of the model and the effect of animation on learning process were studied independently in three different groups. A set of questionnaire is given to three groups: Group 1-Students who are taught with traditional way of teaching. Group 2–Students who are taught with Catia model. Group 3-Students who are taught with animation. Understanding of the subject and reproducing the topic was studied in these groups and the results were presented.

#### 275. Profile of Academically Backward Students and Probable Contributing Factors: A Qualitative and Quantitative Analysis

S.N. Kazi

Dr. D.Y. Patil Medical College, Pimpri, Maharashtra

**Aim:** To find the probable causes of repeated failures in the University of Health Sciences and Deemed Universities.

**Objectives:** To help the students to improve the academic performance and also to help family, college, society, and university.

**Methodology:** Academically backward students are chosen according to MUHS criteria. Data collection is done from the questionnaire formed and personal individual interview. Qualitative research methodology is used.

#### 276. Learning by Use of Animation

S.N. Kazi, Purshottam Rao Manvikar\* S.R.M. Medical College, Kattankulathur Chennai, Tamil Nadu \*Dr. D.Y. Patil Medical College, Pimpri, Pune, Maharashtra

**Background:** Making anatomy easy and appealing to students is an ongoing process. Learning is more effective by applying the mind to a particular topic. The use of animation to demonstrate the course of the ascending and descending tracts is one of the important and effective methods to study the central nervous system. Even the effects of lesion at different level can be demonstrated by the use of animation. Visualization helps in keeping the information for long time in deep memory.

**Materials and Methods:** Physical models of receptors, sections of spinal cord, medulla oblongata, pons, midbrain, coronal section of cerebral cortex through the central part of lateral ventricle are first made. With the help of animation software (3D Maya), the course of posterior column is demonstrated. The first, second, and third orders are shown by animation. The synapses, the decussation, somatotropic representation is also displayed very effectively. The lesion at different level, the effects of lesion on both sides is also animated. A set of questionnaire is given to two groups: Group 1—Students who are taught with traditional way of teaching. Group 2—Students who are taught with animation. Understanding of the subject and reproducing the topic was studied in these groups and the results were tabulated.

#### 277. Introduction of Self-directed Study Method (Team-Based Learning) for Hard Part Demonstrations in Anatomy for First Year M.B.B.S. Students

Pushpa Burute, Sonali Khake, Swati Belsare, S.P. Jog, S.B. Vedpathak, D.S. Jadhav

M.I.M.E.R. Medical College, Talegaon Dabhade, Pune, Maharashtra

**Aim:** To improve learning process of the students, improve outcome (results) of the students during practical examinations, and encourage, motivate, and inculcate self-directed study methods in first year M.B.B.S.

**Background:** Over the years, following problems or difficulties are observed for demonstrations in anatomy. Students do not read the demonstration topics prior to class. Only 30–35% of the students have bone sets at the time of demonstrations. Although demonstrators try their best to show or demonstrate maximum features, it may not be always possible because of paucity of time. In spite of maximum efforts, active participation of students is lacking. Uniformity (standardization) is not observed. Teacher bias factor may be involved.

**Materials and Methods:** Discussion of the project in the department, discussion about role and contribution of other faculty members in the department, formation of methodol-

ogy for execution, and sensitization of the students. One region (superior extremity) demonstrations by conventional method. Use of team-based learning for demonstrations of inferior extremity. Specific learning objectives (SLOs) are provided on each table. SLOs are built up from basic to apply. This method is carried out strictly under supervision. Guidance and support is provided at the level of difficulties.

**Evaluation:** Part completion examination, short tests after each topic, student's feedback, faculty feedback.

#### 278. PowerPoint Presentations as Tools for Learning and Evaluation

Poonam Patnaik, Mohit Patnaik\*, V.S. Chopra\* Jamia Millia Islamia Medical College, New Delhi \*Santosh Medical College and Hospitals, Ghaziabad, Uttar Pradesh

First year anatomy students were assigned the task of preparing PowerPoint presentations using simple photographs taken by them in the anatomy museum (first year) of Jamia Millia Islamia, New Delhi. Similar task involving pharmacology flow charts was assigned for the second year students of Santosh Medical College and Hospitals, Ghaziabad to motivate students to utilize and acquire computer kills to nurture their scientific temperament in present challenging scenario.

**Aim:** Determination of the percent of students well versed with computer utility and their willingness to accept it as part of internal assessment. Possibility of universal acceptance of such exercises at larger level and perhaps at some stage is part of even final external evaluation.

**Materials and Methods:** Students of the above institutions were asked to participate in this exercise, prepare maximum three slides, the first slide is the cover, the second is copy-pasting of the photographs—its labeling of five important landmarks (graphs and flow charts for pharmacology students) with possibilities of animation application.

**Results:** Students already well versed with PowerPoint presentations willingly accepted the proposal; reluctance was evident in other unfamiliar groups. All pharmacology students accepted it to be part of internal assessment.

**Conclusion:** Conclusions were presented before the panel of experts in the conference with full details.

#### **279. Effectiveness of an Educational Intervention on Handwashing among Undergraduate Medical Students** *Tapati Roy*

G.S.L. Medical College, Rajahmundry, Andhra Pradesh

**Background:** Unsafe healthcare settings with ignorance and lack of facilities for practice of hygiene contribute to a significant proportion of healthcare-associated infections.

Bacterial contamination of hands may contribute to infection in cadaver in anatomy dissection hall.

**Aim:** This study attempted to find out the impact of handwashing on microbiological status of hand before and after educational intervention by two methods.

**Materials and Methods:** An educational intervention study was conducted among 120 first year MBBS students. The study subjects were divided in two groups (group A and group B) and given educational instruction by two separate methods. Group A was instructed through lecture and pictorial demonstration of washing techniques and group B was instructed through lecture and hands on practical demonstration of washing technique. Swabs were collected before and after handwashing. Knowledge of handwashing was assessed by oral questionnaires.

**Results:** The knowledge and attitude of students regarding handwashing was poor. About 83% of swabs taken from hand before washing showed positive growth. However, swab taken from washed hands following the educational instruction by two different methods showed positive growth in 53.3% and 40% among A and B group students, respectively.

**Conclusion:** Handwashing with soap and water is effective in reducing the bacterial contamination of hands. Hands on *practical demonstration* are more effective than lecture and pictorial demonstration. Teaching must be strengthened to highlight the importance of handwashing before starting dissection.

### 280. Effect of Formalin and Phenol Exposure in Undergraduate Students

Bikash Chandra Satapathy, Rajashree Biswal, Diptirekha Satapathy\* Department of Anatomy, Department of Pediatrics\*, SCB Medical College, Cuttack, Odisha

**Background:** Formalin and phenol are the most constant constituent of embalming fluid used for preserving cadavers for dissection. Although noxious and potentially carcinogenic, they are used for their effectiveness in preserving and also economical.

**Aim:** To find out the health problems faced by students of first year MBBS, BDS, BPT, and BOT due to exposure to formalin and phenol.

**Materials and Methods:** Questionnaire containing various symptoms was prepared according to suggestions from previous students and teachers. These printed questionnaires were supplied to the first-year MBBS students of SCB Medical College, Cuttack, first year BDS students of SCB Dental College, Cuttack and first year students of BPT and BOT courses of NIRTAR, Olatpur, Cuttack. All of them had undergone one year of practical training in the dissection hall of the Dept. of Anatomy, SCB Medical College. The students were analyzed

and the results were obtained. Due care was taken so as to exclude confounding disease symptoms.

#### 281. The Measurements of Cerebral Ventricles in Population of Coastal Odisha – A CT Scan Study

Bijayalaxmi Parija, Niranjan Sahu, L. Pattanaik IMS and SUM Hospital, Bhubaneswar, Odisha

This study was undertaken to find out the morphometrical measurements of cerebral ventricles in normal individuals between 20 and 70 years of age (both male and female) by CT scan method. In ventricular system, height and width of fourth ventricle, width of third ventricle, the A-P length of frontal horn, and frontal horn with body in lateral ventricle along the diameter of maximum width of inner and outer tables of the skull were measured. For this study, 100 patients were selected from normal individuals comprising 50 males and 50 females. It was found out that the mean height and width of fourth ventricle in males were greater than that in females. In third ventricle, the mean width was also higher in males than in females. In lateral ventricle A-P length of frontal horn in both males and females was higher in left side than right in most cases, and similar result was obtained in frontal horn with body. The mean of maximum width of frontal horn was found higher on left side than right in both sexes. Besides the asymmetry in lateral ventricle observed from above measurements, the males were showing higher values than females in most cases.

#### 282. Morphometry of Pinna – A Comparison of Direct and Digital Photographic Methods of Measurement

*Aaron D.K., Yogitha R., Roopa R.* St. John's Medical College, Bengaluru, Karnataka

**Aims:** Normal ear dimensions are a useful tool for the plastic surgeon, for forensic specialist, and also for the manufacturer of ear prosthesis. In this regard, significant variability has been reported between various ethnic groups. Considering this difference, the present study was aimed to estimate in a South Indian Population: (1) the length and width of the pinna, concha, and of the lobule, (2) the difference in measurements between direct and digital photographic methods, and (3) the correlation of the measured parameters with age, gender, and side.

**Materials and Methods:** In 50 pinna of 25 volunteers (13 males and 12 females of South Indian origin), the highest point (supraaurale), lowest point (subaurale), and posterior most points (postaurale) on the external ear was marked. Length and width of pinna, concha, and of lobule were measured separately by two methods (direct and digital photography) using Digital Caliper. The mean and SD were calculated. Independent sample T test was applied to compare the two

methods. Spearman's correlation coefficient was applied to correlate measurements with age, gender, and side using SPSS version 16.

Difference was considered significant at P value <0.5.

**Results:** The mean values of the length and width of the auricle were 61.75 mm  $\pm$  4.8 mm and 33.12 mm  $\pm$ 3.2 mm, respectively, of the lobule were 19.9 mm  $\pm$  2.5 mm and 21.2 mm  $\pm$  1.9 mm, respectively, and of the concha were 27.7 mm  $\pm$  3.1 mm and 15.89 mm  $\pm$  2.4 mm, respectively. No significant difference of measurements was found between both methods and between both sides for most parameters.

**Conclusion:** There is no significant difference in values between direct and digital photographic methods of measurement so digital photography can be considered as a simpler and more effective way of taking measurements.

#### 283. Diagnostic Value and Clinical Implications of Sperm Chromatin Structure Assay (SCSA) in Male Infertility

Dinesh Kumar, Kishlay Kumar, Monis Bilal Shamsi, Rajeev Kumar\*, Mitra D.K.\*\*, Rima Dada

Laboratory of Molecular Reproduction and Genetics, Department of Anatomy, All India Institute of Medical Sciences, New Delhi \*Department of Urology, All India Institute of Medical Sciences, \*\*Department of Transplant Immunology, All India Institute of Medical Sciences, New Delhi

**Introduction:** Sperm DNA integrity is essential for spermatozoa function. As the classical sperm parameters vary with time, they are poor predictors of pregnancy. Novel tests like sperm chromatin structure assay (SCSA) do not vary with time and so are considered as best predictors of male fertility.

**Aim:** To evaluate the role of SCSA in idiopathic male infertility, to correlate with classical sperm parameters, and to find out the threshold level of SCSA.

**Methods:** One hundred idiopathic infertile men and 50 fertile men were included in the study. Semen sample were analyzed as per WHO 1999 guidelines. Semen sample was processed as per standard protocol and analyzed using flow cytometric principles. DNA fragmentation index (DFI) was calculated and the values were correlated statistically.

**Results:** The mean DFI of infertile men (35.75) was significantly (P < 0.0001) higher as compared to controls (26.22). The threshold level of 30.28% was obtained as cutoff value to distinguish infertile men from fertile controls. Sperm count, forward motility, and normal morphology were found to be negatively associated with DFI. Moreover, 64% of infertile men have DFI > 30 against 6% of fertile controls (P < 0.0001).

**Conclusion:** As the integrity of paternal genome is the most vital factor for birth of healthy offspring, DFI is a good prognostic marker. Cases with higher sperm DFI may have poor success rate even after assisted conception and may experience recurrent pregnancy loss and so should be intervened medically if required.

#### 284. Anomalous Connections of Superior Sagittal Sinus: Its Embryological Interpretation and Clinical Relevance

Preeti Shrivastava, Anita Tuli, Shashi Raheja, Sneh Agarwal Lady Hardinge Medical College and SSK Hospital, New Delhi

Anatomic variations of the sinuses of dura mater, however infrequent, may present puzzling diagnostic and operative problems in the presence of thrombophlebitis, embolization, and other vascular disorders. This paper reports a hitherto less known anomaly of superior sagittal sinus (SSS), correlating with its clinical, surgical, and embryological basis as well as highlighting its importance. The present study seeks to explain the basis of this rare anomaly of SSS in terms of regression and retention of various parts of venous channels during development and their clinical implications. During routine dissection hall teaching of brain, the authors came across anomalous drainage of dural venous sinuses in adult formalin fixed cadavers of Indian origin. No dye was injected with formalin. The formation, course, tributaries, relations, and termination of the dural venous sinuses were noted. The anomalous patterns of drainage were found in 12 out of 60 cadavers. In one of the cases, trifurcation of SSS was seen along with patent and blind connections of significant dimensions with the transverse sinus; however, in other cases small connections were observed. Recognition of these anomalous connections is a must for clinicians and neurosurgeons. These vascular channels, if symptomatic, need to be treated by endovascular ablative procedures.

### 285. Histological Study of Adrenal Gland in Case of Suicidal Deaths

S. Patra, S. Rath, B.K. Dutta, Mishra G., Sahu R.K., Panda R.L., Prusti J.S. M.K.C.G. Medical College, Berhampur, Odisha

The adrenal gland reflects the functional changes of the stress system which leaves an imprint on the gland. Hence, the study of both the histology and morphology of adrenal in case of suicidal death is of immense importance in psychiatric and forensics medicine. The present study is carried out over a period of two years from August 1, 2010, to July 31, 2012. Human adrenal glands of 100 suicidal and 20 accidental cases of different age groups were obtained from the Forensic Department of M.K.C.G. Medical College, Berhampur, and SCB Medical College, Cuttack, after necessary formalities. Specimens were fixed in buffered formalin, and histological slides were made using routine H and E method of staining and also lipid staining with oil red O. On histological study, it was found that the cell size in zona glomerulosa was decreased with increased nuclear density. Hypertrophy and hyperplasia of zona fasciculata with intracytoplasmic lipid depletion varied from moderate to extensive. There was a prominence of vascular sinusoids, parenchymal cord like arrangement of cells in the zona fasciculata. A sinusoidal prominence in zona reticularis and hypertrophy of adrenal medulla was also observed. A normal pattern of adrenal gland is informative of receipt of sudden violence (i.e., accident).

#### 286. A Clinico-Anatomical Study of Strabismus in a Tertiary Care Hospital

*Behera Sarita, Mohapatra C., Sar M., Das S.R.* V.S.S. Medical College, Burla, Sambalpur, Odisha

This study is about the clinical profile, extraocular muscle involvement, epidemiology, and the etiology of 162 cases of manifest strabismus.

This prospective study was conducted over a period of two years from July 2009 to July-2011. Manifest strabismus cases of different types attending the eye OPD were included in the study.

One hundred and sixty-two cases of manifest squint with the incidence of 0.63% were found, of which 62.9% were paralytic and 37% non-paralytic, 66% were esotropic, and 34% exotropic. Paralytic esotropia is common in the age group of 41–50 years (46.4%) and nonparalytic in 0–10 years (47.4%). Males dominate over females whether in esotropia or exotropia. Paralytic exotropia is common in 41–50 years (45.6%) and non-paralytic in 0-10 years (45.5%). Paralytic squint is common in the lower socioeconomic group (52.9%) and nonparalytic in middle and higher class (86.7%). Unilateral involvement is predominant. Abduction anomaly accounts for 73.5% of patients due to lateral rectus muscle involvement. Abducent nerve palsy is the most common cause of paralytic squint (56.8%) followed by oculomotor nerve (21.6%). No isolated 4th nerve involvement was encountered. Mixed nerve involvement is found in 21.6% of patients. Most of the patients presented with deviation of eye. Diplopia and defective vision were the next common presentations.

Ophthalmologists need to be trained and well-equipped squint clinics should be established in this part of the country.

287. Study of Paranasal Sinuses by Computed Tomography Correlated with Various Diseases

Juli Tudu, B.K. Dutta, R. Biswal, J. Mohanty, C. Sarangi, M. Naik

SCB Medical College, Cuttack, Odisha

Pathological lesions of paranasal sinuses include a wide spectrum of conditions ranging from inflammation to neoplasm, both benign and malignant. The sinuses are in close anatomical proximity with orbit, cranial fossa, and pterygopalatine fossa. Hence early involvement of these areas is an important feature. Since clinical assessment is hampered by surrounding bony structures, diagnostic radiology is of paramount importance. While conventional plain radiography readily demonstrates maxillary and frontal sinus disease, they provide limited views of the anterior ethmoid cells, upper two-thirds of nasal cavity and frontal recess. CT provides detailed information of paranasal sinuses and is now well established as an alternative to standard radiographs.In this prospective correlational descriptive clinical study, 104 symptomatic paranasal sinus diseased patients were evaluated by clinical and CT findings for management of patients. Bony involvement by PNS lesions was always demonstrated by CT, which is the standard imaging modality to demonstrate it accurately.

### 288. Determination of Time since Death from the Histological Changes in the Liver

Shrikant V., Yogesh A.S.\*, M. Goyal, C. Banerjee, R.K. Singh \*\* Department of Anatomy; \*\*Department of Forensic Medicine, Pt. J.N.M. Medical College, Raipur, Chhattisgargh \*Department of Anatomy, Shri Aurobindo Institute of Medical Sciences, Indore, Madhya Pradesh

Estimation of time since death is one of the most important object of postmortem examination. After the death, due to lack of blood supply, every organ undergoes a series of gross as well as histological changes. Liver is one of the most active and important organ of the human body where anabolic as well as catabolic reactions take place. With this important factor in view, 30 liver specimens were studied in the present study which were collected from the Forensic Department. Histological changes in the liver such as definite microscopic changes of Glison's capsule, hepatic lobule, hepatic cords, central vein, sinusoids, portal triad, and individual hepatocytes were noted. These histological changes were correlated with the time elapsed since death. The detail findings obtained may be helpful for the forensic experts and in the medico-legal cases.

**289. Morphometric Analysis of Sella Turcica** *Swapna R. Chavan, A.S. Katti, N.G. Herekar, M.R. Shende, A.M. Tarnekar* MGIMS, Sevagram, Government Medical College, Miraj, Maharastra

**Introduction:** The purpose of sella turcica is to contain and protect the pituitary gland. The importance of size and shape of the sella turcica in connection with the occurrence of symptoms of pituitary diseases has long been recognized. Dimensions of sella turcica in dry skull can easily be obtained. However, from a clinical point of view, obtaining the dimensions of sella turcica in the living is important. Sella turcica and pituitary gland are inaccessible to physical examination.

**Aim:** To present a set of baseline measurements of sella turcica by studying the various dimensions by radiographs.

**Materials and Methods:** In the present study, lateral radiographs of skulls of 447 subjects of known age (13–55 years) and sex (M – 237, F – 210) were studied. The various parameters of sella turcica such as greatest anteroposterior diameter, depth, and area were studied.

**Results:** It was found that greatest anteroposterior diameter and depth of sella turcica showed statistically no significant difference in their mean values of males and females indicating no sexual dimorphism. The area also showed no sexual dimorphism.

**Conclusion:** Careful study of these parameters can help in radiological detection of pituitary tumors, suprasellar or parasellar tumors, etc.

The normal dimensions of sella turcica can be used as reference values for evaluating various pathological conditions related to sella turcica in Maharashtra population.

### 290. Morphometric Study of Atrioventricular Valves of Human Heart

Lopamudra Nayak, L. Pattanaik, P.K. Chinara, S. Senapati IMS and SUM Hospital, Bhubaneswar, Odisha

The knowledge about the morphology and morphometric measurement of the normal atrioventricular valves is useful to improve the current surgical repair techniques. Keeping this in mind the present study was conducted to get information about the morphology and measurement of atrioventricular components which can be used by anatomists, radiologists, and cardiac surgeons as these normal measurements will help them to detect any pathology and deformity. In the present study, 50 formalin preserved autopsy hearts were collected from the Department of FMT, SCB Medical College, Cuttack. These samples were obtained from unclaimed bodies and were collected within 6-12 hours after death. They were studied in the Dept of Anatomy, IMS and SUM Hospital, Bhubaneswar. The atrioventricular (tricuspid and mitral) valves were dissected and the annular radius, annular circumference, and annular area were calculated. Height of each leaflet measured from base to free edge in the central axis, and width of each leaflet at its annular attachment were also measured. The annular circumference was maximum in tricuspid valve and the mean annular circumference was found to be 10.68(±2.349) cm. The mean annular circumference of mitral valve was found to be 7.75 (±2.53) cm. In 60% cases of heart the length of the anterior cusp of tricuspid valve was maximum in range of (3.80-4.00) cm. The mean value was found to be 3.73(±1.687) cm. The length of the anterior cusp of mitral valve was maximum in range of 3.80-4.0 cm (50% cases), and post cusp was maximum in range of 3.60-3.70 cm (52% cases). The mean value was found to be 3.95 (±1.754) cm and 3.69 (±1.243) cm, respectively. The mean diameter of tricuspid and mitral valve was found to be 1.664 (±0.367) cm, 1.222 (±0.168) cm, respectively. The annular area of tricuspid valve was maximum in the range of 9.300-10.500 cm<sup>2</sup> (67% cases) and the mean area was found to be 10.591 cm<sup>2</sup>. The annular area of mitral valve was maximum in range of 5.700-6.300 cm<sup>2</sup> (73% cases) and the mean annular area was found to be 6.927 cm<sup>2</sup>.

#### 291. Morphometric Study of Human Brain Ventricles by CT Scan on the Population of Odisha

Senapati S., Pattanaik L., Chinara P.K., Nayak L. IMS and SUM Hospital, Bhubaneswar, Odisha

A prospective study was conducted over 3 years (2008–2011) on 50 normal adults (25 males and 25 females) in the age group of 30–60 yrs chosen randomly. The CT scanner used was Siemens (somatom spirit) with 512 × 512 matrix resolution, dual slice multi-detector machine. In this study it was found that the measurement of ventricular system (max width of ant horn, max width of third ventricle, width of fourth ventricle, min cella media distance, max width of skull both outer and inner, Evans ratio) has significant difference on the basis of sex ,age groups, and sides (RT and LT) of normal individuals. The findings were tabulated and analyzed.

#### 292. Morphometric Study of the Nutrient Foramina of Human Femora and Its Surgical Significance

*G. Manoj Kumar Reddy, Ch. Jayamma, S. Gangabhavani* Kurnool Medical College, Kurnool, Andhra Pradesh

**Introduction:** Nutrient arteries form the majority of the blood supply to the long bones supplying the medulla and inner two-thirds of cortex, entering into the bone through the nutrient foramina, which is usually single, rarely multiple, or occasionally absent.

**Aim:** To determine the common number of nutrient foramina, common position of nutrient foramina in relation to the shaft, and to calculate average foramen index for femur.

**Methods:** A total of 114 dried human femora are studied for the number of nutrient foramina, position of nutrient foramina in relation to the shaft, and average foramen index was calculated using Hughe's formula.

**Results:** On Right side 96% of bones showed single nutrient foramen, 4% showed double nutrient artery, 94% showed the foramen on linea aspera, 6% on the lateral surface. On left side 95% of bones showed single nutrient foramen, 5% showed double nutrient artery, 93% showed the foramen on linea aspera, 6% on the lateral surface, 1% on the medial surface. The average foramen index is 43% on right side and 44% on left side.

**Surgical Importance:** The knowledge of variations in nutrient foramina is of great importance in treating the patients with long bone injuries, surgical procedures like tumor resection, internal fixation, orthopedic transplant techniques, and micro-vascular bone transfer procedures.

#### 293. Estimation of Stature from Foot Length in Tangkhul Naga's of Ukhrul District, Manipur

Roshini N., Melanirajendran, Ramesh Kumar Subramanian Sri Ramachandra Medical College and Research Institute, Sri Ramachandra University, Chennai, Tamil Nadu

Stature is fundamental to assessing growth, calculating body surface area, and establishing individuality of an unidentified dead body. Height can be found out from different anthropometric measurements of different parts of body like long limb bones, facial measurements. The objective of the present study is to find out the relationship between stature and foot length in 192 subjects. The height and foot length of the individual was measured. The results were tabulated and data analyzed using SPSS software. The data showed that there is a positive correlation between foot length and stature. Therefore a linear regression formulae was generated using foot length to estimate stature.

#### **294. Estimation of Stature by Percutaneous Tibial Length in Mangalore Population**

Roopa R., Chitra Prakash Rao, Vinyachandra P., Rachana R. Kulkarni

A.J. Institute of Medical Sciences (AJIMS), Mangalore, Karnataka

Height is an important factor to establish individuality of unidentified dead body or any mutilated part of such dead body. In this study, an attempt has been made to calculate the height from the percutaneous tibia length (PCTL). Bilateral percutaneous tibial length was measured with the help of vernier's calipers (spreading) by using surface anatomical landmarks between most prominently palpable part of the medial condyle of the tibia and tip of the medial malleolus. To find out the relationship between PCTL and the height of the individual and to evolve a regression equation formula, necessary statistical evaluation has been done on the data obtained from 100 adult individuals in both sexes. By using the regression equation formula so derived the height of an individual can be calculated with the help of PCTL. The procedure is of great help in medico-legal cases.

### 295. Estimation of Height of Individual from Tibial Length

Mohite H.S., Mohite S.S., Umarji B.N.

Krishna Institute of Medical Sciences Deemed University, Karad, Maharashtra,

**Aim:** Calculation of the height of individual by measuring the length of tibia.

**Background:** Tibia is important bone in the body and in some medico-legal cases only tibia is available. So it is important to know the relation between the length of tibia and the height of the individual.

**Materials and Methods:** For the present study, healthy adult individuals (25 males and 25 females) without any deformity of leg are chosen. Length of tibia is measured on both sides from prominence of tibial tuberosity to the tip of medial malleolus with the help of a measuring tape. Total height of individual is measured, and the data are analyzed for calculating the relation between length of tibia and the height of the individual.

**Result:** Results were discussed at the time of presentation.

### 296. Incidence of os Inca: A Study on the Population of Eastern India

Biswabhusan Mohanty, Divya Agrawal, Sitansu Kumar Panda, Prafulla Kumar Chinara IMS and SUM Hospital, Bhubaneswar, Odisha

The squamous part of occipital bone has two parts: supraoccipital and interparietal. The interparietal portion ossifies intramembranously and in rare cases may be separated from the supraoccipital part by a suture. It is then called interparietal bone or inca bone. Occurrence of variation of the inca bones was observed in majority of human populations around the world. India has more inca bones than its neighboring countries. Various geographical and ethnological patterns of frequency variation of the inca bones were already found. This study was conducted on 114 human skulls of Eastern India to see the incidence of inca bones. Os incae have a definite anthropological value as an epigenetic trait in racial differentiation. Knowledge of inca ossicles in human skulls may be useful to neurosurgeons, orthopedic surgeons, anthropologists, radiologists, and forensic experts.

#### 297. Estimation of Total Length of Femur from Its Fragments in South Indian Population

Shweta Solan, Roopa Kulkarni Kallinga Institute of Medical Sciences, Bhubaneswar, Odisha

The objective of the present study was to determine the lengths of the femoral fragments and to compare with the total length of femur in South Indian population, which will help to estimate the stature of the individual using standard regression formulae. This can help in comparing these data with other studies conducted in different forensic and archaeological fields. For this purpose 150 (72 left and 78 right) adults fully ossified dry processed femora were taken to analyze the morphometric details of the femoral segments which were measured using osteometric board and scale. The femur bone was divided into five segments by taking predetermined points, from most proximal point on head of femur to most distal point on medial condyle of femur. Length of five segments and maximum length of femur were measured to the nearest millimetre. The values were obtained in ERN (mean  $\pm$  SD) and the mean total length of femora on left and right side were measured. The proportion of segments to the total length was also calculated which will help for the stature estimation using standard regression formulae. This study helps in forensic, anatomic, and archaeological fields in identifying unknown bodies as well as for the orthopedic surgeons for the treatment of proximal and distal femur fractures in their reconstruction in case of extensive damage to those parts of femur.

#### 298. Study on the Epiphyseal Union of Wrist Joint in Adolescents of Eastern Odisha

Dibya Prabha Bara, C.L. Sarangi, B.K. Dutta, M. Panda SCB Medical College, Cuttack, Odisha

**Objectives:** Objectives of the study were to: 1. Study the different stages of epiphyseal union. 2. Compare the pattern of epiphyseal union at wrist among males and females.

**Subjects and Methods:** In the study 124 healthy, young adolescents (70 boys and 54 girls) between 13 and 19 years residing in eastern Odisha were included. Age was certified by means of birth record and school certificates. Radiographs of both wrists were taken in each case and findings regarding epiphyseal union were classified into five stages.

**Results:** In males age of epiphyseal union of both radius and ulna is 17–19 years. In comparison, in females epiphyseal union of radius and ulna takes place at the age of 16–18 years, while that of ulna at the age of 16–19 years. Epiphyseal union is 1–2 years earlier in females as compared to males.

**Conclusion:** Epiphyseal union for radius and ulna are bilaterally symmetrical and females show earlier fusion than males.

#### 299. Clinico–Embryological Correlation of Congenital Ocular Anomalies in a Tertiary Care Hospital

Behera Sarita, Mohapatra C., Sar M., Dehury M. V.S.S. Medical College, Burla, Sambalpur, Odisha

This study aims at studying different congenital ocular anomalies and their association with embryological development over a period of two years. Seventy-five eyes of 60 patients having congenital ocular anomalies as diagnosed by ophthalmologists from June 2010 to June 2012 were included in the study. The demographic profile, perinatal history, and associated systemic diseases were studied. The embryological development of all the anomalies is discussed in details.

Out of 60 patients, 35 (58.3%) were male and 25 (41.7%) were female. Bilateral involvement was seen in 15 (25%). Nasolacrimal duct anomalies were found to be the most common (33.3%) followed by congenital cataract (30.7%), coloboma of uveal tract (20.0%), microphthalmia (4.0%), anophthalmia (4.0%), persistent pupillary membrane (2.7%),

and congenital glaucoma(2.7%), heterochromia iridis (1.3%), and aniridia (1.3%) of total eyes. History of consanguinity was present in 13.13% and history of maternal infection during antenatal period was found in 8.3%. Systemic involvement was seen in 6.06%.

Proper knowledge of developmental pathogenesis of congenital ocular anomalies is highly important for correct diagnosis and early intervention. Preventive measures can be applied if history is taken properly during evaluation of the patients.

#### 300. Variation in the Formation, Course, and Main Tributaries of Great Saphenous Vein

Sriprajna, Antony Sylvan D'souza, Mamatha H., Suhani S. Kasturba Medical College, Manipal University, Manipal, Karnataka

**Introduction:** The anatomical variations are more frequently encountered in the venous system particularly in the superficial veins when compared to the arterial system. A good understanding of venous anatomy is very important for sonographers. The great saphenous vein is the longest vein of the body and represents pre-axial vein of lower limb.

**Materials and methods:** The present study included 20 lower limbs during routine dissection for undergraduate students in the Department of Anatomy, Kasturba Medical College, Manipal. We studied the great saphenous vein with reference to: (1) its formation, (2) its relation with medial malleolus, (3) its distance from patella, (4) level of its termination, and (5) variation in its major tributaries.

Result: Result will be discussed during presentation.

**Conclusion:** Aforementioned anatomical facts including mode of termination of great saphenous vein can be important for surgeons planning intervention in this area. This vein is used as an arterial graft because of the marked anatomical remodeling. Thus, a good understanding of the typical ultrasound appearance of the great saphenous vein, and its relationship to the saphenous compartment of fasciae are critical in performing a successful venous scan.

### **301.** Variation in the Branching Pattern of Axillary Artery

Muthuvel D.M. Amala Institute of Medical Sciences, Amala Nagar, Thrissur, Kerala

Usually the axillary artery gives one branch from its first part, the superior thoracic artery; two branches from the second part are thoraco-acromial and lateral thoracic arteries; and three branches from its third part are subscapular, anterior, and posterior circumflex humeral arteries. In one case there were two branches from its first (both are muscular) and the second part gave four branches, two branches are the usual thoraco-acromial and lateral thoracic arteries, and the other is articular branch to the shoulder joint. The third part gave only two branches, one is usual subscapular artery and other branch is divided in to anterior and posterior circumflex humeral arteries. This anatomical variation assumes clinical significance during the surgery around the axilla and shoulder region.

#### 302. Morphological Study of Accessory Transverse Foramina in the Cervical Vertebrae

*Tushar V. Nayak, C.A. Pensi* B.J. Medical College, Ahmedabad, Gujarat

**Aim:** To study the incidence of accessory transverse foramina in the cervical vertebrae and analyze them morphologically with emphasis on their embryological basis and surgical importance.

**Materials and methods:** The study included 675 human cervical vertebrae (400 were typical cervical vertebra (C3, C4, C5, and C6), 100 atlases, 100 axes, and 75 C7) which were procured from the bone collections of the Department of Anatomy. The transverse foramina was observed macroscopically on both sides of all the vertebrae, and the accessory foramina were noted.

**Results:** Out of 675 cervical vertebrae, only 94 (13.94%) showed the formation of accessory foramina. Among them 93 (13.77%) had double foramina and only 1 (0.15%) vertebra (C 1) showed three foramina on left side. Out of 94 vertebrae, 46 (6.81%) had double foramen on both sides, 48 (7.11%) had double foramen on one side – 28 (4.15%) on the right side and 20 (2.96%) on the left side. Incidence of accessory foramen was 9% in C1, 15% in typical vertebrae, and 30% in C7. No vertebrae showed the absence of transverse foramina.

**Conclusion:** The present study observed the accessory transverse foramina in 13.94% of cases. The unilateral presence was more common than the bilateral. Accessory transverse foramina were more common in vertebrae prominens (C7). The surgical anatomy of these variations is important since the course of the vertebral artery may be distorted in such situations and also for radiologists for interpreting the computed tomogram and magnetic resonance image scans.

### 303. Age and Gender Related Variations in the Panoramic Mandibular Index

Shilpa Bathla, S.K. Srivastava

Pt. B.D. Sharma PGIMS, Rohtak, Haryana

The aim of the study was to measure the panoramic mandibular index (PMI) and study its relation to age and gender, considering its importance as a predictor of osteoporosis. Sixty adult human orthopantomographs were divided into 6 age groups (35-65 years) with equal number of males and females. PMI was calculated as the ratio of mandibular cortical thickness divided by the distance between the superior margins of mental foramen to the inferior border of the mandible, as described by Benson et al (1991). In males, the mean PMI values ranged from  $0.3 \pm 0.025$  to  $0.381 \pm 0.019$ . In females, the values ranged from 0.286  $\pm$  0.036 to 0.36  $\pm$ 0.007. A decreasing trend in PMI values was observed with increasing age in both males and females. Although the female mean PMI values showed lower values than males in all age groups, no statistically significant differences were found. However, for both males and females, statistically significant differences were observed between mean PMI values of right side and left side, left side values being greater for both sexes. Sexual dimorphism was not observed. The total mean PMI values (males and females combined) ranged from  $0.293 \pm 0.03$  to  $0.371 \pm 0.17$ . Significant negative correlation between total mean PMI and age was calculated. Statistically significant differences in total mean PMI values were found between three age groups (46-50, 51–55, and 61–65 years).

#### 304. Morphometric Analysis of the Acromion Process of the Scapula and Its Clinical Significance in South Indian Population

Jayashree Santhosh, Senthil Kumar S, Melani Rajendran, Ramesh Kumar Subramaniam

Sri Ramachandra University, Chennai, Tamil Nadu

**Introduction:** Rotator cuff injury is commonly associated with Shoulder Impingement Syndrome. The variations in the morphology of acromion process predispose to the pathogenesis of Shoulder Impingement Syndrome, resulting in compression of soft tissues between the acromion process and head of humerus.

**Aim:** The aim of this study is to attempt to understand the various morphological patterns of the acromion process using different morphometric samples.

**Materials and Methods:** One hundred South Indian adult dry scapulae were used for this study, conducted in the Department of Anatomy, Sri Ramachandra University, Chennai, Tamil Nadu. The length, thickness, and front projection of the acromion and the distances from the acromion to the uppermost point on the glenoid and to the coracoid process were measured. The measurements were done using vernier calipers and measuring tape. The data observed were statistically analyzed.

**Results:** Different lengths, thickness, projections, and shapes of the acromion process were observed.

**Conclusion:** The data from the present study will serve as yet another tool to promote a better understanding of the various morphological patterns of the acromion process.

#### 305. Estimation of Stature from Percutaneous Measurement of Tibia in Living

Ashita Kaore, Ashish Kamdi Rajiv Gandhi Institute of Medical Sciences, Adilabad, Andhra Pradesh

**Aims and Objectives:** Stature was estimated from the percutaneous length of tibia and percutaneous length of upper fragment of tibia in living. Study will help the forensic experts to estimate the stature of an individual when the individual was alive as they may get only a leg or a portion of the leg of the dead body. Study will be useful in respiratory efficiency tests in kyphoscoliosis and in anthropological studies.

**Methodology:** 200 male and 200 female between 18 and 21 years of age were studied. Height of the subject in standing position, percutaneous length of Tibia, and percutaneous length of upper.

**Results and Conclusions:** In both sexes stature estimated by regression formulae for percutaneous length of tibia and for percutaneous length of upper fragment of tibia was similar to average measured stature with an error of <1 cm. In both sexes stature by derived multiplication factor for length of tibia was similar to average measured stature with an error of < 1 cm. There was a difference of 4.16 cm in male and 5.37 cm in female in stature estimated by derived multiplication factor for upper fragment of tibia and average measured stature. There was no significant difference in percutaneous length of right and left tibia in both sexes.

Regression formulae are more dependable than multiplication factor for estimation of stature.

**306.** A Human Cadaveric Study of Anatomical Parameters of Hip Joint in Hyderabad Region

Ashish Kamdi, D. Suseelamma, S. Saritha Kamineni Institute of Medical Sciences, Narketpally, Andhra Pradesh

Aim of Study: The study was carried out with a view to assist orthopedicians to make suitable hip joint prostheses, to aid forensic experts in disputed sex, and to understand etiopathogenesis of diseases like osteoarthritis of hip joint.

**Methodology:** One hundred hip joints were studied in 40 male and 10 female cadavers. Vertical diameter of head of femur, diameter of acetabulum, and depth of acetabulum were measured using a Vernier calipers. Mean of 3 parameters was compared between males and females and also compared between right and left side for both sexes. The mean diameter of acetabulum was compared with the mean vertical diameter of head of femur for males and females.

**Results and Conclusions:** The mean values of both vertical diameter of head of femur and diameter of acetabulum was found to be significantly greater in males than in females. These values are of use to forensic experts when only fragments of bone are available for sex determination.

The acetabular diameter was greater than the vertical diameter of head of femur in both sexes and plays an important role for clinicians to understand the rarity of occurrence of primary osteoarthrosis in Indians.

The study provides valuable parameters, which will enable orthopedicians and biomedical engineers to design suitable hip joint prosthesis.

**307. Side Differences and Correlation Between the Vertical and Lateral Neck Angle in Dry Tali** *Suresh N., Nachiket S., Balasubramanyam V., Roopa R.* St. John's Medical College, Bengaluru, Karnataka

**Aim:** The vertical angle (VA) and lateral neck angle (LNA) of the talus are indicators of the relative orientation of the head to the body. The LNA value is associated with weight bearing stresses and is useful for designing talar prostheses. The aim of the present study was to document any side differences and determine the correlation between the two angles.

**Material and Methods:** Sixty dry adult tali (30 right and 30 left) were studied. The VA and LNA were measured using a photographic method. Medial view digital photographs were taken and the axes of the body and the head were drawn on the digital photographs using PowerPoint software. The VA was measured as the angle between these axes. Superior view digital photographs of the talus were taken and the LNA was measured using a similar method as described above. Side differences and strength of association were estimated using the independent sample T test and Pearson's correlation coefficient, respectively.

**Results:** The mean values of the VA and LNA were  $87.7 \pm 4.1$  and  $111.9 \pm 2.7$ , respectively, on the left side. Similar values on the right side were  $90.6 \pm 3.9$  and  $112.9 \pm 2.4$ . Significant side differences were noted in the values of the VA but not the LNA. No correlation was observed between the VA and the LNA.

**Conclusion:** The average values of the VA and LNA in the present study were higher and lower, respectively, than previous Indian studies. However, the significant bilateral differences in the NA noted in previous studies were not observed.

### 308. The Orbital Index of Adult South Indian Dry Skulls: A Direct Measurement Study

*Priya Menezes, Sujatha D'costa* Centre for Basic Sciences, Kasturba Medical College, Manipal University, Mangalore, Karnataka

**Aim:** Assessment of orbital dimensions for the study of anatomical disposition of orbital structures and surgical management of orbital pathologies.

**Materials and Methods:** Approximately 80 dry skulls from the Department of Anatomy and from the students of Kasturba Medical College, Mangalore, were collected. The maximum orbital height and width of right and left sides were noted by direct measurement technique.

**Result:** The mean orbital height for the right and left sides were  $3.29 \pm 0.29$  and  $3.32 \pm 0.25$  mm, respectively. While their orbital breadths were  $3.86 \pm 0.17$  and  $3.86 \pm 0.16$  mm, respectively, the mean orbital index was 94.25.

**Conclusion:** The study population belongs to the Megaseme category. Present study may form a useful anthropometric data that will be of clinical and surgical interest in ophthalmology and oral and maxillofacial surgery.

### 309. Variation in the Cutaneous Innervation of the Dorsum of the Hand

Muthuvel D.M.

Amala Institute of Medical Sciences, Amala Nagar, Thrissur, Kerala

Normally the cutaneous innervation of the dorsum of the hand is supplied by the radial and ulnar nerves, the lateral three and half fingers by the radial nerve, and medial one and half fingers by the ulnar nerve. In one of the cases the cutaneous innervation of dorsum of the hand is supplied by both of the radial and ulnar nerves, but the area of distribution is different from the usual way of distribution; here lateral two and half fingers are supplied by radial nerve and medial two and half fingers are supplied by ulnar nerve. This anatomical variation is more essential for clinicians and neurosurgeons for surgical procedures on the dorsum of the hand.

#### **310.** A Study on Neural Tube Defects

Sunita Sethy, C. Sarangi, R. Biswal, M. Panda, M. Naik SCB Medical College, Cuttack, Odisha

Neural tube defects (NTDs) are common congenital malformations affecting the brain and spinal cord. They assume significance by virtue of their morbidity, mortality, health care expenditure, and human suffering. The incidence of NTDs ranges from 0.5 to 11/1000 births in different regions of India. The true incidence of NTDs is difficult to ascertain as affected pregnancies may end up in spontaneous abortions, or may be medically terminated. Neural tube formation (neurulation) is a highly complicated biological process controlled by a number of factors. This study was carried out with an objective to know about the incidence, its various types, and probable causes. It was done for a period of 1 year in the Department of Anatomy with the collaboration of Department of Obstetrics and Gynaecology in SCB Medical College and Hospital, Cuttack, Odisha. This study was undertaken in all live-born and still-born babies delivered in the Department of Obstetrics and Gynaecology of SCB Medical College.

Incidence was found to be more in still-born than live-born babies and more in males than females. Results will be discussed in detail during presentation. Our goal should be to prevent birth of babies with NTDs by supplementing folic acid and vitamin  $B_{12}$  during periconceptional period and early diagnosis by USG, AFP levels, etc, is essential for management and also provides opportunity for early counseling of parents for termination.

### 311. A Study of Congenital Malformations in a Tertiary Care Hospital in Odisha

Agrawal D., Mohanty B.B., Mohapatra K.\*, Chinara P.K. IMS and SUM Hospital, Bhubaneswar, \*Department of Obstetrics and Gynaecology, SCB Medical College, Cuttack, Odisha

Congenital malformations may be defined as any anatomical defect, single or multiple, attributable to fault in development clinical study of spectrum of congenital malformations, its incidence and role of various factors in the causation of these malformations was undertaken on 7268 newborn babies delivered in the Department of Obstetrics and Gynaecology, SCB Medical College, Cuttack, during a period of 12 months. These babies were thoroughly examined within the first 3 days of delivery. The study included all live borns along with still borns after 28 weeks of gestation or whose weight was above 1 kg. The incidence of congenital malformation of neonates per thousand births was found to be 15.9. The commonest system involved was the musculoskeletal system (22.4%) followed by central nervous system (18.1%). Multiple system involvement was seen in 10.4% cases. The incidence of congenital malformations were seen more in still births (10.4%) in comparison to live births (1.4%) which was significant (p < 0.01). Major malformations were observed in 62.1% of malformed babies than minor malformations which was seen in 37.9% babies. Male:female ratio was found to be 1.4:1 (p < 0.05). Malformations were observed more in term babies (77.6%) than in preterm (20.7%) and postterm babies (1.7%).

#### 312. A Rare Case Presentation – Anencephaly with Placental Membrane Attached to the Dura Mater of Head

Kalpana Purohit, K. Rama Rao, S.C. Mohapatra Kalinga Institute of Medical Sciences, Bhubaneswar, Odisha

**Introduction:** An encephaly results from failure of closure of the neural tube in the cranial region. Its incidence is 1 in 1000 births, two to four times common in females.

**Description of the Case:** Full term female fetus, membrane of placenta attached to the dura mater of the brain. The umbilical cord from the placenta, passing on the right side of head and neck, is tilting the head to the left side. Bones of the forehead are present. Bones of the upper half of the front of calvaria and posterior part are absent. Other associated anomalies like syndactaly, cleft palate, cleft lip, and congenital cataract are present. Observation: A detailed study of the anomalies was done and correlated with radiological, embryological, and genetic findings.

**Conclusion:** Though anencephaly is a common anomaly, the attachment of the placental membrane with dura mater makes the condition a rare finding and needs embryological and genetic coordination.

#### 313. Variation in Branching Pattern of Axillary Artery

Pradnyesh N. Panshewdikar, Anuja Deshmukh, D.S. Joshi, Vaishali Inamdar, Vaibhav Anjankar, Uddhav Mane Dr. Shankarrao Chavan Govt. Medical College, Nanded, Maharashtra

In this era of quick result, increasing use of invasive diagnostic and interventional procedures, especially in CVS, makes it important that types and incidence of vascular variations should be well understood and well documented. Here, during routine dissection for undergraduate students in Dr. S.C.G.M.C., Nanded (Maharashtra), we came across right sided axillary artery branching pattern variation in 50-yearold male cadaver. Left side was normal.

Classically each part of axillary artery has its characteristic branching pattern but, in this case, most of the branches of the axillary artery are arising from second part through a common trunk along with muscular branches.

As the axillary artery is most common to get damaged after popliteal artery, vascular surgeons, orthopedician, and radiologist must be aware for its variations. The details of the case were discussed at the time of conference.

### 314. A Study of Coronary Dominance in the Population of Odisha

Suryakanta Seth, B.K. Dutta, R. Biswal, M. Panda, S. Sethy, S. Das, B.C. Satapathy

SCB Medical College, Cuttack, Odisha

With the ever increasing incidences of coronary heart disease, an in-depth study of the coronary arteries has been felt by the medical fraternity. Coronary arteries show wide variations among different populations. The knowledge of these variations is of paramount importance when considering various surgical interventions. This study therefore aims to focus on the pattern of coronary dominance in Odisha, which is ethnically unique from the rest of India. Eighty cadaveric hearts were studied. The population under study included the population of Odisha. The coronary arteries were examined by gross dissection and analyzed statistically. The modes of termination of right coronary artery and the circumflex artery were described with the help of five points: At the right border, between the right border and the crux, at the crux, between crux and left border, and at the left border. Origin of the posterior interventricular artery was taken as the basis of dominance. Right dominance was found in 73%, left dominance was found in 15.47%, while the remaining pattern was observed in 12.53% of hearts. The results of study were compared with other authors and variations were noted.

#### 315. An Anatomical Insight into Construction of Femoral Prosthesis for Maharashtrian Population

Anil Kumar Dwivedi, R. Bhatnagar, Aseem Tandon, M.S. Ahuja Armed Forces Medical College, Pune, Maharashtra

**Introduction:** The morphology of proximal femur is an essential parameter in the design and development of implants for hip replacement (hemiarthroplasty). Inappropriate implant design and size can affect outcome of the surgery with associated complications. Clinical practice in our country has shown a lack of suitable implants that perfectly match the anthropometry of the local populace.

**Aim:** To collect anthropometric data of upper end of femur in Maharashtrian population and compare the data with that reported in western literature and dimensions of commonly used prosthesis.

**Materials and Methods:** Cadaveric femora were studied to obtain the following anthropometric measurements: femoral head offset, diameter, and circumference in addition to neck shaft angle and femoral neck torsion. Mean and SD of these values were calculated and compared with those reported in western literature using the one sample t test.

**Results:** Morphology of the proximal femur in our study population differed significantly (p < 0.001) from western literature.

**Conclusion:** Regional variation exists in the morphological parameters of femoral head indicating a need to customize implant design to suit the local population.

#### 316. Study on Sulcus Vocalis

S. Melani Rajendran, L. Somu\*, B. Vivkanandan\*

Department of Anatomy and \*Department of ENT and Head and Neck Surgery

- Sri Ramachandra Medical College and Research Institute,
- Sri Ramachandra University, Chennai, Tamil Nadu

Vocal cords in clinical conditions may lead to dysphonia, change of pitch, or hoarseness of the voice. Several clinical conditions are present for the change of the voice such as benign pathological nodules, polyps, cysts, Reinke's edema, paresis, and sulcus vocalis. Of these, the sulcus vocalis is commonly missed in diagnosis. A study was carried out to find out the prevalence of sulcus vocalis in the patients of the Departments of Anatomy and ENT, Sri Ramachandra Medical College and Research Institute, Sri Ramachandra University, for a period of one year. Patients of both sexes, between 25 and 50 years, with horseness of the voice and vocal cord problems were observed. The study was correlated with the anatomy of the vocal cords in the cadavers.

Treatment options include speech therapy and phonosurgery.

It is a challenging disorder and commonly neglected. Therefore a thorough knowledge on sulcus vocalis would lead to extra care in the diagnosis.

#### 317. Anthropometric Measurements of the Hand Length and Their Correlation with the Stature in Oriya Population

Pal A., Roy P.\*, Nayak S., Sethy S., Panda M., Sarangi C., Biswal R., Ray S.

Department of Anatomy, SCB Medical College, \*Department of Paediatrics, KPC Medical College, Jadavpur, West Bengal

**Introduction:** Stature or body height is a useful anthropometric parameter for identification of an individual. From the time of Leonardo da Vinci (the Virtuvian Man) the human hand is estimated to bear a 1:10 ratio with height. The study was done to estimate stature from the hand length on 150 Oriya adult Hindu males and females. The morphometrical study has been conducted in the Department of Anatomy, SCB Medical College.

**Materials and Methods:** Undergraduate students during the period August–November 2012 were selected as cases. Consent was obtained from the volunteers. Stature was measured with a standard stadiometer. Length of both hands were obtained from tip of the styloid to the tip of the middle finger with a slide caliper. Data were analyzed with IBM SPSS for Windows ver.20.

**Results:** The present study showed significant (p < 0.001) positive correlation between the stature and hand lengths.

#### 318. A Comparative Study of a-b Ridge Count and Total Finger Ridge Count in Schizophrenics and Control Groups

Subhasis Chakraborty, Alpana (De) Bose

R.G. Kar Medical College and Hospital, Kolkata, West Bengal

**Objective:** The case control study was designed to compare the value of two dermatoglyphic parameters like a-b ridge count (ABRC) and total finger ridge count (TFRC) in patients of schizophrenia with sex matched control groups and also to see whether these parameters differ significantly with respect to sex.

**Methods:** Finger and palmar prints of both hands of 58 schizophrenics (male = 30, female = 28) and 50 sex matched

control groups (male = 25, female = 25) were taken using traditional ink method. Schizophrenics were diagnosed using DSM-IV criteria from outpatient department of R.G. Kar Medical College and Hospital. Ridge counts were read by method of Cummins and Midlo. Schizophrenic patients with other psychiatric illnesses were excluded from the study to avoid confounding bias.

**Results:** Statistically significant difference in ABRC of schizophrenics was noted in relation to sex (p < 0.05). ABRC decreased in both male and female patients compared to control group although difference was not statistically significant. TFRC also significantly differs between male and female schizophrenics (p < 0.01). No significant difference was noted in between schizophrenics and control group although in both sexes the value of TFRC increased compared to control group.

**Conclusion:** The results show an association between certain dermatoglyphic characteristics and schizophrenia. The nature of association can be better evaluated by further analysis.

### **Poster Presentations**

### 319. A Case Report on Bipennate 2nd Lumbrical Muscle of Hand

Chintan J. Lakhani, Mayank D. Javia, Mohit V. Changani, Dhaval H. Talsaniya M.P. Shah Medical College, Jamnagar, Gujarat

The lumbrical muscles form an important part of intrinsic musculature of the hand. The first two lumbricals are unipennate and remaining two are bipennate as described in various textbooks. The variation in hand muscles including lumbricals are very common. We found bipennate 2nd lumbicals in both the hands of the same cadaver during routine dissection. This variation was found only in one among the 30 cadavers dissected during a period of 2.5 years at Anatomy Department of MP Shah Medical College, Jamnagar, Gujarat. The photographs were taken for proper documentation and an attempt was made to compare and discuss the case with other research workers. The present study had concluded that the variation of bipennate 2nd lumbrical muscle of the hand was at 3.3% (1 in 30 cadavers).

### 320. Variations in the Branching Pattern of Celiac Trunk

S. Jayagandhi, Suman Verma, Magi. M, Mohamed Fasil, Anup Rao

Pondicherry Institute of Medical Sciences, Pondicherry

The celiac trunk is the branch of the abdominal aorta at the level of the twelfth thoracic vertebra. Its branches namely left gastric, common hepatic, and splenic arteries supply the