Abstracts

5TH INTERNATIONAL SYMPOSION OF CLINICAL AND APPLIED ANATOMY AND 1ST PANEUROPEAN MEETING OF ANATOMISTS

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ASSOCIATION BETWEEN OSTEOPOROSIS AND NO-RELATED METABOLIC DISORDERS IN RATS

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Bone structure and mineral composition is characterized by the age-related changes and determine personal biological age and correct overall health. Recent studies showed that many factors, both, exogenous and endogenous origin, as diabetes mellitus (DM), gastro-intestinal and cardio-vascular diseases and other, tightly regulated by various metabolic signals affect bone turnover. NO is main regulator of many physiological processes, including bone remodeling, as formation, and as resortion. We hypothesized that abnormal NO-related metabolism is key in multifactorial bone remodeling with exceeded resorption (BR) and studied its specific effects on BR during experimental nitro-oxidative stress with abnormal NO synthesis which we previously revealed in modeling of DM (by streptozotocin, 70 mg/kg, ip, «Sigma»), metabolic acidosis (by 0.04% ammonium chloride, *per os,* 4 mg/kg) and hypothyreos (by mercazolil, *per os* 5 mg/kg) *versus* control (placebo, vehicle 1,0 ml, group). During 28 days of administration male rats (weight 150±25g) basal condition and blood *via* biochemical essay, the volumetric bone mineral density (VBMD) of caudal vertebrae and jawbone by radiovizualization applied software «VixWinPro», were investigated. DM caused significant decreased the rat body weight to 12 %, metabolic acidosis – 10 %, and increased in hypo-thyreosis to 14% in comparison to control. Under the biochemical confirmed pathological background of nitro-oxidative stress, morphological analysis of bone remodelling indicated that after 4 weeks of the experiment the bone density in comparison to control was decreased for the 3-4% in DM, for the 2-4% - in metabolic acidosis, and for the 3-5% - in hypo-thyreosis. We concluded that bone tissue remodeling with shift to resorption developed in short-term during the different metabolic changes with common NO-related pathogenesis. These results suggest that novel therapeutic approach for osteogenic pathology prevention under selected investigated conditions may be associated with correction NO activity and can be considered to the follow-up investigations.

PREDICTION OF STATURE USING HAND AND FOOT DIMENSIONS

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The estimation of stature is crucial for formulating a biological profile during the process of personal identification, especially when the utility of DNA analysis is limited due to economical issues or due to uncontrollable difficulties, such as war or mass disasters. These estimation attempts are based on establishing the linear relationship between stature and various body parts of an individual. In the literature to date, anthropometric data of the hand and foot has been reported to be promising for stature estimation, however only in a limited range of populations. Body proportions in different populations demonstrate considerable differences, not only due to ethnic origin but also owing to the effects of time, geographical context, nutrition, physical activity, and environmental factors. Therefore, each group requires a different formula, for which a regional based study of subjects is necessary. The aim of this preliminary research was to investigate the utility of hand and foot dimensions to estimate stature. The study sample comprised of 70 right- handed males and aged matched females of Sudanese between 25-30 years old. The length and

breadth of the left hand and foot length were measured in all subjects. The statistical analysis revealed a positive correlation between hand and foot dimensions and stature ($p < 0.001$). Linear and multiple regression equations were developed for prediction of stature. This research will provide insight into new forensic standards for the prediction of stature using hand and foot dimensions of Sudanese adults. Additionally, it will provide valuable data for further comparison against other Arab people living in Sub-Saharan regions or in those with a genetic background mixed with African descent.

FIBERS OF THE CORACOHUMERAL LIGAMENT ENVELOP THE SUPERIOR AND LATERAL PART OF THE SUBSCAPULARIS MUSCLE: STABILIZING FACTOR OF THE MUSCLE

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Background: It is well known that the coracohumeral ligament spreads along the supraspinatus to infra-spinatus muscles in order to stabilize the glenohumeral joint. However, only a few reports had mentioned about its extension to the subscapularis muscle. The purpose of this study was to make histoanatomic examinations of the relationships between the coracohumeral ligament and subscapularis muscle in order to discuss the function of the ligament. Materials and Methods: Sixteen formaldehyde embalmed shoulders were used for the macroscopic study. Four specimens were examined histologically. In addition, four specimens embalmed by Thiel's method were used to be observed its change of morphology and tensions according to various limb positions. Results: The coracohumeral ligament originated from the base of the coracoid process and had two (superficial and deep) layers enveloping the cranial part of the subscapularis muscle. These findings were observed both macroscopically and histologically. In particular, the superficial layer of the ligament covered broadly the anterior surface of the subscapularis muscle; the ligament spread medially beyond the glenoid level and reached inferiorly the muscular insertion of the subscapularis. Limb position drastically changed the morphology and tensioning portion of the ligament. In histological study, the ligament consisted of loose connective tissue abundant in type III collagen. Discussion: The subscapularis muscle is enveloped by the anteriorly spreading coracohumeral ligament and anchored to the coracoid process. Fiber configuration of the ligament was irregular and did not show clear 'ligamentous' structure because of its fiber composition. This structure should be important for the subscapularis tendon to be pressed to spherical surface of the anterior anatomical neck and bent along the lesser tubercle even when the tendon changes its morphology according to various limb positions. Therefore, the ligament would also be a stabilizing factor of the subscapularis muscle.

MORPHOLOGY OF THE PERINEAL SKELETAL MUSCLES REVISITED

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Background: It is generally accepted the morphology of the perineal muscles in the textbooks and the perineal body as the pivot of the most of the perineal muscles in both sexes. However, we had sometimes have experiences that it was very difficult to dissect the pelvic muscles like as the figures and descriptions of the textbooks during the dissction practices. In this study, we examined these muscles macroscopically and identified the muscle attachments in detail. Methods: In this study, we used twenty Japanese cadavers. Fourteen cadavers (seven males and seven females) were fixed by 8% formalin and were preserved by 50% alcohol: these specimens were divided in the median line, and dissected from the medial aspect of each side. Six cadavers (three males and three females) were fixed and preserved by Thiel's method: these specimens were dissected from the inferior aspect. In addition, the skeletal muscle and the smooth muscle were identified immunohistologically. Results: There were obvious differences between males and females. Both sides of the bulbospongiosus muscles in females were attached to the right and left lateral surfaces of the external sphincter muscles respectively. However, in males, the muscles were attached to the anterosuperior region of the external sphincter muscle. In addition, in both sexes, the anterior wall of the external sphincter muscle was adjoined by the anterior bundle of the puborectal part of the levator ani muscle. The superficial transverse perinei muscles were attached to the lateral surfaces of the bulbospongiosus and the external sphincter muscles. The deep transverse perinei muscles were not identified, and the perineal body were considered as the extension of the longitudinal muscle layer of the rectum. Conclusion: The perineal muscles are found to be composed as a continuous skeletal mucle sheet, and the morphology of the muscles should be reconsidered.

SCIATIC ARTERY ANEURYSM: A CAUSE OF ISCHAEMIC PROCTITIS?

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The rectum is continuation of the sigmoid colon and ending at the anal canal: it extends from the third sacral vertebra level to the tip of the coccyx. The rectum gets its blood supply from three arteries: superior, middle and inferior rectal arteries. The superior rectal artery is a terminal branch of the inferior mesenteric artery, while the middle and inferior arise from the internal iliac system. The inferior rectal artery usually arises from the internal pudendal artery and the middle from the anterior trunk of the internal iliac artery

either directly or indirectly. The rectum has a collateral circulation between the mesenteric and iliac systems through the middle rectal artery serving as an anastomosis between the superior and inferior rectal arteries respectively. The current anatomical dissection study of 304 hemipelves found a sciatic artery arising from the anterior and posterior division of internal iliac artery either directly or indirectly. The sciatic artery ran on the posterolateral aspect of the rectum giving a direct and indirect supply via the middle rectal and internal pudendal arteries. With a coexistent sciatic artery, the rectum was supplied by a middle rectal artery arising from sciatic artery in 2.3%, as well as from the inferior rectal artery from the internal pudendal artery also arising from sciatic artery in 4.3%. Therefore in 6.6% of specimens the sciatic artery supplied the majority of the rectum. In cases of sciatic artery aneurysm, with or without thrombosis, the rectum is in danger of ischaemia due to insufficient supply from the mesenteric system. In conclusion, sciatic artery aneurysm may lead to ischaemic proctitis, which may present as severe bleeding per rectum. Clinicians need to be aware of this anatomical variation in arterial supply to proceed to a proper diagnosis. In addition, radiologists also must be able to alert surgeons to such variations to avoid unnecessary ligation during aneurysmectomy that may lead to iatrogenic trauma.

SEXUAL DYSFUNCTION AND PERINEAL INFARCTION: CLINICAL FEATURES OF SCIATIC ARTERY ANEURYSM SYNDROME

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The sciatic artery is a rare anomaly appearing during the first three months of embryonic life. Previous studies have reported that sciatic artery aneurysm incidence at 0.04% and 0.06%. In an anatomical study of 342 specimens a sciatic artery was observed in 68. The sciatic artery arises directly or indirectly from the internal iliac artery (IIA) frequently passing below piriformis to enter the gluteal region. Within pelvis, it may give the internal pudendal and inferior gluteal arteries or a gluteopudendal trunk, and the middle rectal artery. The internal pudendal artery usuualy arose from the anterior trunk of the internal iliac artery directly or indirectly (from the gluteopudendal trunk). The sciatic artery is said to be highly predisposed (46% of cases). When associated with a sciatic artery the internal pudendal artery was observed to have variable origin: direct branch of the IIA (65.2%); indirect with the inferior gluteal artery (12.1%); indirect from a gluteo-obturatopudendal trunk (1.5%); indirect from an obturatopudendal trunk (1.5%); indirect from the anterior division from the sciatic (13.6%); and indirect from the posterior trunk from the sciatic artery (6.1%). Therefore, sciatic artery aneurysm syndrome can lead to sexual dysfunction and perineal ulcer in cases where the internal pudendal artery arises from the sciatic artery. Clinicians need to be aware of this anatomical variation to enable a proper diagnosis; in addition radiologists must alert surgeons to such variations to avoid unnecessary ligation during aneurysmectomy that may lead to iatrogenic trauma.

DEVELOPMENTAL THEORY OF THE ORIGIN OF THE INFERIOR GLUTEAL ARTERY

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The inferior gluteal artery usually arises from the anterior trunk of the internal iliac artery and leaves the pelvic cavity through greater sciatic foramen below the inferior border of piriformis. As soon as it enters the gluteal region it gives three main branches: coccygeal, inferior gluteal (3 to 4), and comes nervi ischiadici respectively. The inferior gluteal artery was known for many years as the sciatic artery. Embryologically, the inferior gluteal artery is linked to the sciatic artery development theory as it is considered to be the proximal remnant of the sciatic artery following its involution. A prolongation of the inferior gluteal artery as it exits the pelvic cavity with the sciatic nerve is the sciatic artery. In an anatomical study of 342 specimens, a sciatic artery found in 68 specimens. The study focussed on the origin of the inferior gluteal artery in association with a sciatic artery. The inferior gluteal artery is frequently congenitally absent with coexistence of a sciatic artery. The present study included several examples of the inferior gluteal variations, which are counter to the existing sciatic artery theory, consequently a new theory of inferior gluteal artery development is proposed based on the observations of this study.

MORPHOLOGY OF THE VERTEBRAL ARTERY IN ASIAN POPULATION

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Background: Recent clinical trials have shown a rising trend of stroke in Asian population. Approximately 20% strokes of total occur at the vertebrobasilar basin, which responsible for the posterior cerebral circulation. The anatomical features and variability of the third segment of vertebral artery (VA) in Asians are analyzed in this study. Methods: A prospective cohort study of 68 consecutive Asian patients undergoing MRA examination for head and neck in the Department of Radiology of Hospital of University of Jordan, during period from 1.10.2011 to 30.04.2012. The 116 VA were analyzed on the obtained angiograms. Results: The third segment (V3) of VA was studied according to its conventional division into vertical, horizontal, and oblique parts. The mean diameter of V3 varied from 3.18±0.73 mm to 4.28±1.08 in the different parts. It prevailed in 91.4% cases on the left and was greater in males, than in females. The distal loop of VA projected downward in 26 cases on the right (78%) and in 28

cases on the left (74%). The tortuosity of loop-formations of V3 was evaluated by angles between their ascending and descending bends. Conclusion: In comparison with Westerns population, the V3 of VA in Asians has lesser outer diameter, especially along its oblique part; the zero-distance between the occipital bone and horizontal segment of VA occurs more often (up to 26%); the Lang's III type of V3 variability is the most common in Asians.

VASCULAR RELATIONS OF THE INFRATEMPORAL FOSSA IN AGE-RELATED ASPECT

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Background: The Infratemporal Fossa is characterized by complex topography with numerous arterial and venous interrelations. The maxillary artery (MA) that extends here gives off a number of functionally important branches to supply face and dura mater. The Pterygoid Venous Plexus (PVP) braiding the main trunk of MA communicates with the lumen of the cavernous sinus via oval foramen emissary vein of skull base. Some of these vessels can be used as an endovascular access for embolization of hemangiomas and bleeding vessels, as well as for selective intravascular chemotherapy in modern oncology. Material and Methods: Topography of the trunk and branches of MA, as well as structure of PVP in age-related aspect were studied by injection, dissection, corrosion, and morphometry methods on twelve fetal (32-38 weeks of gestation) and six adult cadavers. Results and Discussion: It was established that superficial part of PVP has intimate morphological and functional relations with MA, while its deep part accompanies the extracranial segment of the Middle Meningeal Artery along the 1/4 of its length. Vessels of the deep part of PVP are partly reducing with age, but in 33% cases they still permanent in adults. The shape of pterygoid segment of MA varied from "arch" (22.2%) to "staple" (27.7%) subject to angle between beginning and termination of its length. Morpho-functional and applied aspects of the received results are discussed.

PERONEAL SYNDROME

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The common peroneal nerve is the lateral terminal branch of the sciatic nerve dividing into superficial and deep peroneal branches. The current study includes 317 dissections of the gluteal and posterior compartments of the thigh to explore the origin of the common peroneal nerve. It was observed to have a variable level of origin during its course in the thigh from a distance between the lower border of piriformis and the knee joint line: 83.9% of specimens showed an origin between these levels. It was also observed to have an early origin proximal to piriformis and delayed origin distal to the knee joint line in 11.7% and 4.4% of specimens respectively. The common peroneal nerve was found to arise within the pelvis and then pass below piriformis in all except 7.2% of specimens: in 0.6% it passed above piriformis, in 1.9% it pierced piriformis, while in 4.7% it passed between a double piriformis. These variations may lead to entrapment of the common peroneal nerve, with compression of the common peroneal nerve by piriformis referred to as common peroneal syndrome. Compression of the common peroneal nerve may present as a combination of superficial (lateral compartment) and deep peroneal (anterior compartment) syndromes. These syndromes are characterized by several features, such as wasting of the anterior and lateral compartment muscles, loss of dorsiflexion and eversion of foot, inability to extend the toes, as well as a loss of sensation over the anterolateral surface of leg and dorsum of the foot. Steppage gait is a compensatory mechanism for the loss of muscle function. Therefore, neurologists have to be aware during clinical examination to reach accurate diagnosis and differentiate peroneal syndrome from other diseases.

A REVIEW OF RETROPUBIC ARTERIES IN PUBIC FRACTURE

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The obturator artery frequently arises from the anterior trunk of the internal iliac artery. Previous studies have reported that it can also arise from the external iliac, femoral and inferior epigastric arteries. Recently, several authors have reported that the obturator artery originates either directly or indirectly from the external iliac artery. A 1988 review estimated that the obturator artery arose from the external iliac artery in 25% of individuals. The current review is based on studies reported in the literature of sciatic artery aneurysm in relation to the size and course of the obturator artery and includes 206 cases in 171 patients published between 1864 and 2012. The incidence of the obturator artery arising from the external iliac artery ranges between 1.1% and 48%. An anatomical dissection study explored the origin of the obturator artery in 342 hemipelves. In 38 specimens the obturator artery was having been removed during undergraduate dissection. The obturator artery was observed to arise from external iliac artery in 22%: directly from the external iliac artery in 5.6%, indirectly from a common trunk of the external iliac in 13.8% and from the inferior epigatric artery in 2.6%. In the remaining specimens, the obturator artery originated from the anterior and posterior trunks of the internal iliac artery either directly or indirectly. Orthopaedic surgeons need to be aware of these variations may lead to aggressive life threatening bleeds in pubic bone fractures. To avoid post-pubic fracture

haemorrhage, radiologists also need to be aware of this high prevalent variation and report it to surgeons.

A REVIEW OF SUPERFICIAL FEMORAL ARTERY CHARACTERISTICS IN ASSOCIATION WITH A COEXISTENT SCIATIC ARTERY

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The femoral artery starts below the inguinal ligament terminating as the superficial and deep femoral arteries in the femoral triangle. The size and course of the superficial femoral artery have been correlated with the existence of a sciatic artery. For example, one review of sciatic artery aneurysm reported that the superficial femoral artery can show either hypoplasia (46.8%) or aplasia (7.4%). The current review is based on studies reported in the literature of sciatic artery aneurysm in relation of superficial femoral artery size and course and includes 206 cases in 171 patients published between 1864 and 2012. The superficial femoral artery has been reported to be of normal size in 24.6%, shows hypoplasia in 66.7% and aplasia in 8.8%. Observations of 68 specimens with sciatic artery supports previous findings that superficial femoral artery aplasia is less common than hypoplasia. This phenomena is a high risk for patients with a sciatic artery and may lead to intermittent claudication (peripheral vascular disease), culminating in extreme cases in lower limb amputation. This is due to sciatic artery aneurysm when the superficial femoral artery terminates in the thigh region (40.8% of specimens): in some cases the sciatic artery connected with the popliteal artery directly (9.6% of specimens) or indirectly via collateral branches (7.9% of specimens). Therefore, the superficial artery anatomical features such as size, course and collateral branches are a significant and should be studied in detail to decrease risk of lower limb amputation.

PARALYSIS OF LOWER LIMB IN SCIATIC ARTERY ANEURYSM

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The sciatic nerve is the largest nerve in human body providing sensory and motor innervation to the lower limb. Embryologically, its vascular supply is provided by the sciatic artery, while anatomically it is provided by inferior gluteal artery. With the existence of a sciatic artery, the inferior gluteal artery is usually absent. A review of the relevant literature reveals that there are no clear descriptions of inferior gluteal artery variability in association with a sciatic artery. In the present study of 68 sciatic artery cases the inferior gluteal artery was either present or absent. This is a first study to assess the variability of origin of the inferior gluteal artery in association with a sciatic artery. This variability leads to a modification of the usual origin inferior gluteal artery from the internal iliac artery (IIA). The inferior gluteal artery was observed to be an indirect branch of the anterior and posterior trunk of the IIA, being from the sciatic artery in 9.1% and 4.5% respectively. The inferior gluteal artery was absent in 60.6% of specimens in the presence of a sciatic artery: the sciatic artery is therefore compensatory in these cases. The sciatic artery mainly supplied the sciatic nerve 74.2% of specimens. Consequently, aneurysm of the sciatic artery may lead to complete paralysis to the lower limb due it being the only blood supply to the sciatic nerve supply when the inferior gluteal artery is either absent or branch of the sciatic artery. In conclusion, the current study shows that an increased awareness by radiologists, general surgeons, obstetricians, gynecologists, urologists and orthopaedic surgeons prior to any pelvic procedures are undertaken.

A NEW THEORY OF PERSISTENT AXIAL ARTERY

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A persistent axial artery is an unusual vascular anomaly due to lack of regression of the embryonic dorsal axial (ischiatic) artery. As the axial artery regresses, the iliofemoral system develops: failure of development results in a persistent axial artery. Based on existing embryological theory, the remnant of the proximal division of the sciatic artery becomes either the superior or inferior gluteal artery, serving as the proximal nutrient arteries of the sciatic nerve in the third embryonic month. As the middle division of the sciatic artery disappears, the distal division of the sciatic artery becomes the popliteal artery and its branches. The embryological description of a persistent sciatic artery for a particular developmental period/stage is vague. Based on an anatomical study of 342 specimens, a sciatic artery was observed in 68 cases. Anatomically, a persistent axial artery has been described, based on a series of radiologic studies, as being a continuation of the internal iliac artery. In the present study it was observed that a coexistent sciatic artery has different origins due to the variations present in the pelvic arteries. In addition, the study revealed that an axial artery can coexist with both the superior and inferior gluteal arteries; consequently, embryologically the proximal part of the axial artery is neither the superior nor the inferior gluteal artery. Furthermore, the profunda femoris is frequently absent, based on the classification of persistent sciatic artery by Pillet et al (1982) in which Type I has a complete axial artery. The current study therefore proposes a new embryological theory of the axial artery which explains the presence of both the superior and inferior gluteal arteries, as well as a congenital absent of the profunda femoris with coexistence of an axial artery.

20 YEARS OF THIEL´S EMBALMING PROCEDURE: FROM THE BEGINNINGS TO THE APPLICATION TODAY AT THE INSTITUTE OF ANATOMY GRAZ

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For 30 years W. Thiel worked on developing a new method of preservation. Finally his method was published in 1992 and 2002. Based on it, up to now 3362 corpses were preserved at the Institute of Anatomy in Graz. Since 1992, 9569 students were taught. In postgraduate education 22364 physicians from 90 nations took part in surgical training courses. Since its first publication the Thiel method was constantly being simplified and adapted to the requirements of different surgical disciplines.

A NEW CHALLENGE IN ARTHROSCOPIC SURGERY; ROBOTIC ARTHROSCOPIC SURGERY WITH AN ANATOMICAL PERSPECTIVE

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Background: Advances in technology and search for more minimal invasive surgery will always offer new techniques in any surgical field. Robotic technology is such an advance which offers technical advantages over standard laparoscopic approaches. The aim of the present study is to test whether robotic surgery can be used while performing shoulder or hip arthroscopy or not. Methods: Robotic shoulder and hip arthroscopy was tried on two fresh-frozen human cadavers. The best position of the cadaver and most suitable instruments were evaluated. Results: Docking of the robotic system and manipulation of the instruments were successful in both arthroscopies. Although most of the regions which can be reached by standard arthroscopy were also reached with this robotic setting, the 5 mm instruments were limited in movement due to its long articulation section. The 8 mm instrument had shorter articulation section and it exhibited a full range of motion inside the joints. The arthroscopic control of the biceps tendon, glenoid labrum, rotator cuff muscles, rotator interval, glenohumeral ligament and the coracoid process were possible for shoulder arthroscopy. However there were serious limitations for hip arthroscopy. Discussion and Conclusion: Robotic shoulder and hip arthroscopy seems feasible in a cadaveric model but has some significant limitations at this time. A clinical application could be performed as diagnostic arthroscopy and as simple arthroscopic surgery until more specific instrumentation is developed. It may also enable the surgeon to perform more complex and precise tasks in restricted spaces. We suggest that the anatomists should take part in developing instruments and training orthopedic surgeons for robotic arthroscopies.

POSSIBILITIES OF CLINICAL ANATOMY TEACHING ON CADAVERS IN PREGRADUATE AND POSTGRADUATE MEDICAL EDUCATION

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The last ten years have witnessed a rapid increase of the importance of mini-invasive techniques in many medical disciplines, ranging from internal medicine (bronchoscopy, gastroscopy) to surgical disciplines (laparoscopy, thoracoscopy). The increase of the number of indications for these procedures resulted in the growing need for mastering these techniques, both in terms of theory and practical skills, in particular. In response to this trend in the period between 2000-2005, a unique multimedia educational centre for topographic and clinical anatomy, endoscopy and microsurgery was developed at the Anatomical Institute. The centre offers a possibility of a repeated use of cadavers fixed by a special method, in order to imitate different medical procedures. One room of the Institute of Anatomy has been converted into a small operating theatre, and the premises of the dissection wing were interconnected by an audio-video network with a wireless connection to the Internet. There is also a graphic studio for creation of materials for instruction. Dissection training of medical students includes demonstrations of arthroscopies, laparoscopies, bronchoscopies and gastroscopies. In addition, training courses are organized for young physicians, offering them the opportunity to get acquainted with the technology and instruments for a wide range of endoscopic and microsurgical procedures on a specifically treated anatomical material. All postgradual students can use e-learning materials designed for the selected practical course in advance to their enrollment. Distant educational components together with the practical cadaver courses seem to be a good approach in clinical anatomy education and surgical skills improvement. The centre provides an advanced approach to the practical training in the field of mini-invasive and endoscopic methods concentrated in one place and, in fact, represents the maximum progress achievable in this respect, before the students enter the real world of medical practice.

VISUALISATION AND IDENTIFICATION OF IMMUNOCOMPETENT CELLS IN HUMAN CORNEA

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In humans the corneal transplantation is currently the most frequently performed transplantation - in the Czech Republic it is about 600 operations per year. The graft survival depends on number of endothelial cells present in the donor cornea and there are also involved immunological mechanisms that were the focus of various studies, but the share of its own of white elements series naturally occurring in the cornea is unclear. The aim was to verify the procedure for display cells of white line in the various layers of the cornea. The physiological corneas were dissected and examined under a surgical microscope, and only those without any signs of inflammation or other abnormalities were used in the studies. The corneas were cleared from attached lens, conjunctiva, and excess limbal tissue. The corneal stroma and epithelium were then separated after a 20-minute incubation at 37°C in PBS containing 20 mM EDTA. After separation, the corneal stromas were fixed for 30 minutes at 4°C in 1% paraformaldehyde-PBS followed by extensive washing with PBS. After fixation, the corneal tissue was permeabilized with 0,2-0,5% TWEEN20 aqueous solution for 20 minutes at 37°C. Following corneal tissue was incubated overnight at 4°C with 100 µL antibody antihuman CD45 FITC/CD14 –PE DUAL TAG TM diluted in 0,2% TWEEN/PBS. Tissues stained with primary antibody were fixed again with 1% paraformaldehyde-PBS, rinsed with PBS, placed on slides, mounted with Prolong Gold Antifade Reagent (Life Technologies), and coverslipped. All slides were examined by fluorescence microscopy on a 1 × 40 microscope (Nikon, Eclipse). The procedure has been verified and there were shown individual immunocompetent cells and evaluated in terms of quantity and type. This preliminary work is the first step in research on the specific difficulties of cross-linking methodology in corneal transplantation to reduce rejection episodes.

COMBINED MACERATION PROCEDURE PERMITS ADVANCED MICROSURGICAL DISSECTION OF "THIEL" EMBALMED SPECIMENS

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Background: Due to the realistic color, texture conservation and preservation of biomechanical properties, the "Thiel fixation" becomes the main embalming procedure for clinical courses based on human cadaver material. In spite of the excellent tissue preservation, microsurgical dissection is a challenging issue. Aim: To establish a new procedure that allows satisfactory micro-dissection of Thiel-embalmed material. Methods/Results: In order to remove the main part of connective and fat tissue a classical gross anatomic dissection of human hemipelves has been performed. This was followed by repetitive application of 3 consecutive steps:

1. Maceration with alloy of nitric acid and MiliQ water 1:10 for 24 h- 48 h.
2. Immersion: the hemipelves were rinsed under tap water for 20-30 min. and placed in a water bath for 1h. The macerated remains have been rinsed and the nerves become more prominent due to the swelling and increased water content.
3. Microdissection of the specimen under surgical microscope.

To facilitate the organ visualization and to distinguish them from nervous structures, the vasculature was perfused with polyurethane (Pu4ii, VasQtec®, Switzerland) in red/blue for arteries/veins respectively. Conclusion: By using repetitive nitric acid maceration followed by immersion we were able to perform satisfactory micro-dissection on Thiel fixed samples. Combined with polyurethane vascular casting, this new methodology permits visualization up to the level of small arterioles and venules in a range of 20-25µm. The method is very suitable for demonstration of somatic and vegetative nerves. Branches of the sacral plexuses and autonomic nerves from the superior and inferior hypogastric plexus have been tracked up to the smallest intraorganic branches in a range of 12.5-15µm. In conclusion, the established combined procedure offers a new possibility for advanced micro-dissection, which will allow acquisition of clinically relevant information about organ specific micro-vascularization and innervation and will help to create more effective treatment strategies.

CHARACTERIZATION OF EQUINE HOOF KERATINOCYTES FROM CANKER-AFFECTED HORSES *IN VIVO* AND *IN VITRO*

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Hoof canker as a destructive hypertrophic pododermatitis of the hoof and adjacent structures in equids, is a sporadic chronic disorder which seriously comprises the use and welfare of horses. Its aetiology is still unknown and thereby it often shortens the lifetime of affected animals, because therapy mostly remains insufficient. It is likely that infection and an underlying defect in horn production are involved, but several attempts to identify causative agents have been unsuccessful so far. Histopathological alterations of hoof-canker affected tissues are hyperplastic epithelial cells including ballooning degeneration of the keratinocytes. Therefore, the aim of the study was to isolate keratinocytes from healthy and canker hooves to investigate signs of tumorous transformation in keratinocytes from canker-affected horses *in vitro*. Furthermore, an intact connection of the keratinocytes to the basement membrane *in vivo* including collagen XVII, dystonin and integrin α-6/β was investigated by

means of immunohistochemistry. The outcome of these examinations may provide new insights in the aetiology, as hoof canker still represents a relevant veterinary problem. Hoof-samples were minced, washed and digested in collagenase I to isolate primary keratinocytes for cell culture. Additionally, samples of healthy and affected hooves, as well as cultured keratinocytes, were fixed in 4% formaldehyde and embedded in paraffin for morphological and immunohistochemical investigations. Preliminary results demonstrated an increased cell doubling rate in hoof-canker keratinocytes compared to normal hoof keratinocytes *in vitro*. Cell formation *in vitro* was altered in affected keratinocytes resulting in spheroidal formations compared to normal monolayers of keratinocytes. The immunohistochemical assays will allow further insights in both, the alterations of hemidesmosomal proteins and ECM interactions in hoof-canker keratinocytes *in vivo* as well as protein expression patterns in diseased and healthy equine hoof keratinocytes *in vitro.*

ANATOMICAL STUDY ABOUT ANTERIOR MANDIBULAR LINGUAL FORAMINA

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Introduction: In descriptions of surgical procedures in the inferior jaw, often there is no mention of an important anatomical variance, the spinal lingual foramina, where nerves and vessels go through. Aim of this study is to investigate the frequency, the shape and the dimension of anterior mandibular lingual foramina and their canals, in order to give more information to operators who have to consider these structures in a correct planning of the surgical procedures. Materials and methods: 25 computed tomography dentascans were analyzed with an implant planning software (MICERIUM IMPLANT PLANNING-M.I.P.). The parameters considered were the frequency, the number, the localization, the diameters and the length of canals, and for each patient a table was made where the measured data were inserted. These data were statistically analyzed and compared with the ones found in literature. Results: The results of measurements agree with the ones found in earlier studies, except for the length of the inferior spinal canals which resulted lesser than those found in literature (4.38 mm $\pm$1.43 vs 6.1mm $\pm$2.6). The frequency of the inferior spinal foramina and the data related to the inferior spinal foramina diameter (cross section scan) and the measurements related to the superior spinal foramina diameter (axial scan) resulted major than those found in earlier studies (respectively 49% vs 38(1)/13.34(2)%, 1.09 mm $\pm$0.4 mm vs 0.8 $\pm$0.4 and 1.24 mm $\pm$ 0.29 vs 0.7 mm $\pm$ 0.2). Conclusion: This study is clinically interesting because it has been used an implant planning software that is daily used by operators and that permits in vivo investigations. Furthermore, due to the possibility of hemorrhagic accidents in the anterior region of the mandible, the oral surgeon has to perform an accurate planning, attending to search also the structures less known than others, like the alveolar inferior nerve canal.

A HUMAN CADAVER CT-STUDY ON THE COURSE OF THE INFERIOR ALVEOLAR ARTERIES

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Background: The inferior alveolar arteries (IAA) enter the mandibular canal at the mandibular foramen, where they accompany the inferior alveolar nerve and veins until the mental foramen. They represent the major blood supply to the mandible and mandibular teeth. The aim of this radiographic study was to display its bilateral course within both mandibular canals. Materials and Methods: Contrast agent (Peritrast, iodine concentrations: 180 and 400mg/ml) was injected bilaterally into the external carotid artery of 15 fresh cadaver heads. Mandibular CT scans with a standard dental CT investigation protocol were acquired immediately afterwards. The course of the IAA was assessed in the dental reconstruction slices. Results: Injection with both iodine concentrations enabled to display the entire course of the IAA from the mandibular to the mental foramen. The higher iodine concentration (400mg/ml) improved the visibility still without creating artefacts. The course of the IAA appeared similar on the left and the right side in two thirds of the subjects, and up to two arterial branches were visible. On average, the IAA changed 4.3-times its position in the canal. Cranial position was most frequently detected (right: 42.1%, left: 41.9%), followed by lingual (right: 35.6%, left: 36.5%), caudal (right: 17.8%, left: 13.8%) and buccal position (right: 4.5%, left: 7.8%). Conclusions: This study presents a radiologic method to display post mortem the course of the IAA in the mandibular canal by injecting contrast agent before CT recording. Compared to previous histological studies (Kim 2009, Pogrel 2009) this non-invasive method enables to study easily the entire course in the mandibular canal simultaneously on both sides.

THORACIC VAGUS NERVES IN FETUSES

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Studies on vagus nerves and traditional literature are clear in the description at the base of the neck, the lower part of the thorax and associate their final position with gastric rotation occurred between the 4th

and 6th week of gestation. If we assume there won't be variations during the following weeks this knowledge is important during esophagus surgical produres in neonates and early childhood (esophagus fistulas, hernia of hiatus, gastro-esophagic reflux, etc.). The objective of this study was to observe vagus nerves in the thorax, describe the variations in number, position and distribution and determining the relation with the gastric rotation. We dissected vagus nerves from the inferior neck to the abdomen, in 30 fetuses with 12 and 23 weeks of gestation. Recurrent nerves were indentified. Dissection of the 2nd third of the thorax let us observe the cardiac and pulmonary branches which were cut to continue dissecting the nerves around the esophagus. Final position at the hiatus was described and he diaphragm was opened to access the abdominal portion. The gastric rotation was associated with nerves position. Vagus nerves entered the thorax laterally to the common carotid arteries and included in the same sheath. At this level it had a big diameter. After giving the recurrent nerve, the main branch addressed to the pulmonary pedicle and provided the cardiac and pulmonary branches. Under the tracheal division, vagus nerves remained as a thin branch (1/3 or 1/4). Both nerves showed many variations under the pulmonary pedicle and at the diaphragmatic hiatus The 2 cases with unrotated stomach had a multiple divided right nerve and an anterior left nerve. According to our observations the distribution and position of the vagus nerves in the thorax is variable and complex. It does not seem so easy to associate vagus nerves location with the stomach rotation.

BRACHIOCEPHALIC TRUNK ANOMALIES AND VARIATIONS

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Knowledge of anatomical anomalies and variations on the brachiocephalic trunk (BCT) are important in medical practice, mainly for the interpretation of diagnostic images, in surgical procedures of thorax and neck, and may also be of high risk for life. We studied 50 fetuses, of both genders, between 12 and 21 weeks of gestation and described the variations we found according they happened at the origin, the position or the branching of the brachiocephalic trunk. We reviewed the literature and organized the articles (most of the case reports on eventual findings) following the same criteria. Fifteen percent of the studied fetuses were female. On 9 occasions we observed a common origin of the brachiocephalic trunk and the left common carotid artery. We found one case where there was no brachiocephalic trunk, as the right common carotid artery originated from a common trunk with the left common carotid artery, but the right subclavian artery was a branch of the left pulmonary artery. Another case showed the emergence at the BCT division of a third descending branch to the pulmonary pedicle, as an anastomosis to the right pulmonary artery. The remaining cases presented in the manner usually described; there were not positional variations. Some other variations and anomalies found in the literature are mentioned and correlated with our findings. Some of those cases were not compatible with life but most of them are asymptomatic and only eventually found surgically or during studies by diagnostic images. The anatomical information was associated to the clinical aspects and therapeutic procedures described in the published papers.

THE LIGAMENTUM CAPITIS FEMORIS – AN ANATOMICAL EVALUATION OF FUNCTION IN SITU

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Introduction: Reviewing the literature there is evidence that lesions of the Lig. capitis femoris (LCF) can have a pathologic value. Hitherto, the arthroscopically performed reduction, resection, or trimming of ruptured or injured ligaments causing impingement are state-of-the-art. Latest examinations of the LCF found similarities with the anterior cruciate ligament (ACL). This leads to the question whether reconstructions of the LCF are worth to be considered. Material and Methods: Twenty-one cadaver hips were dissected down to the joint capsule and bone. Parts of the lamina quadrangularis were removed to open the fossa acetabuli from the pelvic side. Both, 30° and 70° angled optics were used to examine the performance of the LCF during different movements. Results: Each form of the LCF described in the literature was found. We could separate only two distinct bundles, and proof a „continuous recruitment of fibres" when approaching different positions; in nearly each movement parts of the LCF get tightened. The LCF gets the highest tension in flexion-adduction-external rotation, and in extension-abduction-external rotation. The most relaxed position for the LCF is in 0° rotation (extension or flexion), whereas each kind of rotation (internal or external) tightens different sections of the LCF. The more the rotation gets, the more fibres are recruited. Discussion: This technique of examining the LCF offers the opportunity to evaluate the actions of the LCF during the full range of motion, and the tensioning of fibres in different positions, respectively. It is one of the first studies on the LCF performed in situ. The LCF gets tensioned in each form of rotation, independent of the flexion-extension. In flexion-adduction-internal rotation (impingement-position), the posterior fibres are strongly tensioned. The other positions show tensioning of different fibres, depending on the motion. This supports the theory of the mechanic stabilising effect of the LCF in hip joints.

LECTURES FOR MEDICAL STUDENTS USING VIRTUAL PROJECTIONS

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Background: The aim of this work is to report on the results of the innovation in teaching gross anatomy. Seeing that the imagination is one of the most difficult aspects in education of anatomy, our lectures are improved by presentation of 3D virtual models, with the aim of more effective and more illustrative education. Materials and Methods: 3D projection systems are based on principles of virtual reality and are presented in the lecture room. The students feel an existence of 3D space using specialized glasses. This virtual system consists of three components: large screen projection, teacher workstation and 3D camera. Results**:** The students' responses are very positive. However, the using of virtual projection is limited to lecture room. Due to this, the Department of Medical Informatics transformed education materials into the 2D pictures playable also outside the projection system. These can be equipped by audio and text comments and/or explanations of teachers. At the present, the movies are prepared according to the syllabus for Anatomy guaranteed by our department. Conclusion: This method uses a variety of sophisticated applications and it offers students the possibilities of more detailed study of human body, its organs and their topographical relations. Using 3D virtual projections they can easily understand the space relationships and synopsis of anatomical structures without the necessity of memorization, students increase self reliance on practical lessons as well. The innovation helps students to prepare for anatomy in a better way.

ASSESSMENTS ON THE MORPHOMETRY OF THE AORTIC ARCH

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Aim of study. Some assessments on the caliber of the ascending aorta and aortic arch by their measurement at different levels: at origin, in the middle portion of the ascending aorta, prior to the origin of the brachio-cephalic trunk, posterior to the origin of the left subclavian artery. We also measured the distance between the ascending aorta and the descending portion of the aortic arch and the distance between the inferior face of the aortic arch and the pulmonary artery. Materials and methods. The study was performed on a total of 44 angioCT's, 32 male and 12 female cases. Results. The diameter at origin of the ascending portion of the aorta was between 25.8 to 37.6 mm in males and from 27 to 28.9 mm in females, with a difference between mean values of 2.73 mm for males. The diameter in the middle portion of the ascending aorta was 26.1 to 38.5 mm in males and from 28 to 30.2 mm in females, with a difference between mean values of 4.34 mm for males. The aortic diameter prior to the origin of the brachiocephalic trunk was of 26.4 to 29.4 mm in males and from 25.8 to 37.5 mm in females, with a difference between mean values of 2.61 mm for males. The aortic diameter posterior to the left subclavian artery origin was 20.2 to 28.4 mm in males and from 21.3 to 24.1 mm in females, with a difference between the mean values of only 0.97 mm for males. The transverse distance between the ascending aorta and the descending part of the aortic arch was 33.9 to 38.5 mm in males and from 40 to 68.6 mm in females; this distance allows the classification into narrow, medium and large aortic arches. The vertical distance between the inferior surface of the aortic arch and the pulmonary artery was 3 to 12.5 mm in males and 7.5 to 11.1 mm in females. Conclusions. The differences in size between genders favor males with differences of 0.97 to 4.34 mm; the frequency of medium and large aortic arch shows a small difference in favor of females, of only 4.17% of cases.

CLINICAL SIGNIFICANCE OF THE ENDING LEVEL OF THE ABDOMINAL AORTA

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Aim of the study. The assessment of the level of bifurcation of the abdominal aorta in relation with the vertebral column and with the origin of the inferior vena cava, in both sexes. Materials and methods. The study was performed by dissecting the adult and fetal human cadavers, by plastic injection followed by corrosion and/or dissection and the study of Doppler ultrasound and abdominal angiographies, simple and angioCT's. Results. In relation to the vertebral column, the abdominal aortic bifurcation was studied in 96 cases, finding it between middle 1/3 of the L3 vertebra and upper 1/3 of the L5 vertebra. The level of the aortic bifurcation related to the mid-vertebral line was assessed on 94 cases, finding that in 50 cases (53.19% of cases) it was to the left, in 26 cases (27.66% of cases) the bifurcation was located on the midline and in 18 cases (19.15% of cases), it was at the right of the midline. The deviation from mid-vertebral line ranged from 1-2 mm to 15 mm. In relation to the origin of the inferior vena cava, we followed the aortic bifurcation on 38 cases, finding that most often, in 27 cases, the aorta bifurcate above the level of origin of the inferior vena cava, with a distance between 2 to 45 mm. In 7 cases the aortic bifurcation was located below the origin of the inferior vena cava and in 4 cases the bifurcation was located at the same level. The subiliac angle was measured on 48 cases, and we found it 21.4 to 75.90^0 in males and 19.8 to 47.40^0 in females. Conclusions. Given the high frequency of pathology of these vessels (atheros-clerosis, stenosis, aneurysms, thrombosis), it is absolutely necessary to know the normal anatomy of these vessels and the angiographic examination should precede any surgery in the region.

TERRITORIES OF SUPPLY OF THE INFERIOR MESENTERIC ARTERY

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Aim of study. The study of vascular segmentation of the inferior mesenteric artery, indicating the colic areas served by its collateral branches and their contribution to the blood supply of the rectum. Materials and methods. The study was performed on a total of 209 cases, using as study methods the dissection of human adult and fetal cadavers and subdiaphragmatic organic blocks, plastic injection followed by corrosion or dissection and study of simple and angioCT angiographies. Results. The colic territory supplied by the inferior mesenteric artery, together with the number and the arrangement of the sigmoid arteries, depend largely on the topography of the left colic artery. The left colic artery supplies the transverse colon (usually the neighboring segment of the left colic flexure), the left colic flexure and a variable portion of the descending colon. When the middle colic artery is missing, the left colic artery may also supply the left half of the transverse colon or even more, when the middle colic artery originates at its level. Frequently, the left colic artery emerges form a trunk that gives the left middle colic artery (rarely, even an inferior left colic artery), the superior sigmoid artery or even the middle one; rarely, a common arterial trunk that gives all three or four arteries may occur. The rectosigmoid anastomosis is performed most often with the superior rectal artery, but there are quite often cases when the anastomosis is established with one or two terminal branches of the superior rectal artery, the anterior or the posterior. The superior rectal artery may distribute towards the upper half or even two thirds of the rectum. Conclusions. We noticed the great variability of the collateral and terminal branching of the inferior mesenteric artery, an aspect of great importance not only to the morphology and radiology, but especially important for right hemicolectomies, segmental colectomy, esophageal plasty with isoperistaltic transverse colon.

MICROSURGICAL ANATOMICAL CONSIDERATIONS OF THE ANTERIOR CEREBRAL ARTERY AND ANTERIOR COMMUNICATING ARTERY COMPLEX: RECENT ADVANCES AND PROGRESS OF THE ANATOMICAL POINT OF VIEW

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The anatomical details of the branches of the anterior cerebral artery and anterior communicating artery are crucial to the successful clipping of these aneurysms. In order to preserve normal anatomy simple-fast knowledge about their applied anatomy is required. The anterior cerebral artery has been divided into a proximal part and a distal part the latter also called the pericallosal artery. Proximal part of the anterior cerebral artery passes anteromedially superior to the optic nerve to the longitudinal fissure. It depends on the diameter, length, and course and morphology of the arteries. Anatomical information can change from gross viewing to microscopic examination. The anatomical orientation of the anterior communicating artery complex inside the lamina terminalis cistern and its relation to the adjacent anatomical structures is highly variable. Anatomical conundrums during surgery can humble the most talented surgeon and can confuse the inexperienced surgeon. For the surgeon this practical anatomical knowledge is essential to acquire. Knowledge about these practical anatomical considerations should be in armamentarium of each vascular neurosurgeon and clinicians. High variation in the origin and size of the branches of distal anterior cerebral artery makes impossible to define a standard distribution pattern. There are anomalies of anterior cerebral artery such as azygos or medial callosal artery. Additionally severing of crossover branches may cause injury. For the optimal surgical strategy and properly directed trajectory, detailed knowledge of the microsurgical anatomy is essential. Exercises through anatomical dissections permit surgeons to learn applied anatomical features and considerations. Reviewing the practical anatomy preoperatively is important and is crucial for neurosurgeons for successful operations.

THE CLINICAL – FUNCTIONAL ANATOMY OF THE TERES MAJOR MUSCLE

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Background: Information in recent literature on the teres major muscle (TM) is diverse. Exact information about its attachment footprint and its neurovascular supply is clinically relevant for its intended use as a substitute in reconstructive shoulder surgery. Materials and Methods: 30 upper extremities of 15 human cadavers (7 female, 8 male) were investigated during the students' dissection course in the winter term 2012. First, the neurovascular pedicle was dissected, identified, and measured. Secondly, the TM and Latissimus dorsi muscle (LDM) were removed and the attachment footprints were investigated. Results: The TM and the LDM insert separately: The TM attaches on the crest of the lesser tubercle, whereas the LDM attaches within the bicipital groove. The attachment footprint of the TM is bigger than the LDM's (average relation TM:LDM = 2:1). The TM is innervated by the lower subscapular nerve in general. In 10 %, the muscle can be supplied by the thoracodorsal nerve. The entry of the neurovascular pedicle is located almost in the centre part of the muscle. Dorsally to the proximal third of the tendon, a separate strand of muscular fibres was found in 50% of all cases. This additional head inserted on the humerus with a short (< 3 mm) tendon. Discussion: The biomechanical effects of the TM's larger attachment and of the LDM inserting in the bicipital groove are to be discussed. The results on the innervation disagree with the information found in most anatomical textbooks. The knowledge of the additional TM's head is clinically relevant for a posterior surgical approach.

APOPTOSIS OF THE OOCYTES OF HYPOTHYROID NEONATAL RATS

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Background: The aim of our study was to examine the effect of mild maternal hypothyroidism on the apoptosis of the oocytes in the ovaries of rats in the early postnatal period during formation of oocytes and follicles. Materials and Methods: Hypothyroidism was induced in pregnant and lactating rats by feeding 1.5mg/L propylthiouracil (PTU) through drinking water. Ovaries were obtained from newborns on postnatal day (PND) 0, 4 and 7. The degree of oocyte apoptosis was measured from the largest cross sections (n=2) from each ovary using by Colorimetric - TdT (terminal deoxynucleoid transferase) Enzyme *in situ* cell death detection kit (Merck). Results: This preliminary result suggests that hypothyroidism induce increase of the total oocyte number from 4. day in the experimental group while the number of apoptotic oocytes is the lowest that day. However, the highest percentage of apoptosis is noticed on day 0. in control group. Conclusion: In our further investigation we will notice whether the morphological changes induced on the oocytes appear before or after development of primordial follicles as a result of the impacts of maternal hypothyroidism on folliculogenesis of their offspring.

DESIGNING A GROSS ANATOMY LABORATORY FOR NEXT GENERATIONS' HEALTH PROFESSIONALS

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Background: Anatomists are familiar with several teaching and practicing methods of anatomy. Beyond being a client, they infrequently encounter the profession of architecture during their academic life. This presentation is intended to help guide faculty members through the process of designing a new gross lab or renovating an existing gross lab, since there are limited references about the subject in the literature. Materials & Methods & Results: Before starting the work, the purpose of the design should be determined. It can be a simple renovation or a new planning for a new laboratory. Short-term planning is undertaken to arrive at new design specifications for renovating or replacing existing aging facilities in the department. There might be extensive improvement desires which will be limited due to the constraints of the available existing space and building layout place. In early planning a new gross anatomy laboratory, the scope of the project planning can be much broader than in a simple renovation. Some of the major steps are determining the needs of the department and designing the best that supports them within the budgetary constraints, building the final design. The needs should be assessed considering the number of the students will be working in the lab, the number of the cadavers going to be presented, the types of the activities will be done including lecture, dissection, demonstration, radiology exercises etc. and the design aspects (e.g., room layout, flooring, tables, sinks, lighting) what worked best and what did not, based on experiences. Discussion: There is no one right way to build a gross anatomy laboratory and what is most important to a specific institution is what they can develop to meet their carefully considered existing and future needs, including capacity for innovation.

MORPHOLOGICAL DIFFERENCES OF THE MIDDLE HEPATIC VEIN UPON GENDER

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Aim of study. The assessment of some morphological characteristics of the middle hepatic vein (size, number, place of origin and termination) in relation with the gender and with surgical clinical application. Materials and methods. The study was performed on a total of 41 ultrasounds (21 male and 20 female cases), as well as dissection and plastic injection, on a number of cases that brought information regarding the number, the origin and the ending manner. Results. The caliber of the middle hepatic vein in males was, most often, within the range of 6.8 to 8.1 mm (76.19% of cases), while females ranged usually between 5.0 to 7.6 mm (90% of cases). Among the 116 cases on which we evaluated the formation of the middle hepatic vein, we found that they may be formed by two venous tributaries in 80.17% of cases in females while in males, more frequently, they are formed by three tributaries (68, 8% of cases); the confluence of the tributaries is at a distance of between 1 to 7.5 cm from its inferior vena cava or left hepatic vein end, the distance being smaller in females. The ending manner was evaluated on a total of 130 cases (72 cases in males and 58 cases in females). We found that, in male, the middle hepatic vein ends into the inferior vena cava in 52.78% of cases and in females in 48.28% of cases. We encountered only two cases with double middle hepatic veins, both in males. Conclusions. The gender differences of the middle hepatic vein morphology concerns not only its size, but also the aspects of number, origin and manner of termination. The study is important in surgical practice for the procedures of liver segmentectomies and lobectomies and also for liver transplantation.

QUANTITATIVE COMPARISON OF SOME MACRO- AND MICROANATOMICAL CHARACTERISITCS OF HUMAN PRECUNEUS CORTEX

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Aim: Precunes (P), gyrus of the medial surface of parietal lobe contains mainly parts of Brodmann area 7. We analizied the the cortical thickness and numerical density of neurons in cortical layer V of precuneus on left and right hemispheres. Material and methods: Tissue blocks of P removed on standardized way from 20 brains (40 hemispheres) were fixed in formaldehyde, processed for histology and stained with H&E. We separately analizied the cases with larger right or left hemispheres, according to hemispheric lengths. After measurements of cortical thickness on sections, we determined numerical density (Nv) of pyramidal neurons in layer V (according Floders Nvp =N/Ha /(t+ D2h)). Counting of pyramidal neurons included 10 boxes sampled by standarizied way from cortical surface to layer V. The differences of obtained values were tested by the T-test. Results: In larger right hemispheres cortical thickness of right (3.34 mm) and left P (3.13 mm) was not significantly different (p>0.005). However, in these brains (larger right hemispheres) Nvp of pyramidal neurons in layer V of left P (4013.00) was highly significantly higher (p<0.01) than in right P (3404.400). In brains with larger left hemispheres P cortical thickness was not significantly different (p>0.05) on right and left side, while Nvp was significanlty higher (p<0.05) in left (3852.600**) than in right P (3675.800). Conclusion: Our results indicate that simple measurements of only one cortical parameter are not sufficient to provide accurate data related to cortical asymmetries.

QUANTITATIVE COMPARISON OF SOME MACRO- AND MICROANATOMICAL CHARACTERISITCS OF HUMAN LOBULUS PARIETALIS SUPERIOR CORTEX

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Aim:Lobulus parietalis superior (LPS), gyrus of the superolateral surface of parietal lobe consists of Brodmann areas (BA) 5 and 7. We analizied the cortical thickness and numerical density of neurons in layer V of LPS on left and right hemisphere. Material and methods:Tissue blocks of LPS were removed on standardized way from 20 brains (40 hemispheres), fixed in formaldehyde and processed for histology. After measurements of cortical thickness on H&E stained sections, we determined numerical density (Nv) of pyramidal neurons in layer V (according Floders Nvp =N/Ha /(t+ D2h)).Counting of pyramidal neurons included 10 boxes sampled by standarizied way from cortical surface to layer V. The differences of obtained values were tested by the T-test. Results: We separated the cases with larger right or left hemisphere according to hemispheric lengths. In larger right hemispheres cortical thickness did not show significant difference between the right (3.66 mm) and left (3.76 mm) LPS.However, in these cases Nvp of pyramidal neurons in layer V of left LPS (4771.800) was highly significantly higher (p <0.01) than of right LPS (3954.200).In brains with larger left hemispheres cortical thickness of right LPS (3.76 mm) was highly significant larger (p <0,001) thicker than in left LPS (3.13 mm), while Nv layer V pyramidal neurons of left LPS (4771.800) was highly significantly higher (p <0,01) than of right LPS (3954.200). Conclusion: Our results indicate that simple measurements of only one cortical parameter are not sufficient to provide accurate data related to cortical asymmetries.

FINAL RESULTS OF THE COURSE OF THE ANTERIOR AND POSTERIOR INTEROSSEOUS NERVE OF FOREARM IN RELATION TO ADJACENT STRUCTURES

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Background: The course of the anterior and posterior interosseous nerve of forearm and their relation to muscles and arteries has not been examined in detail so far. A precise description of these structures is required for surgical use in particular in view of a new technique of wrist denervation of the posterior interosseous nerve through a volar approach. Material and Methods: The examination involved 120 upper limbs of adult human cadavers, embalmed with Thiel's method and without obvious signs of interventions and pathologies in the area of interest. The course of the anterior (AION) and posterior interosseous nerve (PION) and the anterior interosseous artery (AIA) were identified and measurements were taken. As reference point of measurement the radial styloid process was used. To show the correlation between the course of the AION and PION at the level of the proximal border of pronator quadratus needle penetration was performed. Results: AION reaches the interosseous membrane at 14.9 cm on average measured from the radial styloid process. It courses lying on the membrane and often perforates the flexor pollicis longus on his way to the pronator quadratus. AION crosses the proximal border of the pronator quadratus at 6.6 cm and with a distance to the ulnar interosseous border of 0.9 cm on average. The position of AION related to the AIA shows three groups with one (56%), two (3%) or no (41%) crossing points. PION: The nerve exits the supinator at 17.7 cm on and reaches the interosseous membrane at 10.0 cm on average. The nerve passes the extensor compartment in two different ways. In 98% PION crosses over the abductor pollicis longus and extensor pollicis brevis, in only 2%

it penetrates these muscles. In all cases extensor pollicis longus is crossed below. In most cases (86 %) the PION is located radial to the AIA. In 84% needle penetration reached the PION through the interosseous membrane. In 14 % PION was located 0.3 cm radial to AION and in 2 % 0.3 cm ulnar. Conclusion: From anatomical view successful wrist denervation of the PION from volar approach is possible based on the results of this investigation.

THE GROOVE OF THE TROCHLEA OF TALUS

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Introduction: The talus is described in detail in literature. Nearly every anatomical textbook describes a concave form from side to side. The direction of this groove and its correlation to the medial and lateral malleolar facet respectively to the medial and lateral crest of the superior facet has not yet been object of investigation. The aim of this study is the investigation of the nature of the groove of the trochlea of talus in order to complete the morphological description of this bone, and on the other hand, to expand the basic biomechanical knowledge of the ankle joint. Material and Method: 66 tali, embalmed following Thiel's method, were investigated. To describe the direction of the groove it was necessary to identify its bottom and the medial and lateral crest of the trochlea of talus in a frontal plane in different areas of the bone. Two methods were used: profile gauge and CT scan;
RESULTS: The groove of the trochlea of talus shows a distinct tendency in its directionality: The anterior part of the groove runs parallel by trend to the medial crest. The posterior part of the groove tends to run parallel to the lateral crest, thus it approaches the medial crest in the posterior area of the trochlea. Conclusion: In dorsiflexion the trochlea of talus is tightly led between both malleoli whereby the movement is directed by the medial malleolus. Consequently the anterior section of the groove needs to run parallel to the medial crest. The posterior section of the groove runs parallel to the lateral crest. This, as well as a tight fixation of the trochlea of talus to the lateral malleolus by means of the ligaments explains the moving away of the medial malleolar facet from the medial malleolus during plantar flexion. Further investigations including additional specimens and detailed statistic evaluation are necessary to substantiate the statements. These findings will be helpful for prostheses construction in the future.

AUDITORY OSSICLES DEVELOPMENT IN FETAL LIFE

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Background: The middle ear contains three auditory small serious ossicles, which are, in order from the eardrum to the inner ear: malleus, incus, and stapes. Studies have shown that ossicles ossify endo-chondrally as a parts of Meckel´s cartilage, that are attached to the jaw. Anatomy of ossicles in adult humans was described in different studies. In a contrary to the adult studies there are only few data available about ossicles dimensions during fetal life. The aim of our study was to investigate the dynamic of growth process of ossicles in fetal skulls. Materials and methods: In this experiment we used 30 ossicles from bone collection of the Department of Anatomy, University of Zagreb. Bones were scanned by microCT and for bone volume analysis CTAn software was used. Bones were divided in three groups based on fetus length: 300, 400, and 500mm. Results: Average incus and malleus bone volume in all groups was increased in accordance with the fetal linear growth. Average stapes bone volume in 500mm fetus length showed a dynamic growth. In other two groups bone volume was without significant change. Conclusion: In conclusion, we showed that stapes increased in size when fetus gained 500mm, while incus and malleus enlarges linearly during whole fetal period.

RATS WITH REMOVED THYROID AND PARATHYROID GLANDS IN OSTEOPOROSIS RESEARCH

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Introduction: Osteoporosis is one of the most common metabolic diseases of bones. The field of research on osteoporosis has grown in recent years and large number of experimental drugs are tested. For better understanding of drug efficacy and molecular mechanism on bone metabolism establishing of appropriate animal model without influence of hormones that affect bone metabolism would be required. Materials and methods: Experiments were carried out in male Sprague-Dawley rats, weighting approximately 350-380g. Removal of the thyroid and parathyroid glands (thyroid-parathyroidectomy - TPTx) was done surgically by a ventral approach under general anesthesia. Blood was collected by retroorbital bleed for serum chemistry, hormones and for determination of bone turnover biomarkers by commercially available kits. The microCT 1076 and analysing software used in these experiment were procured from SkyScan (Kontich,Belgium). Using a materials testing system (TA.HD, The Stable Micro Systems, Goldalming, UK) two types of biomechanical tests were performed on the rat femurs. Results: TPTx resulted in a hypocalcemia with significantly lower serum calcium levels as compared to sham operated control rats. As expected, the TPTx surgery increased serum phosphorus level. TPTx further resulted in a decreased C-telopeptide and osteocalcin serum level as compared to intact rats. TPTx animals had progressively decreasing thyroid hormone and PTH serum level. 1,25-D(3) was at day 7 decreased about 10 times while TSH increased 4 to 5 times due to the lack of T3/T4. The effect of TPTx on the trabecular bone followed by microCT and biomechanical testing, showed a significantly decreased bone volume and the loss of biomechanical strength.

PROSTATE GLAND CARCINOMA

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Actuality. ***Prostate Gland Cancer*** *is a disease developed when cells within the prostate gland become abnormal, forming into tumors. Prostate carcinoma develops primarily in men over 50 as the second leading cause of death. A tumor within the prostate interferes with proper bladder control and normal sexual functioning. The most common symptom of prostate cancer is difficulty in urinating. Materials and Methods.* ***Prostate cancer*** *is typically comprised of multiple, small, primary tumors within the prostate, thus the cells grow uncontrollably. They are constantly dividing, maturing, and then dying in a tightly controlled process. At this stage the disease is curable (rates of 90% or even better). We have taken biopsy of 231 patients for retrospective analysis, where prostate carcinoma has been revealed morphologically and PSA level has been defined serologically. Patients' age ranged from 33 to 87. Chromatographic separation methods by mass spectrometry or protein capturing by immunoassays or immunized antibodies have been applied. Test method involved quantifying the amount of the biomarker PCI referring to the Gleason Score. It can detect patients in the diagnostic grey zone with a serum free to total Prostate Specific Antigen (ratio of 10-20%). Conclusions. Retrospective clinical and morphological analysis, prostate gland biopsy have been taken and the correlation between clinical symptoms, tumor stage according to TNM-system, certain laboratory assay and morphological revealing of carcinoma has been studied. In the TNM system, clinical T1 and T2 cancers are found only in the prostate, while T3 and T4 cancers have spread elsewhere. The tissue samples are examined under a microscope to determine the presence of cancer cells and to evaluate the microscopic features of any cancer found. Prostate specific membrane antigen is a transmembrane carboxypeptidase and exhibits folate hydrolase activity. This protein is overexpressed in prostate cancer tissues and associated with a higher Gleason score.*

MORPHOLOGICAL BASICS OF A PATENT FORAMEN OVALE AND ITS IMPLICATION ON PERCUTANEOUS CATHETER-GUIDED CLOSURE: AN ANATOMICAL STUDY IN 99 FORMALIN-FIXED HEARTS

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Background: This study was conducted to gain basic anatomic information concerning a patent foramen ovale (PFO) and adjacent structures in man which, in turn, may influence the percutaneous closure of a PFO. Methods and Results: Morphology of the oval fossa (FO) and its adjacent structures were analysed in 99 formalin fixed human hearts of both sexes. The size and morphology of FO, the Valvula vena cava inferior (Vvci) and the Limbus fossae ovalis were determined and categorized regarding their size (SiC1-3), shape (ShC1-3) and delimitation (DC1-3).All hearts were scanned for a PFO and if present, its dimension and location were evaluated. We found a PFO in 24,24% of all examined hearts, with a 10% higher incidence in female individuals, showing a mean diameter of 3,67±1,93mm with larger diameters in female hearts. 47,83% of these PFO were localized in the cranio-ventral quadrant. The FO showed a mean CC of 20,22±7,27mm, a mean DV of 16,28±6,16mm, both larger in hearts with PFO and female hearts, and a mean depth of 4,56±2,76mm. The morphology of the Limbus fossae ovalis was mostly classified as SiC3 and DC3, again showing significant difference in terms of sex and presence of a PFO. The Vvci had a mean height of 10,6±5,36mm, a mean thickness of 1,51±1,46mm, and was mostly categorized as ShC3 and DC2. The Vvci was significantly higher in female hearts. Conclusion: We found evidence of variability of morphology of a PFO and adjacent structures in terms of sex and presence of a PFO. This information may help improving device design and the intervention of percutaneous closure.

FLEXOR TENDONS OF THE HAND – SURGICAL ANATOMY

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The hand, as a very complex organ, is in the center of daily life activities. It has multiple joints, different types of ligament, tendons and nerves. With constant use, it is no wonder that hand injuries are common in population. The back of the hand is the surface that is usually visible and therefore aesthetically important, while the palmar surface, which is usually hidden, is the functional surface. The flexor tendons run along the palmar surface of the hand, close to the surface of the skin. Because of that flexor tendon injuries are common. A solid grasp of the anatomy of the hand flexor apparatus is crucial to understanding not only the location and extent of the injury, but also the approach to treatment and what outcome the patient may reasonably expect from treatment. The flexor apparatus can, at its most basic, be seen as a system of tendon, tendon sheath, and pulleys. The thumb has one, while other fingers have 2 flexor tendons. Verdan divided the flexor tendon into five anatomic zones. The flexor tendons are covered by a thin visceral layer of adventitia or paratenon. The tendons enter a synovium-lined fibro-osseous tunnel at the base of each digit that provides both a biomechanical advantage on the basis of the pulley system and a source of tendon nutrition from the parietal and visceral layers of paratenon. There are five annular and three cruciform pulleys. Fibrous annular pulleys prevent bowstringing, while cruciform pulleys are thin and provide flexibility. The most important are A2 and A4 pulleys. Tendon excursion and joint rotation are controlled by pulley system. Tendon excursion of 9 cm is required for composite wrist and digital flexion, while only 2.5 cm of excursion is required for full digital flexion with wrist stabilized in neutral position. In the synovial sheath, nutrition and vascular supply reaches flexor tendons from segmental branches of the paired digital arteries which enter the tendon through long and

short vincula and at the osseous insertions as well as synovial fluid diffusion

ARTHROPHONY OF THE FEMOROPATELLAR JOINT, A CHALLENGING NEW INVESTIGATION METHOD ON THE LOWER LIMB JOINTS?

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The following study assesses the recording of sounds caused by the femorpatellar articulation. The choice of this particular joint was well considered and consequence of several principles, which are going to be explained later on. Furthermore, it is worth mentioning, that this study is a forerunner in this domain, since there haven't been any examinations of joints of the extremities, but of he temporomandibular articulation. Following things have been evaluated: a running test and five knee bends before and after the run. The emerging sounds were, computer assisted, charted graphically and mathematical fractionalised in statistically usable numbers. Several parameters, with different emphasis, were investigated for their normal distribution. The femoropatellar articulations of 40 test persons were analysed separately, which resulted in a total number of 80 joints. As the intention of this study was the definition of the healthy range, only healthy individuals were chosen to attend the study. The determining parameters were the area under the curve, the arithmetic average of the amplitudes and the peak. The statistical evaluation revealed that the values follow a normal distribution. Consequently it was possible to establish a healthy range. However, a few outliers were noticed, whose possible causes are going to be outlined over the course of the discussion

THE "GHOST NERVE" ALIAS SARTORIAL BRANCH OF THE SAPHENOUS NERVE

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During a literature research concerning the saphenous nerve, we stepped over the sartorial branch of the saphenous nerve. As this nerve does not exist in anatomical textbooks as well as in anatomical terminology, we searched for the origin of this branch. In a publication more than 30 years ago, the reason of this creation of this odd nerve was dyslexia of some authors, reading "sartorial" instead of "saphenous". This gives reason to think about the pressure at universities to focus only on quantity and not on quality of papers. Literature research is sloppy as well as poor; the knowledge sometimes is even poorer and in addition time to analyse the content of textbooks and papers not taken. More dreadful is the fact, that the manuscript underwent the regular review process which indicates that the reviewer did not provide the anatomical knowledge as well. Therefore we are all, as scientist or reviewer, always required to research properly and to review only if we are sure to provide the responsibility of a correct judgement together with the anatomical background.

CORRECTION OF PAIN SENSITIVITY OF SURGICAL DENTAL PATIENTS WITH 'ALPHARIA' APPARATUS

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Aim: To assess the efficiency of transcranial electric stimulation (TES) influence on pain sensitivity of dental patients and the dynamics of content of endogenous ligands of antinociceptive system with 'Alpharia' apparatus. Materials and Methods: Thirty-five patients (twenty men and fifteen women aged 20-55) with different psychological and emotional statuses determined with the help of psychological testing, the Aizenk questionnaire (determination of extraversion-intraversion, neuroticism), were involved in the clinical observation. Determination of pain sensitivity threshold in patients was conducted with the help of EDI diagnostics with 'Pulpotest' apparatus. The study of ß-endorphin and serotonin content in blood was conducted with the application of the method of immune-enzyme analysis. TES was implemented with the 'Alpharia' apparatus. The active electrodes clips were fixed on the lobes of the ears. The production of endogenous opioid peptides (ß-endorphins, encephalins) and serotonin is stimulated. The activation of alpha rhythms improves the emotional state of patients. Results: On the basis of psychological testing the high level of psychological and emotional lability (14±2,5 points) was revealed in 9 patients, medium level of neuroticism in 11 patients (9±1,8 points) and low level – in 15 patients (4±1,3 points). The obtained results directly correlated with those revealed through immune-enzyme analysis and the content of endogenous pain control system transmitters in blood. The best results of pain perception correction were reached after the TES session with patients of high indices of neuroticism. In particular, the concentration of serotonin and ß-endorphins in patients with the high level of neuroticism increased from 0,25±0,09 μg/cm³ to 0,44±0,07 μg/cm³ and from 0,1±0,03 m/ml to 0,37±0,09 m/ml ($p<0,05$) respectively. In our opinion, the increase of the above indicated biologically active substances in blood influenced pain sensitivity of the intact teeth pulp – the index of immune-enzyme analysis increased from 7±1,5 microamps to 12±1,9 microamps. Conclusion: By means of transcranial electrical stimulation with the 'Alpharia' apparatus the antinociceptive system of patients is activated. It is clinically manifested by the increase of pain sensitivity threshold of the patients' dental pulp on the dental level.

MORFOLOGICAL STUDY OF THE HEART WITH HYPOPLASTIC LEFT HEART SYNDROME

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Background: The Hypoplastic left heart syndrome (HLHS), also known as the Norwood Syndrome, is a complex clinical entity, a part of the cardiac congenital maladies, with a birth frequency of 1/15000. The lack of development of the left ventricle and the atresia with mitral or aortic stenosis mainly characterizes the syndrome. Material and Methods: The investigated heart has been harvested from a seven-month fetus, deceased in an obstetrics service. The heart has been dissected and we made sagittal sections through both left and right part. The dissection stages were photographed using a digital camera. Results: The examined corpse presented generalized adenopathy.The thymus was hypertrophied. The heart is generally hypertrophied, with a dominant right hypertrophy. Between the ascending aorta and the pulmonary artery we observe two embryological remains of the branhial arteries. The ductus arteriosus is permeable and well represented. The left ventricle is hypoplasic. Its endocardium is thickened. The left ventricular myocardium is very thick, has no regular structure and keeps a poorly differentiated appearance.The aortic orifice is atresic and stenosed. Discussions: The left ventricular hypoplasia refers to the absence of forming a normal-sized ventricular cavity . But the left ventricle exists and has very thick walls, with a nearly embrionar aspect of the myocardium, which stopped its evolution. This issue might be due to the lack of blood flow through the ventricle. Conclusions: We consider that presenting and commenting the dissection of a heart with the Norwood syndrome, has several benefits:

- shows the clinician the seriousness of this pathology
- accommodates the cardiac surgeon with anatomic details of the hypoplastic left heart syndrome
- it represents a good reference for the effort of the imagistic diagnosis
- the grim prognosis may be better explained to the patient's caregiver, using these images.

THE STUDY OF A DEEP VENOUS CHANNEL FROM THE VESTIBULAR WALL OF THE RIGHT ATRIUM

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Background: We describe the anatomy of the deep venous channel located in the very substance of the vestibule of the right atrium. This structure variably present is often ignored. Its role in the cardiac pathology is not investigated yet. Materials and method: We performed anatomical microdissection in 9 adult human cadaveric hearts, fixed in formalin solution.It is a descriptive study and not a statically meaningful one, as the number of dissected hearts is not large enough.We highlighted the deep venous channel in the subauricular vestibule of the right atrium. The internal wall of this duct was resected in order to visualize the anterior veins ostia. The channels dimensions were measured. The pictures were taken using digital camera. Results We identified the deep venous channel in 6 of the 9 dissected hearts. In the situations described by us, 2 to 5 veins from the anterior group go perpendicular or oblique in the wall of the subauricular vestibule of the right atrium and open through very well defined foramina into a deep venous channel, located in the vestibule of the subauricular region. Disscusion: In the vestibule of the subauricular area of the right atrium might exist aberrant muscular atrioventricular sleeves that form the anatomical basis of the pathological transmission of the electric impulse in Wolf-Parkinson-White syndrome. In such a clinical context, the deep venous channel might be catheterised, being an acces gate for the exploring electrode. Conclusions: When it exists and it is well developed, this channel might represent a good access way towards difficult to explore heart territories. The cardiac surgeons may protect this structure if they are aware of its existence. Such potential implication of the deep venous channel, in the cardiac pathology, justifies the necessity to create a standard for its imagistic exploration.

THE INFLUENCE OF THE DELTA 9 TETRAHYDROCANANBINOL TO THE MORPHOLOGY OF THE MEDIUM SIZE NEURONS OF THE ACCUMBENS NUCLEUS OF THE RAT. GOLGI STUDY

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Background and aim. Cannabis is one of the most widely used intoxicants; almost half of all 18 year olds in the USA and in most European countries admit to having tried it at least once, and ~10% of that age group are regular users. Δ^9-Tetrahydrocannabinol (THC), the principal psychoactive ingredient in marijuana, produces euphoria and relaxation and impairs motor coordination, time sense, and short term memory. In hippocampus, CBs inhibit GABA release from a subset of interneurons and inhibit glutamate release from principal neurons. Material and Methods. Brains of the four out of ten animals (two exposed and two controls) were taken for the light microscopic analysis performed by standard Golgi staining. Blocks of brains cut accordingly to the coordinates of Paxinos atlas were cut from 1 cm thick coronal sections through

fresh brain in the region anterior to the decussating anterior commissure and then underwent usual procedure of Golgi staining. Under the light microscope and Image J freeware as well as by Neurolucida system. Results. The THC application affected total dendritic length and, subsequently, number of spines at 10 □m length in the region of shell but not in the core of the accumbens nucleus. The average number of spines was 2.8/10 μm (8.4/10 μm in controls), while total dendritic length was also affected and significantly reduced. Conclusion. Tetrahydrocanabinol affects the morphology of the shell neurons of the accumbens nucleus of the rat brain.

THE MORPHOLOGICAL STATUS OF THE CEREBRAL CORTEX, LIVER, GUT MUCOSA AND SPLEEN IN CASES OF SUDDEN INFANT DEATH SYNDROME VICTIMS

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Background: The etiology of SIDS is still unknown. We analyzed the structural changes in some internal organs of the SIDS victims. Materials and Methods: Samples from 8 SIDS victims 2-5 months of age and 7 aged – matched control infants were compared. Using immunohistochemical methods we examined the distribution of CD235a positive erythroid precursor cells, CD68 and iNOS positive macrophages, CD20 and CD21 positive B lymphocytes in the liver, gut mucosa and spleen of SIDS cases and controls. Neocortical areas were investigated using glial fibrillary acidic protein (GFAP) immunohistochemistry. The mean diameter of splenic follicles and the cross – sectional surface area (CSSA) of Kupffer cells was also measured. Results: SIDS victims produced more CD21 positive B cells in the marginal zone of the spleen. Likewise, there was an increase in the mean diameter of the germinal centers of the spleen in SIDS victims in comparison with controls. The number of iNOS expressing intestinal macrophages increased in SIDS cases, as well as the CSSA of Kupffer cells of the liver parenchyma and the number of CD20 positive B lymphocytes in the portal tracts of the liver. Our study reveals persistence of hematopoetic activity in the liver and increased expression of iNOS in portal tract macrophages in cases of SIDS. Morphological changes in neurons and astrocytes of neocortex of SIDS victims were not observed. Conclusion: We hypothesize, that SIDS might have an immunological basis (e.g. a genetically determined inability of the immune system to eliminate an infectious agent). As a result, chronic immune response leads to NO overload, dilatation of the blood vessels and toxic shock.

CLINICAL ANATOMY OF THE UPPER ABDOMINAL REGION'S VENOUS ANATOMY, WITH SPECIAL REGARD TO THE PORTAL VENOUS DRAINAGE OF THE PANCREAS

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Introduction: There are no literary data on the variants of the venous drainage of the pancreas. Awareness of the precise anatomy is critical during the surgical interventions in the especially challenging pancreatic region. Methods: We examined 22 corrosion casts of human abdominal organ complexes. The resin was injected through the proximal end of the abdominal aorta and simultaneously through the portal vein (Pv) with differently colored resin. In two cases only the portal system was injected. Results: We found the superior mesenteric vein (SMv) to reach the splenic vein (Sv) with a right and a left trunk in 5 cases. The inferior mesenteric vein (IMv) drains into the SMv in 13 cases and into the Sv in 9. The left gastric vein (LGv) opens into the SMv in 3 casts and into the IMv in 2 cases. „Normal anatomy" of the gastrocolic trunk (GCT) was found is 12 cases. In six cases the venous trunk was missing. In 3 casts it was formed from the convergence of RGaev and ASPDv, in 1 case six vessels joined ~~in~~ the trunk. Venous arches around the head of the pancreas were observed only in nine cases. ASPDv drains into the GCT in 13 cases; into the SMv and the superior right colic vein (SRCv) in 3-3 casts; into the Pv in 2 and into the RGaev in one cast. In the most cases the posterior superior pancreaticoduodenal vein (17 casts) entered the Pv. It drains into the SMv (2 cases) and the RGaev (2 cases), in 1 cast into the SRCv. Conclusions: We made a systematic analysis of the portal venous system of the pancreatic region. We found a variation of the formation of the GCT and two other variants of the LGv that have not been published in the international literature.

THE ARTERIAL BLOOD SUPPLY OF THE PANCREAS – SURGICAL ANATOMICAL STUDY

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Introduction: The pancreatic surgery emerged at the beginning of the twentieth century, and the surgical techniques continuously improve. The more sophisticated surgical approaches and diagnostic methods applied the more knowledge of the arterial variations is needed. We aimed to investigate and analyze the arterial variations of the pancreatic region in the Hungarian population taking into account the embryologic background.

Materials and methods: We examined 48 corrosion casts of human abdominal organ complexes. The resin was injected through the abdominal aorta and after its hardening the parenchyma was corroded. Thereafter, using the most widely accepted nomenclature we analyzed them macroscopically. Digital photographs, CT images were taken. Results: The anterior superior pancreaticoduodenal artery (ASPDa) arose from the

gastroduodenal artery (GaDa) in 44 casts, in the remaining cases we found atypical origin, from the coeliac trunk (TC) and the common hepatic artery (CHa) in 1-1 cast, from the proper hepatic artery (PHa) in 2 cases. The posterior superior pancreaticoduodenal artery (PSPDa) arose from the CHa in 3 casts, from the PHa in 2 casts and from the TC in 1 cast. The inferior pancreaticoduodenal artery (IPDa) originated from the superior mesenteric artery (SMa) with a short common trunk in 7 cases. Twenty five casts displayed the variation described in the literature as the dominant one in which both an upper jejunal artery and the superior mesenteric artery contribute to the formation of IPDa. The anterior and posterior IPDa arose separately from the SMa in 16 casts. Conclusions: We described extremely rare variants of the ASPDa, even so of the PSPDa. We found the transverse pancreatic artery (TPa) to arise from the SMa or the GaDa in higher frequency than it was reported in the literature. Our results stress on the importance of the detailed preoperative radiological analysis of the upper abdominal vascular structures.

MEAN CARDIAC VALVE CIRCUMFERENCE MEASUREMENTS IN A CADAVER POPULATION AT THE FACULTY OF MEDICINE AND HEALTH SCIENCES, STELLENBOSCH UNIVERSITY

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Background: Accurate anatomical knowledge of the cardiac valves is of crucial importance in the understanding of valvular variation, physiology and pathology. The two pairs of cardiac valves are topographically situated in the heart to act functionally interdependent and physiologically separate. The lack of detailed circumferential measurements on the cardiac valves in embalmed cadavers used for medical dissection prompted this study. Materials and Methods: A retrospective study was undertaken in which embalmed cadavers (n=42: male n=24, female n=18, average age 49.9 (29-83)) were dissected and circumferential measurements taken of all four cardiac valves. Results: Of the 42 hearts examined, nine hearts showed valvular pathology (eight had atherosclerotic plaque involvement while one showed signs of rheumatic mitral valvular disease). Mean circumference measurements of the valves were as follow: aortic valvular ring: 73.4 ± 9.7mm (males), 63.9 ± 7.8mm (females); pulmonary valvular ring 76.2 ± 11.0mm (males) and 65.8 ± 8.0mm (females); mitral valvular ring: 95.1 ± 14.3mm (males) and 85.5 ± 9.8mm (females); tricuspid valvular ring 119.8 ± 14.9mm (males) 108.9 ± 15.6mm (females). Mean valvular circumferences were greater in males than in females and in both sexes increased progressively with age. The circumferences of the diseased valves fell within the range seen in normal hearts. Discussion and Conclusion: The increase in valvular circumference associated with age was similar to that described in literature. The measurements in our study fell within the range reported in unembalmed autopsy specimens. This study contributes to circumferential analysis in cadaveric hearts and helps to emphasize clinical aspects of cardiac anatomy to students during medical dissections.

THE PREVALENCE OF EMPHYSEMA IN ASSOCIATION WITH PULMONARY TUBERCULOSIS IN A CADAVER POPULATION: A MORPHOLOGICAL STUDY

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Background: Chronic obstructive pulmonary disease (COPD) is a complex disorder in which numerous conditions act together to produce chronic airflow obstruction due to irreversible alterations in lung parenchyma, airways and vasculature. Pulmonary emphysema, a form of COPD, is the abnormal and irreversible enlargement of airspaces distal to terminal bronchioles with accompanying destruction of alveolar walls. The aim was to determine the prevalence of pulmonary emphysema in association with tuberculosis (TB) in a cadaver population at Stellenbosch University, Cape Town, South Africa. Materials and Methods: Embalmed cadavers (n=43: male n=25, female n=18) with ages ranging from 29 to 83 (average, 47.4 years) were dissected. Tuberculosis and emphysema lesion distribution were noted and photographed. Standard histological procedures were performed on tissue sections removed from each lobe of both lungs. The HAIN® MTBDR*plus*® (ver. 2.0) kit was used to determine the presence of the *Mycobacterium tuberculosis* complex. Results: Emphysema was observed in 37 (86.0%) of the 43 cadavers dissected. Tuberculosis was confirmed in 32 (74.4%) cadavers. Twenty six cadavers (60.5%) had emphysema in combination with TB. Only 11 cadavers (25.6%) had emphysema with no TB, while five cadavers (11.6%) had TB only. Emphysematous changes were most frequently observed (55.8%) in the lung apices, often close to fibrotic scars due to old, inactive TB. Histologically, emphysema presented with typical destruction of the alveolar walls. Discussion and Conclusion: Reduced lung function with increased inflammatory processes is ideal for the development of COPD. The majority of cadavers in this study cohort had a combination of TB and emphysema, supporting the notion that pulmonary TB may be considered a primary predictor of COPD, particularly emphysema.

VIENNA CHILDREN'S UNIVERSITY: AN OSTEOLOGY WORKSHOP FOR CHILDREN

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Many children are interested in human anatomy and are curious to learn more about the human body, but don't have the possibility to take a look at human anatomical specimens or real human bones. At the Vienna Children's University children get in touch with scientists, are allowed to ask questions and gain insight into university. Our aim was to develop an anatomy lecture appropriate for children to raise their interest in human osteology and to stimulate their dealing with this subject. Therefore we created a three-parted osteology workshop for children aged 7-12 years: In the introduction some basic questions are discussed (How many bones constitute the human skeleton? Why do we need bones?) and different bones are shown. The children can touch the bones and take a closer look at them. In the bone quiz three packages with hidden bones are shown. The children guess which bone it is and to which animal it belongs to. Showing the whole skeleton via slide projection the quiz is solved together. The bone puzzle is the highlight of the workshop. The children are asked to help to rearrange the skeleton which bones got mixed up. Each child takes a bone out of a box and sits down in a circle on the floor. Starting with the skull each child puts its bone into the right place, and then is allowed to take another bone out of the box until no bones are left. The "bone puzzle" is an appropriate way to arouse children's interest in human anatomy and to explain human osteology in a simple, entertaining way! Vienna Children's University is meant to be fun for children and researchers.

HOW TO EXAMINE MANY STUDENTS FAST, OBJECTIVE AND HANDS-ON ANATOMICAL SPECIMENS?

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Since 2007 the number of participants in "dissection course for anthropologists rose (minimum 50, maximum 60 people) steadily. Due to this fact an oral final exam would have been too time-consuming and not objective. We were looking for a possibility to examine many students fast, objective, but still hands-on the anatomical specimens. We created 20 stations in one dissecting room – on each table was an anatomical specimen and on each specimen three structures were marked with numbers. We adapted a test script with questions for each of this numbers. During the exam the students had to recognize the marked structures and write down the correct answer into their exam papers. Each student got a test script after entering the dissecting room and started the exam at station one after a signal. The students changed from one station to the next every 3 minutes. After the twentieth and fortieth student the anatomical specimens and test scripts were changed to avoid cheating when students left the room after having finished the stations. It took each student 60 minutes to complete all stations and the whole examination of 60 students took 4 hours and 6 minutes. Analysis of the results of the examination (grade 1 to 5) showed approximately a normal curve of distribution. In comparison to that, the results of the oral exams (performed in each course week before final exam) varied depending on the examiner (usually two lecturers and six tutors were examining groups of students). We were able to avoid this effect with this new method of examination. This kind of exam needs to be well planned but combines practical character with highly objective evaluation of the student's knowledge. It is an appropriate way to examine many students in a short time and due to the modality cheating is avoided.

LIVER HISTOLOGICAL CHANGES ASSOCIATED WITH OXIDATIVE STRESS IN EXPERIMENTAL PORTAL HYPERTENSION

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Background: Our study highlight some histological changes of hepatocytes, hepatic sinusoids and central (terminal) veins in experimental portal hypertension, demonstrating some uncommon pathological aspects due to oxidative stress. Material and methods: We created an experimental model of portal hypertension by partial portal vein ligation (PVL) in rabbits. The portal vein is freed from surrounding epiploic tissue after a midline abdominal incision and a clip was placed along the portal vein or some of its tributaries. The animals were sacrificed 45 days after the vascular clamping and liver samples were processed for optic microscopy, including Antibody Staining Protocol for Immunohistochemistry. Results: Hepatocytes dysfunct-ion is pointed out by steatosis. There are aspects of granulovacuolar distrophy and mild lipic charges especilly pericentrolobular and inflammatory infiltrate around the suprahepatic veins. Most important vascular change was profuse stasis in hepatic sinusoids and centrolobular veins, the emphasis of interstitial vascular stasis being not a direct consequence of the pportal vein ligation. Discussion: Hepatocyte injury correlated with increasing of the oxidative stress and vascular stasis can produce an early appearance of fibrosis. Our study suggests that vascular stasis is a witness for generation of nitric oxide. In condition of an oxidative stress this can trigger a vicious circle, worsening the portal hypertension, even if the aim of modern portal hypertension therapy is to increase the bioavailability of nitric oxide in liver.

DEVELOPMENT OF THE ANTEROMEDIAL RIDGE IN THE INTERCONDYLAR NOTCH

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Introduction: Ridges at the anteromedial border of the intercondylar notch have shown to be a risk factor for non-traumatic ACL-rupture. The goal of this study is to estimate the prevalence of the existence of this ridge in man. Material and Methods: Out of all the patients with a 3-Tesla knee scan at our radiologic institute between 2008 and 2012 subjects were selected. The patients (n=333) were subdivided into the following six groups: < 10 a (n=37) , 11-20 a (n=56) , 21-30 a (n=61), 30-45 a (n=61), 46-60 a (58), > 60 a (n=60). Exclusion criteria were: previous documented arthroscopic or open surgery of the knee, fracture or dysplasia of the distal femur or proximal tibia, osteoarthritic changes to the IN or tumor in this area. Of coronal images the one showing the decussation of the ACL and PCL and as close to the midportion of the ACL as possible was selected. At the level of the popliteal groove, the width of the lateral and medial femoral condyle, the notch width (NW) as well as the total width of the distal femur were measured. The same measurements were made at the level of the distal outlet of the notch. The notch width index (NWI) and the condyle index (CI) were calculated for both levels. All measurements were executed by two independent investigators. Results: The existence of a ridge was defined as a ratio >1 between the proximal and the distal NW. A significant increase of this ratio during aging was shown. Conclusion: The larger prevalence of existing ridges in elder people can not only be the reason for increasing non-traumatic ruptures of the ACL but also enhance the development of ACLdegeneration.

AGE-RELATED CHANGES OF THE INTERCONDYLAR NOTCH AND THE DISTAL FEMUR

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Introduction: The ACL is not only impinged against the roof but also against the lateral wall of the IN (intercondylar notch), therefor information of the development of this structure could be relevant in predicting the risk for ACL-rupture and -degeneration. Material and Methods: Out of all the patients with a 3-Tesla knee scan at our radiologic institute between 2008 and 2012 subjects were selected. The patients (n=333) were subdivided into the following six groups: < 10 a (n=37) , 11-20 a (n=56) , 21-30 a (n=61), 30-45 a (n=61), 46-60 a (58), > 60 a (n=60). Exclusion criteria were: previous documented arthroscopic or open surgeryof the knee, fracture or dysplasia of the distal femur or proximal tibia, osteoarthritic changes to the IN or tumor in this area. Of coronal images the one showing the decussation of the ACL and PCL and as close to the midportion of the ACL as possible was selected.At the level of the popliteal groove, the width of the lateral and medial femoral condyle, the notch width (NW) as well as the total width of the distal femur were measured. The notch width index(NWI) and the condyle index (CI) were calculated. All measurements were executed by two independent investigators. Results: An increase of all the values towards the group of > 60 years was measured. The width of the distal femur, of the lateral and medial condyle and of the IN change significantly (p<0,01) during life. There was no significant difference in NWI, gender and between left or right knee. 49 of all the subjects had a NWI<0,2, most of them were aged between 11 and 30 years. Conclusion: Growth of the femoral component of the knee is concluded below the age of 11. Thereafter only minimal changes could be observed. The increase of low NWI between 11 and 30 years could be a reason for the prevalence of ACL-rupture in this age group.

INSIDE INTO THE 3D-TRABECULAR ARCHITECTURE OF THE HUMAN PATELLA

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Introduction: The subchondral bone plate (SBP) is a dynamic component with functional adaptation to long-term loading [Mueller-Gerbl, 1989]. Since the force within a joint is transmitted through the SBP to the trabecular system, we expect it to show structure-dependent topographical differences. This anisotropic deformation property of the trabecular bone has only been described by analysis of 2D X-ray images [Toumi, 2012]. Methods: Samples were scanned (Siemens Somatom, 0.6 mm slice thickness) for CT-osteoabsorptiometry (CT-OAM) and for trabecular analysis (phoenix nanotom® m, 0.02 mm voxel size). CT-OAM was used to analyze density distribution of the SBP. VGStudio® Max 2.2 (Heidelberg, Germany) and CT-analyser (Bruker-Microct, Belgium) for structural analysis of the trabecular bone. Obtained parameters: density values of the SBP (in HU); total bone volume (BV); trabecular number (TN); trabecular thickness (TT); trabecular separation (TS); and structure model index (SMI). Results: The parameters varied throughout the articular surface and the trabecular bone beneath it in each specimen itself as well as in-between them. BV, TN, and TT decreased with depth, TS and SMI increased. The correlation of density distribution and BV (r^2=0.81); TN (r^2=0.88); TT (r^2=0.79); TS (r^2=-0.76); and SMI (r^2=-0.75) was significant (p<0.01). Discussion: The trabecular network, in its function to support the SBP, adapts to its needs and is therefore not homogenous in architecture. According to the intake of long term load,

the trabecular structure remodels in a way to optimise the support. The density distribution of the SBP correlates significantly with the structural and numerical parameters of the trabecular bone as both can be seen as functional unit.

POTENTIAL CORRELATIONS BETWEEN THE SHAPE AND THE DIMENSIONS OF THE INTERVERTEBRAL FORAMEN AND LOW BACK PAIN

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By its position and morphological features, by its neighboring structures and, not ultimately, by its content, the intervertebral foramen may be one of the key elements within the management of the pathology of lumbar spinal region. We evaluated morpho-metrically the lumbar intervertebral foramen on 70 isolated lumbar vertebrae and 11 spinal blocks (22 sectioned hemi-blocks), measuring the longitudinal and the antero-posterior diameters and evaluating the shape of the intervertebral foramen and its degree of occupation by the vasculo-nervous bundle. The harvested dimensional data is statistically processed and turned into indices and the possible correlations between the elements of the region are identified, thus providing a significant information regarding not only the occurrence of this type of pathology but also the possible

PATTERNS OF REACTION OF THE LUMBAR VERTEBRAL COLUMN TO MECHANICAL LOAD

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The lumbar intervertebral disc is one of the "key" elements within the ethology of the low back pain, considering its structural complexity and the mechanical proprieties. The changes and the biomechanical response to the axial loadings that occur within the intervertebral disc transform it in a genuine shock absorber, able to grant the stability and the mobility of the vertebral column under different loadings and solicitations. We tested under axial loading 17 human samples of lumber vertebral column L1 – L5; with the aid of a universal stress test machine (traction and compression) type LBG 200, we applied a compressive load of variable couples and forces. The results are obtained as stress displacement curves under different loads and led to the assessment of different types of models of stress behavior of the lumbar segment. These models may offer significant data for potential prevention/cure strategies and management of low back pain.

ASSESSMENT OF THE ACCURACY OF TWO ANATOMICAL BONY LANDMARKS ON THE NECK: THE VERTEBRA PROMINENS AND CHASSAIGNAC´S TUBERCLE ON THE TEST STAND

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Objective: Vertebral levels of cervical bony landmarks are well documented but are they accurate if considering every possible method of detection? Our study was designed to determine the agreement between the anatomical landmarks Vertebra Prominens and Chassaignac's Tubercle in identifying the C7 and C6 vertebral level using palpation. Methods: To determine with which certainty to assume that Vertebra Prominens is equitable to the height of the 7th and Chassaignac's Tubercle to the height of the 6th cervical level when using palpation for detection, 40 cadavers embalmed with Thiel's method were examined. Involving 2 investigators the landmark was located by palpation and marked with a nail before preparation. Afterwards a third investigator identified the cervical vertebral height corresponding to the previously marked level. Results: The C7 vertebral level evaluated after preparation coincided with the palpated landmark in 50% of the cases. The second most frequently detected level was C6 in 35% of the cases. Regarding Chassaignac's Tubercle on both sides 34 cadavers were recruited. The C6 vertebral level corresponded with the landmark palpated in 55.88% of the cases on the right and in 73.52% on the left side. The second most commonly marked level was C5 in 32.35% of the cases on the right and in 17.64% on the left side. Conclusion: These results might suggest that neither Vertebra Prominens nor Chassaignac's Tubercle should be used as particularly promising landmarks in detecting cervical vertebral levels by palpation.

NOTES ON THE GROWING RATE OF THE CARPAL BONES

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The target of our study is to establish possible relations between the growing rates of the carpal bones. The study was performed on 167 subiects (111 males and şi 56 females), aging between 0–16 years, patients of the Pediatric Surgery Department of the Constanta County Hospital, who had clinical indication of X-ray imaging of the the forearm, wrist and/or hand. On each of these X-rays we made measurements of the maximal dimensions of the nuclei of ossification, which we reported to the size of the distal metaphyseal-diaphyseal junction of the radius. The individual values thus obtained, which we called *growth indeces*, were statistically analized and plotted on charts. We noticed correlations with high statistical significance between

the growing rates of the scaphoid, trapezium and trapezoid. We also noticed significant correlations between the growing rates of the other carpal bones, with the exception of the capitate and the pisiform. Conclusions: The scaphoid, trapezium and trapezoid have similar growing patterns, which could suggest either an inducing role of the radius or a gradient generated by the functional solicitation of the first two fingers.

MORPHOLOGICAL ASSESSMENTS ON THE ORIGIN OF THE ARTERY OF THE INFERIOR RENAL SEGMENT

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Aim of the study. The study of the artery of the inferior renal segment in what concerns the number, the origin and the supplied renal vascular. The topographical interest regarding the artery of the inferior renal segment is significant, mainly due to the relations with the renal pelvis and the origin of the ureter. Materials and Methods. The study was performed on a total of 298 kidney (164 right and 134 left renal arteries), using as methods the dissection on human cadavers and on eviscerated kidneys, the injection of contrast medium followed by radiography, the plastic injection followed by corrosion and the study of renal angiographies, simple and angioCT's. Results. The artery of the inferior renal segment originated from the renal artery in 33.89% of cases, from the terminal division of the renal artery in 13.09% and prior of the terminal division in 20.47% of cases (8.05% of cases closer to the aorta, 3.02% of cases halfway aorta – kidney and 9.40% of cases closer to the kidney). In 4.70% of cases it originated directly from the aorta, as a double or triple artery and in 4.03% of cases from the posterior division of the renal artery. Most often, in 57.38% of cases, the artery of the inferior renal segment originated from the anterior branch of the renal artery. Among the arteries for the inferior renal pole, 63.76% of cases were proper arteries and 36.24% of cases were basal arteries. In 32.21% of cases the supply of both renal poles was from the anterior terminal branch of the renal artery, 2.68% of them being renal arteries with aortic origin. Conclusions. We notice the high variability of the artery of the inferior renal segment and the existence of an asymmetry between right and left arteries. The supplied territory is related to the origin of the artery; the arteries originating from the aorta always supply both faces of the inferior renal segment, without expanding towards the suprajacent segment.

COMPARED STUDY OF THE RIGHT AND LEFT ENDING LEVEL OF THE COMMON ILIAC ARTERIES

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Aim of the study. The evaluation of the terminal division of the common iliac arteries in relation to the vertebral column and upon gender. Materials and methods. The study was performed on a total of 92 cases, but only in 78 cases we were able to perform this comparison by gender (52 male and 26 female). As study methods we used the angiographic study of simple and angioCT's. Results. *The right common iliac artery* ends, in males, within a range between the upper border of L4 vertebra and the inferior part of the sacral wing, while in female is between the upper border of the L5 vertebra and the inferior part of the sacral wing. The *left common iliac artery* terminates, in males, between the superior border of L4 vertebra and the anterior face of the sacrum. We have not encountered, in females, a termination above L5 vertebra or intervertebral disc L4-L5. Among the 92 cases, in 44 of them the right common iliac artery ends at a higher level than the left one and in 42 cases the left common iliac artery ends at a higher level than the right one. In 6 cases the two arteries showed the same level of termination. Among the 78 cases evaluated upon gender, in 40 cases the termination level of the right common iliac artery was higher, 24 cases were in males and 16 cases were in females. In 32 cases, the left common iliac artery was ending above the right one, 22 cases in males and 10 cases in females. In 6% of cases the two common iliac artery ends the same level, all cases in males. Conclusions. Regarding the lower termination, only in males, the left common iliac artery ends in front of the sacrum, an aspect not encountered for the right common iliac artery. It appears that, in females, the left common iliac artery do not shows a lower end while the higher end is present in a small percentage (5.56% of cases).

THE WORKSHOP ANATOMY FOR THE INTERNET (WAI) ONE OF THE MOST COMPREHENSIVE ANATOMICAL TEACHING OFFERS ON THE INTERNET

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The internet became the most important source of information in all fields of research and teaching. However, comprehensive sources of anatomy like the WAI are rare. Original images and explaining texts of high didactic value were created according to relevance for medical education. In part, students labelled the images of ultrastructures or of the visible human in an interactive course under competent supervision. The constantly extended offer consists of interlinked modules: A complete atlas of human x-sections shows photos next to corresponding CT/MR-images, animations of serial sections and sections labelled in great detail. An electron microscopic (EM) atlas with >1,500 micrographs provides comprehensive texts on ultrastructures and histology in general presenting morphology in context with biochemical-physiological processes and clinical aspects. English versions of such pages are provided for international benefit. These atlases are accompanied by vocabularies explaining official terms in German and English. Clinical anatomy including some movies; comprehensive data and facts on human development ordered in stages, days/weeks; small modules like

explained an extensively labelled spinal chord or skull base; tables of muscles. Numerous links allow selection of interesting information. Higher resolution and labelled images as well as image-overviews in an ordered arrangement provide easy navigation. The atlas of human sections allows to gain a three-dimensional topographically correct picture of the human body and to correlate anatomy to radiology in an easy way. Many images are provided thoroughly labelled as well as unlabelled offering the possibility to control self-acquired skills. The materials are an online supplement of anatomical collections and helpful in teaching clinical anatomy. The vocabularies allow checking of terms. In contrast to conventional media the internet offers knowledge transfer with the possibilities of easy linking, correction, update, feedback and continuous extension. All content is part of a general didactic concept that shall provide an overall comprehension of the composition of humans from ultrastructure to systems of organs and from physiological-biochemical processes to clinical patterns.

THERMOGRAPHIC STUDY OF THE PERFORATOR ANATOMY FOR THE DEEP INFERIOR EPIGASTRIC ARTERY PERFORATORS

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Background / Aims: Cutaneous perforators are arteries that supply the subcutaneous tissues and skin and are the basis for successful tissue transfer in reconstructive surgery. The deep inferior epigastric perforator (DIEP) flap is a fasciocutaneous perforator flap commonly used in breast reconstructive surgery. The majority of perforators are found periumbilical. Various studies have shown a large variation in the number of perforators and in their location. The aim of this study was to further assess the local vascular anatomy of the perforators used for this flap. Methods: 20 healthy male volunteers were scanned using a thermal camera. Each had radii of 2.5cm and 5cm centred on the umbilicus marked. Thermographic 'Hot spots' representing perforators were marked and recorded. Results: In 20 abdomens there was a mean of 0.7 perforators within 2.5cm of the umbilicus (range 0-3) and a mean of 3.7 perforators within 5cm of the umbilicus (range 1-8). All abdomens had at least 1 perforator within 5cm of the umbilicus, but 11 did not have a perforator within 2.5cm of the umbilicus. We found no definite pattern of perforator location. Discussion: This study found all abdomens had at least 1 perforator with 5cm of the umbilicus. Our study showed considerable variation in perforator location between individuals. Despite these anatomical challenges for the surgeon, the DIEP flap has many advantages in reconstructive surgery that outweigh the surgical challenges.

A STUDY COMPARING ANATOMY KNOWLEDGE OF STUDENTS WITH AN INTEREST IN SURGERY AND THOSE WITHOUT

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Introduction: It is important for all doctors to have a good knowledge of anatomy. Many students decide early on if they have an interest in a surgical career, even before clinical exposure. For the students who decide against a surgical career, it is still vital to ensure that they learn anatomy to the standard required for a junior doctor. This study aimed to assess if students with a surgical interest had superior anatomical knowledge when compared to students with no interest in a surgical career. Methods: An 11 question anatomy questionnaire was distributed during two medical school third year lectures. Results: 42 3rd year medical students completed the questionnaire. Out of these, 11 (26%) stated they were interested in a surgical career. In those who had an interest in surgery, the mean score was 63.6% (range 27.3%-100%), and in those with no interest in surgery the mean score was 49.6% (range 9.1%-90.1%). The p-value was 0.073. The areas where the students interested in a career in surgery performed considerably better, was in the anatomy of the superficial inguinal ring (63.6% vs. 41.9%), deep inguinal ring (63.6% vs. 38.7%) and the bones of the foot (72.7% vs. 16.7%). Conclusion: There was a trend for students with an interest in surgery to score higher in this anatomy questionnaire. This demonstrates that an effort needs to be made to ensure that all students, no matter what their career intention, are engaged with anatomy and understand its clinical relevance.

A COMPARISON OF FOOT ANATOMY IN MEDICAL STUDENTS AND SURGICAL TRAINEES

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Introduction: Over recent years many surgeons and anatomists have commented on the falling standards of anatomy knowledge. Some areas are notoriously poorly understood including the anatomy of the bones of the foot. The aim of this study was to compare the knowledge of the bones of the foot in medical students who had just completed pre-clinical teaching with doctors at the commencement of core surgical training. Method: A diagram of the bones of the foot was handed out during a 3rd year student lecture and a lecture at the commencement of core surgical training. The participants were asked to correctly label the bones of the foot. Results: Only 35% of 3rd year medical students could label all the bones of the foot compared to 50% of core surgical trainees. The mean mark out of 7 was 4.5 (64.6%) for 3rd year students, and was 4.9 (69.5%) for core surgical trainees (P=0.60). Of core surgical trainees, 91% could identify the calcaneus and 82% the talus. Only 55% of surgical

trainees could identify the cuneiforms and 59% the navicular. 73.8% of medical students could identify the talus and calcaneum. The students fared worse on identifying the cuboid (45.2%) and navicular (47.6%). Conclusion:Anatomy knowledge of the bones of the foot is poorly understood, and there is no significant improvement in surgical trainees compared to 3rd year medical students.

MICROANATOMICAL STRUCTURE AND TOPOGRAFIC ANATOMY OF ISCHIATIC NERVE IN HUMAN FETUSES

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The longest and thickest nerve of the body, sciatic nerve is divided into tibial and common peroneal nerve in the popliteal fossa. Anatomical variations can be seen during the course of sciatic nerve at the gluteal region and posterior compartment of the thigh. These anatomical variations may contribute to piriformis syndrome, sciatica, coccygodynia and muscle atrophy. This should be taken into account by clinicians. The aim of this study was to evaluate the morphometric development, the correlation between sciatic nerve and relative structure, determine the incidences of anatomical variations which was to be during the course of this nerve according to gender and trimester. In this study which was carried out on 60 spontaneous abortion human fetuses aged between 9-40 weeks of gestation without anomalies. After the determining the localization of sciatic nerve, morphometric measurements were carried out about sciatic nerve and relative structures. Mean values and standart deviations of all parameters according to trimesters were determined and all parameters were found to be increased with gestational age ($p<0.05$). No significant differences were found between gender and right and left sides for all parameters realated to the sciatic nerve. In 99 of the 120 (82.5%) extremites, sciatic nerve divided into tibial and common peroneal nerves in the popliteal fossa, in 19 of the 120 (%15,83) above the popliteal fossa and in 2 of 120 (%1,67) the highest division seen. Furthermore, the sciatic nerve was evaluated according to the piriformis muscle. In 59 of total 60 cases (%98,3), on the both right and left sides sciatic nerve exited below the piriformis muscle and in one case (%1,67) sciatic nerve showed the highest division and tibial nerve exited below the piriformis muscle and common peroneal nerve passed through the piriformis muscle on the right side. We believe that our study will provide important datas for development of sciatic nerve in the fetal period and also this datas will be benefit for clinical procedures.

REFLECTION OF EPONYMS IN FUTURE

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Terminology and nomenclature is the basic construction stone of any scientific field. In anatomy, the nomenclature has a long tradition from 1895 (Basiliensia Nomina Anatomica - BNA) and in histology and embryology from 1975 (Nomina Histologica and Nonima Embryologica). The last revisions are the Terminologia Anatomica (TA 1998), Terminologia Histologica (TH 2007) and Terminologia Embryologica (TE 2012). The eponyms were excluded from the nomenclature as early as 1955 (Parisiensia Nomina Anatomica – PNA) but they still survive both among anatomist and among clinicians. TA, TH and TE brought a list of some of them with their official Latin equivalents. Several website exist serving as databases of the eponymous personalities and the eponyms. But the situation still remains unclear especially for the teachers how to approach this question, mainly due to the local and interdisciplinary differences in usage and favor of eponyms. The authors proposed a simple classification of eponyms into three groups: A for every student and physician, useful and necessary in the whole study, scientific and medical life (e.g. Achillis tendon or Eustachian tube); B for specialist in one specific field (e.g.Weitbrecht's retinacula or Onodi's cell) and C for archaic, obsolete and abundant terms (e.g. torcular Herophyli or vein of Lichaceva). The task for future is to complete all eponyms from groups A and B with their official Latin terms, if missing.

BOTTLENECKS OF ULNAR ARTERY CATHETERIZATION

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Introduction: The arteries of the upper limb are now the method of choice for intervention cardiologist to perform both diagnostic and therapeutic procedures in coronary arteries. The preferred site is the distal forearm end of the radial artery. However, the radial artery is also used as a graft for cardiosurgery, pedicle vessel of flaps for plastic surgery and a site for vascular shunt placement for dialysis. These aspects privilege the ulnar artery as the possible alternative, although the close vicinity of the ulnar nerve and deeper location of the bone for compression can seem to be threatening conditions. Material and methods: Cadaver study of 205 dissected extremities and radiodiagnostic study of 25 catheterization videos have been performed. Results: The diameter of the ulnar artery 1 cm proximally to the styloid process of ulna was 2.5 mm in average and that of the brachioulnar artery ranged from 1.9 to 2.9 mm. Totally, 23% of specimens featured some variation of the arterial trunks of upper limbs: the brachioradial artery (14%), superficial brachial artery (5%), median artery of hand (3%), accessory brachial artery (0.5%), etc. Those related to ulnar artery such as the superficial brachioulnar artery (4%) and brachioulnar artery (0.5%) were less frequent than those concerning the radial one. Duplication or absence of radial or ulnar

artery or superficial ulnar artery was not encountered at all. The tortuosities of both arteries were recorded in the extent 0-17 cm proximal to the styloid process. Conclusions: The ulnar approach can serve as an alternative choice due to the lower incidence of anatomical variation.

ANATOMICAL DIFFERENCES OF THE EPITHELIUM IN THE ESOPHAGOGASTRIC TRANSITION AND THEIR CLINICAL VALUE

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Anatomic and histotopografic analysis of 70 specimens of esophagus from cadavers, 20 specimens of the abdominal part after resection of esophagus in patients with cancer and endoscopy in 100 patients was carried out. Height of the situation of esophageal and gastric epithelium contact line is different from 40 mm higher and 18 mm lower than the anatomical border between esophagus and stomach: on the level of this border – 22%, higher on 5-9 mm – 28%, on 10-19 mm – 27%, on 20-40 mm – 7%, lower than the border to 10 mm – 7%, to 11-18 mm – 9%. Forms of the contact line can be linear, wavy, arc-form, tongue-form. The end of esophageal stratifid squamous epithelium can put on the end of gastric simple columnar epithelium forming the duplication to 10 mm wide. Variability of endoscopic Z-line in the esophagogastric transition corresponds to the determined range of anatomical differences. The availability of gastric mucosa in the wall of esophagus abdominal part has the significance for its endoscopy, a study of Barrett esophagus, makes possible the development not only squamous cell nonkeratinous carcinoma, but adenocarcinoma in esophagus.

COMPUTED TOMOGRAPHICAL ANATOMY OF THE RETROPERITONEAL SPACE

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Anatomic analysis of computed tomograms in 140 persons was carried out. All patients had no abdominal pathology. The retroperitoneal space may be divided into three twin sections: suprarenal, renal and infrarenal.. The volume of the retroperitoneal space changes from 877 to 1470 cm^3, the height – from 147 to 245 mm. In average the height of the suprarenal section is 27,7±3,5 mm, of the renal – 99,4±12,1 mm, of the infrarenal – 78,1±9,8 mm. The volume of its fatty connective tissue changes from 291 to 852 cm^3. Volumes of the retroperitoneal space and its fatty connective tissue are more: a) in men than in women, b) in the second period of the mature and elderly age than in the first period, c) in the left side than in the right. It's determined that there is the fatty connective layer behind the pancreas and the duodenum. The prerenal fascia connects with the similar fascia of another side in front of the aorta and inferior cava vein. It is the posterior border of the afore-named fatty connective layer.

AGE-RELATED MODULATION OF THE HYPOTHALAMO-HYPOPHYSEO-ADRENAL AND THYROID AXES IN STRESS

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Background: Contradictory effects of stress on the hypothalamo-hypophyseo-thyroid and adrenal axes due to type, length and controllability of the applied stressors have been recently reported (Gutiérrez-Mariscal M. et al., 2012; Olivares E.L. et al., 2012). The objective of this study is to elucidate modulational changes in the hypothalamus, pituitary, thyroid and adrenal glands in the young and aging experimental animals in chronic mild and severe stress. Materials and methods: Total of 72 male Sprague-Dawley rats of the two age groups (3 and 12 months old) were involved in the study. Experimental animals were exposed either to chronic mild (Yin D. et al., 2000) or severe (Kvetnansky R., 1970) stressor or served as an age-matched control. Hypothalamus, pituitary, thyroid and adrenal glands were sampled and processed for immunohistochemistry with subsequent image analysis. Results and discussion: Chronic stress resulted in decreased activation index and expression of thyroglobulin in the thyroid gland and of TSH in the pituitary gland. These changes were more prominent in severe stress group compared to the mild stress one, with the difference between the two experimental groups being more pronounced in the young animals compared to the aging rats. Weight of the adrenal glands and their cortex-to-medulla ratio were increased in both experimental groups with significant changes between the mildly and severely stressed rats. On the contrary ACTH expression in the pituitary gland was elevated only in the young animals, with higher level of increase in the severe stress group, while CRH was increased in the parvocellular fraction of the paraventricular nucleus of both experimental groups of the aging rats and in the severely stressed young animals. Conclusion: Different patterns of activation and interplay between the hypothalamo-hypophyseo-adrenal and thyroid axes observed in the young and aging animals exposed to different types of stressors should be addressed in prevention of maladaptive physiological changes caused by prolonged stress exposure.

HOMO- AND HETEROTYPIC STRESSOR-INDUCED IMMUNOSUPPRESSION IN THE GROWING BODY

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Background: Immune responses are generally enhanced in compartments of the lymphoid organs that

are enriched with immunocytes and suppressed in compartments that are depleted of them during or following stress. In early life stress has lasting immune consequences (Dhabhar F.S. et al., 2012; Pervanidou P. et al., 2012; Fagundes C.R. et al., 2013). Information regarding patterns of redistribution of the lymphoid cells between the compartments of the immune organs during early postnatal ontogenesis is scarce. The objective of the study was to evaluate redistribution of the immunocytes in the compartments of lymphoid organs following exposure to chronic homo- or heterotypic stressors in early life. Materials and methods: Prepubertal Sprague-Dawley rats of the two age groups (14 and 56 days old) were chronically exposed to either homotypic (E.Freudin et al., 2004) or heterotypic (B.K.Choudhary et al., 2009) stressors. Thymus, spleen and mesenteric lymph nodes were sampled and processed for immunohistochemistry using antibodies against CD3, CD8, CD20, CD45RC, CD90, CD68, PCNA and caspase-3 followed by image analysis. Results and discussion: T- and B-zones of the peripheral immune organs were depleted of the lymphoid cells in the age- and type of stress-related pattern. In juvenile rats volume density of the recirculating pool of lymphocytes in the thymic medulla was reduced after chronic application of heterotypic stressor, while reduction of volume density of CD3+, CD8+, CD90+cells and CD20+cells in the T- and B-zones accordingly was higher in the heterotypic stressor-exposed animals than in the homotypic stressor group. In preweaning rats both homo- and heterotypic stressor exposure resulted in lymphoid cells depletion in the T-zones, hypoplasia of the B-zones with increased amount of apoptotic cells and reduced number of proliferating cells. Conclusion: Juvenile rats exhibited higher sensitivity of the redistribution pattern of the lymphoid cells in the T- and B-compartments of the immune organs to the type of stressor applied compared to the preweaning animals.

REDUCTION OF CARBON TETRACHLORIDE-INDUCED LIVER INJURY IN RATS BY OMEGA-3 FATTY ACIDS

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Background: Eicopentaenoic acid (EPA), Docosa-hexaenoic acid (DHA) and α-linolenic acid (ALA) are categorized as omega-3 essential fatty acids (ω-3 EFA). It has been reported that that ω-3 fatty acids have antioxidant, anti-inflammatory and anti-hypertensive properties. In the other hand, carbon tetrachloride (CCl_4) is a well-known hepatotoxic agent used to induce experimental liver damage. Therefore, the present study aimed to examine the protective effects of ω-3 fatty acids against liver injury induced by CCl_4. Materials and Methods: 21 male Wistar rats were divided in three groups. Group I was used as control. Rats in group II were injected every other day with CCl_4 for 1 month, whereas rats in group III received daily ω-3 fatty acids while exposed to CCl_4 for 1 month. At the end of the experiment, all animals were killed by decapitation and blood samples were obtained. Serum aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), total and conjugated bilirubin levels were measured. Additionally, hepatic superoxide dismutase (SOD), glutathione peroxidase (GSH-Px) and malondialdehyde (MDA) contents were determined. For histopathological evaluation, livers of all rats were processed for light microscopy. Results: All biochemical parameters in serum and the hepatic MDA content were significantly higher in animals treated with CCl_4 than in the controls. SOD and GSH-Px values were significantly decreased in these animals. Furthermore, livers of rats treated with CCl_4 showed histopathological changes. Whereas, rats treated with CCl_4 and ω-3 fatty acids showed a significant reduction in the elevations in biochemical parameters in serum and hepatic MDA content. Additionally, the rats that were exposed to CCl_4 along with ω-3 fatty acids administration had increased SOD and GSH-Px enzyme levels. Also, the histopathological changes induced by CCl_4 were disappeared after administration of ω-3 fatty acids. Conclusion: It is suggested that ω-3 fatty acids protect liver against CCl_4 toxicity.

THE VARIABILITY OF OSTEOMETRIC PARAMETERS OF TUBULAR BONES OF THE HUMAN HAND IN DEPENDING FROM THE MORPHOLOGICAL TYPE

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The human hand types are genetically determined and by steroid hormonally dependent morphogenesis mediated constitutional characteristics. The distribution of the hand types in males and females are differently. Men hands dominate by the ulnar type with protruding tip of the ring finger over index finger (ulnar), women hands - by radial type with protruding tip of the index finger over ring finger (radial). The aim of the study is to determine the variability of osteometric parameters tubular bones of the hand, depending on factors the hand type and sex and on interdependence influence of these two factors. 200 X-ray images of both hands were received by standard conditions and were taken into the study (100 men and 100 women). Osteometric parameters as the length and width of bone structures phalanges and metacarpals were measured by using electronic caliper with accuracy 0.01mm. Male hands accounted 71.4±5.6% ulnar type, and female hands accounted 61.4±10.4% radial type. With two-factor ANOVA were showed that regardless of gender, the highest diversity of osteometric parameters characterizes tubular bones of the ulnar type of hand. Most osteometric parameters hands ulnar and unidentified type significantly above analogous parameters hands of the radial type. Most of the statistical differences of the studied parameters were obtained for bones of III, IV and V hand rays i.e. that is

shifted to the ulnar edge of the hand. Ulnar type of hand differs by high variability osteometric parameters of metacarpals, middle and proximal phalanges of these rays. Thus, sex and type of hand are independent diagnostic features and should be considered in forensic expertise.

OSTEOMETRIC AND PHYSICAL VARIABILITY OF THE HUMAN FOOT BONES

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Osteometric and physical properties of the human bones are important characteristics for a determination of sex. The most studied sexual dimorphism of the hand bones, pelvis, and skull, but the greatest value for the diagnosis are the foot bones as most preserved after death, and as protected by footwear from the effects of destructive environmental factors. The purpose of this study was to examination the variability sex dimorphic osteometric and physical parameters of human foot bones which were obtained from 120 cases of observation. In 60 cases, the observations were direct osteometry anatomical specimens of bones and in 60 cases the study was carried out X-ray images of the foot. Osteometry were made with using electronic caliper and also were identified some physical parameters of the bones. To carry out the above measurements were selected middle phalanges, talus and calcaneus. Mean values of osteometric measurements of male bones were significantly higher than similar of female bones. The largest difference was observed among these indicators for the length, width, height, width and height of the bone apophyses. The weight and the volume of the male foot bones were significantly higher than the similar characteristics of female foot bones. In first time was established a statistically significant increased physical density female foot bones compared with that of men's bones. It was also found that the osteometric parameters of the foot bones and some osteometric indexes significantly differ depending on the anatomic variability of the shape and size of the articular surfaces of the talus and calcaneus. The resulting findings have diagnostic value for forensic diagnosis, sex, race and ethnicity of human foot bones.

EFFECT OF PRENATAL ANDROGENIZATION AT THE FINGER LENGTH AND 2D:4D DIGIT RATIO OF LABORATORY MICE.

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Numerous applied research the ratio of the index finger at ring finger (2D:4D Digit Ratio) for the diagnosis of different psychological and physiological charact-eristics (masculinity-femininity) uncertainly prove the hypothesis about the prenatal effect of androgenization on the development of human fetal. The purpose of this study was to examine the effects of prenatal androgenization at the finger length and 2D:4D digit ratio of laboratory mice in adult life as an experimental model to test the above hypothesis. Pregnant female outbred mice, at the day begin of the differentiation and morphogenesis of the primordium of fingers limbs oil solution testosterone it was injected intramuscularly in high therapeutic doses for the obvious passing through the placenta. To offspring on reaching adulthood the length of fingers and digit ratios was measured. It was found that a greater degree not androgens, but injection of olive oil in the same volume causes the greatest effect of the growth of fingers length and changes of digit ratios. To explain the results, the authors suggest that prenatal andro-genization of pregnant mice can not be the best model, since most of the exogenous hormone is metabolized in the body of the mother, does not fully pass through the placenta and is metabolized in the fetal tissues. Even in case that testosterone obviously passes through the placenta, it only modify to the effect of steroid hormones released during the procedure of injection as a stress factor. Thus, the more likely that not androgens but the all steroid hormones influence on the postnatal growth of limbs.

DETERMINATION OF TARGET POINT FOR TRANSPEDICULAR SCREW PLACEMENT IN THE LUMBAR SPINE

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Introduction: Dorsal transpedicular screw placement is a common method in the surgery of the human lumbar spine. During this process complications might occur as there are no anatomical landmarks being described to use for orientation. The aim of the study was to prove the existence of a special target point situated on the back of the vertebral pedicle which might be a useful structure for orientation. Material and Method: 26 skeletons provided by the Department of Anatomy Graz and therefore 260 pedicles on 130 lumbar vertebrae have been used to prove the existence of a crista as a special landmark on the pedicle of a lumbar vertebra. For the study 7 female and 19 male compounds have been used. Results: The crista was classified in shape and variety, its length was measured as well as length, height and depth of the pedicle itself, to evaluate the profit of a target point. In 98% the existence of a crista could be revealed. Clear correlations between the different lumbar vertebrae and their various shapes and length of cristae could be demonstrated. No association with sex or age could be proven. Discussion: The crista seems to be a helpful target point for transpedicular screw placement in surgery of the human lumbar spine due to its special location. In future furthermore investigations will be necessary to find out even more about this crista's clinical relevance.

MAXILLARY SINUS SURGICAL LIFT: SUMMERS' TECHNIQUE VERSUS A PIEZO-ELECTRIC TECHNIQUE

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Objectives: The aim of this study is to investigate in a randomized-controlled pre-clinical trial the performance of hand instruments (Summers-technique) compared with a piezoelectric device during maxillary sinus floor elevation. Study design: Specimen: Using Panorama radiographs, DVT- scans 16 unhurt human cadaver heads in Thiel´s fixation will be selected. Inclusion criteria for the human cadaver heads are edentulous upper jaws and a bilateral lack of sufficient bone in the posterior maxillary region with a scored Cawood classification II - III on preoperative radiographs. Material and methods: This experimental phantom study is applied to evaluate the differences of both techniques in a split-mouth design. Randomly allocated, on one side of each maxilla Schneiderian membrane elevation will be carried out using the piezosurgery (test) and conventional Summers technique (control) on the contra-lateral side. Study procedure can be divided into three sections as presented in flowchart 1: Initial situation, augmentation procedure and assessment of the applied techniques. Simulation of sinus augmentation will be performed by filling the cavity through the enoral access using a radioopaque impression material (elite implant medium, Zhermack, Italy). Parameters: Augmented volume (V) – calculated by an validated computer software, bone thickness (T) and osteotomy area (A). In addition, the time necessary for the osteotomy and sinus membrane elevation as well as the number of surgical complications were calculated.

Hypothesis:

- H0: There is no significant difference when using technique A or technique B in regards to trauma to the Schneiderian membrane and augmented volume.
- H1: Technique A is significantly less traumatizing to the Schneiderian membrane and augmented volume.

Data aquisation: All scans will be processed with a Somatom plus 4 CT Scanner (Siemens AG, Bensheim, Germany) at the Department of Radiology, Medical University of Graz. CT data were acquired by taking 1, 25-mm slices each using 140KVp and 240mA, high qualitiy scanmode, with a speed of 3, 75mm/ rotation and a field of view (FOV) of 20 cm.

A NEW ANATOMY TEXTBOOK OF HUMAN BODY FOR DENTAL STUDENTS

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Background: There is a clear need for every dental student to learn anatomy of head and neck in as detailed way as does the general medical student. On the other side dental students should also have an adequate idea of the anatomy of trunk and limbs. Materials and Methods: A new textbook of anatomy was specifically designed for teaching and learning dental students to help them explore anatomy of trunk and limbs. In the book was limited text to the extend which can be demonstrated in the dissecting room according to a new curriculum for dental students. Results: The organization of textbook followed a need to be concise guide for dental students. After the introduction, the descriptive terms were offered to learn. Following, main systems were described in general: bones and skeletal system, joints, muscular system, cardiovascular and lymphatic system. The anatomy of the upper and lower limbs was decided to be regional rather than systemic, described in a limited way. Similarly, the main structures of the thorax were described. After that, more in detail were described parts of human body: heart, respiratory system and digestive system. Finally, the only main structures of abdomen and retroperitoneal structures were described together with urinary system. Male and female genital systems were shortly described as well. Conclusion: In the textbook of human body for dental students were eliminated all unimportant anatomical details of trunk and limbs. The book was completed by full color drawings which should help students to learn and understand main anatomy structures of human body.

ANATOMICAL AND MORPHOMETRIC CHARACTERISTICS OF POSTERIOR INTERCOSTAL ARTERIES AS ARTERIAL GRAFTS FOR MYOCARDIAL REVASCULARIZATION

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Background: Posterior intercostal arteries - PIA meet the necessary criteria for myocardial revascularization due to favorable histological structure and location in thoracic cavity. The arteries could be used as in situ grafts to transplant the entire coronary arterial system. The aim of the study was to determine the anatomical and morphometric characteristics of left 5th and right 7th PIA. Material and Methods: Dissection was carried out on 43 human cadavers embalmed after the method of Thiel. The variations of PIA were documented and outher diameters at the origin and at the costal angle were measured. Results: Anatomical variation known as thoracic vertebral artery was found by 5th left PIA. Common trunks of 4th and 5th (n=4) and 5th and 6th (n=5) left PIA were found at their origin from the aorta. No anatomical variations described earlier were found by 7th right PIA. Outher diameters depend on type of origin. When common trunk divided into single arteries their diameters did not differ from diameters of individual arteries at the origin. At the costal angle diameters were the same regardless the type of origin. The average outher diameters at the origin of 5th left and 7th right PIA were 1,9 ± 0,4 mm and at the costal angle level 1,4 ± 0,3 mm (5th left PIA) and 1,6 ± 0,3

mm (7th right PIA). Discussion: 7th right PIA has less anatomical variations and is therefore more suitable as 5th left PIA due to haemodynamic changes which could result in turbulence. Outher diameters of 5th left PIA support previous histomorphometric studies of lumen diameter at the origin (1,4 ± 0,3 mm) considering the average thickness of intima (54 ± 38 µm) and media (205 ± 38 µm), and lumen diameter at the origin (1,75 ± 0,35 mm) and the total thickness of intima and media (246 ± 35 µm).

ANATOMIC STUDY OF THE INNERVATION OF THE LINGUAL GINGIVA AS A BASIS OF THE LOCAL NEUROLYSIS

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Background: Sensory disorders have multiple causes and are also observed in the oral cavity, partly in the gingival area. Generally, some forms of sensory disturbances – e.g. allodynia, paraesthesia, hyper-aesthesia - are treated by neurolysis. Inter alis, alcoholic injections are applicated for this purpose. Neurolysis in the gingival area is quite unknown, there are no guidelines for techniques of this procedure. There are no ideal volumes defined. A further problem arises from the different description of the gingival innervation in the anatomical literature. Materials and Method: The discrepancies of the anatomical description of the gingival innervation led us to investigate this region precisely. The nerve branches of the lingual, mental and buccal nerve in the mobile and fixed gingiva were dissected. 83 head halves were examined, in 51 cases the lingual nerve could be dissected, in 46 cases the buccal and in 49 cases the mental nerve. In all other cases, the preparation was not possible due to bad conditions (too thin, too dry nerve fibers, severed or already during the dissection course prepared nerves). Results:The lingual, exactly the sublingual nerve innervates the lingual mandibular gingiva. Conclusion: The implementation of neurolysis in sublingual nerve endings is from the anatomical point of view possible, as long as low injection volumes are maintained. Because of the fine nerve branches and the small operating area alcohol injections should not exceed 1 ml.

ANATOMICAL MAPPING OF THE MIMIC NASAL MUSCLES WITH REGARD TO PLASTIC AND AESTHETIC SURGERY

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Background: An anatomical mapping of the most important muscles influencing the nose, with the incorporation of constant anatomical structures and their spatial correlations as a practical guideline for plastic aesthetic surgeons. Methods: All in all the midfaces of 18 bodies of both sexes, obtained by informed consent from body donators aged between 60 and 80 years, were at our disposal. Macroscopically we dissected the nasal region of 8 corpses, 6 midfaces were prepared according to plastination histology, 4 by creating plastinated slices. Results: On their way from their periosteal origin to the edge of the skin the mimic muscles of the nose cross the subcutaneous adipose tissue, dividing it into a superficial and a deep layer. The individual muscle fibers insert into the skin directly at the reticular corium, sometimes even reaching the border of the epidermis, which represents a special arrangement of corial muscle attachment. Conclusions: To surgeons the anatomical fiber course of the individual mimic nasal muscles presented macroscopically and microscopically as mapping in this study offers a detailed overview of the anatomically important muscular landmarks of the midface.

THE NON-RECURRENT INFERIOR LARYNGEAL NERVE (NRILN) IN CURRENT THYROID AND PARATHYROID SURGERY – A CLINICAL-ANATOMICAL MAPPING WITH REGARD TO INTRAOPERATIVE NEUROMONITORING (IONM)

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Background: We present a NRILN, the most important anatomical course-variation of the inferior laryngeal nerve in surgical interventions concerning the thyroid and the parathyroid gland (0.5 – 6 %) by means of a clinical case study as well as a topographical specimen, demonstrating, at the same time, its anatomical course with regard to the use of intraoperative neuromonitoring (IONM). Thus we provide an overview of the clinically important anatomical-topographical structures and their spatial relations and offer an anatomical explanation for the absence or abnormality of vagus signals necessary for the detection and location of a NRILN by IONM. Methods: The course of the inferior laryngeal nerve and the possible presence of a NRILN (dexter sive sinister) was investigated and anatomically-topographically demonstrated in 36 formalin-fixed specimens. Our findings were transferred to the respective anatomical specimen. Results: We found one NRILN (dexter) branching off from the vagus nerve at the level of the inferior thyroid artery (ITA), following an ascendant course, on its way crossing the ITA. Similarly we could show the anomaly of a lusorial artery which only occurs in association with a NRILN. The intraoperative image displayed the descending variation. Neurostimulation signals of the vagus nerve are positive if derived proximal of the branching-off of a NRILN and negative if derived distal from it; thus they exhibit different electromyographical responses. Conclusion: Surgeons need a profound anatomical-topographical knowledge about NRILNs in order to avoid temporary or permanent recurrent nerve palsy. Therefore in case of non-existent vagus stimulation they should be familiar with the possible topographical courses of a NRILN. Furthermore they must be able to correctly interpret negative as well as positive signals of the intraoperative neurostimulation before operating

on the thyroid or the parathyroid gland respectively, at the same time bearing in mind the different topographical course varieties (descending, horizontal, ascending).

OCCURRENCE OF SPINAL DEFORMITIES IN ADOLESCENTS LIVING IN PRYKARPATTYA REGION

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Aim of Investigation: The objective is to determine the occurrence of spinal deformities generalization in adolescents living in Prykarpattya region in relation to their body type. Materials and Methods: To reach the objective 133 persons have been examined (43 males sex and 90 females) who are residing in Prykarpattya. All persons have been examined, the histories taken and anthropometric measuring conducted. On the basis of the ratio of brachium width to trunk height indices the examined persons have been divided onto three types: dolichomorphic – 29 persons (4 males and 25 females); mesomorphic – 64 persons (26 makes and 38 females); brachymorphic – 40 persons (13 males and 27 females). Results: As a result, it has been fixed 9 cases (6.8%) of thoracic spine deformities, the other areas of spine are normal. thoracic spine deformities to some extant depend upon sex and constitutional characteristics. 8 cases (6.0% of all examined and 8.9 % of examined women) of spine deformities have been fixed in females (4 – dolichomorphic and 4 – mesomorphic types of body) and 1 case (0.8% of all examined and 2.3% of examined women) – in male with mesomorphic type of body. Conclusion: As follows, the spine deformities are more common with females of mesomorphic and dolichomorphic types of body.

ANATOMIC VARIATIONS OF THE COMMON HEPATIC ARTERY WITH DIGITAL SUBSTRACTION ANGIOGRAPHY

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Objectives: The anatomical variations of the abdominal arteries are important. Previous and modern anatomists, radiologists and surgeons have reported and accumulated anatomical variations from a morphological and clinical interest. During graft procurement and reconstruction, accidental injury of the hepatic artery is more likely in the presence of hepatic arterial variation, which can be a common clinical entity. Various types of vascular anomalies are frequently found in human abdominal viscera especially common hepatic artery, during cadaveric dissection and diagnostic radiological imaging. Material and Methods: Based on Turkish population, anatomic variations in the common hepatic artery were studied. The data of totaly 152 consecutive patients (103 males and 49 females and aged between 6 – 77 years) undergoing orthotopic liver transplantation, selective chemoembolization for hepatic malignancy, and embolization procedure for visceral artery bleeding with Digital Substraction Angiograhy. Results: We examined the anatomy of the common hepatic artery in a total of 152 consecutive patients. A total of 61.8% (94/152) cases showed the classical trifucation of the celiac trunk. Variant the common hepatic arteries arising from the superior mesenteric artery were observed in 17.1% (26/152), the common hepatic arteries arising from the left gastric artery were found in 12.5% (19/152), the common hepatic arteries arising from the superior mesenteric artery were observed in 6.6% (10/152) and the common hepatic arteries arising from the aorta were found in 2.0%(3/152), respectively. Conclusion: These data are useful for planning and conduct of surgical and radiological procerures of the upper abdomen, including laparascopic operations of the biliary tract.

MELATONIN PREVENTS HIPPOCAMPAL OXIDATIVE DAMAGE INDUCED BY PINEALECTOMY IN RATS

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Background: Melatonin is an endogenous neurohormone produced by the pineal gland and easily penetrates all biological membranes including both the placenta and the blood-brain barrier. Melatonin is known to be involved in a variety of physiological processes including the regulation of endocrine rhythms, antigonadotropic effects, neuro-protective effects and stimulation of the immune function. Besides these functions, many recent studies have shown that melatonin functions effectively as an antioxidant. Also, melatonin stimulates enzymes of the antioxidative defense system such as superoxide dismutase and glutathione peroxidase. The aim of this study was to examine the protective effects of melatonin against oxidative damage induced by pinealectomy in the hippocampus of rats. Materials and Methods: For this purpose, male wistar rats (n=21) were divided into 3 groups: Group I and group II were designated as control (sham-pinealectomy) and pinealectomized rats, respectively. Rats in group III were pinealectomized and injected daily with melatonin (1 mg/kg) for 3 months beginning at day 7 after surgery. At the end of experimental period, all rats were killed by decapitation. The brains of the rats were removed and the hippocampus tissues were obtained from all brain specimens. Superoxide dismutase (SOD), glutathione peroxidase (GSH-Px) and malondialdehyde (MDA) levels were measured spectrophotometrically in all tissue specimens. Results: The levels of SOD and GSH-Px were

significantly decreased, and MDA levels were significantly increased in pinealectomized rats compared to the controls. However, increased SOD and GSH-Px enzyme activities, and decreased MDA levels were detected in the rats administered melatonin after pinealectomy. Conclusion: It was determined that pinealectomy-induced hippocampal tissue damage was prevented by administration of melatonin hormone.

VAGAL AFFERENT INNERVATION OF THE PANCREAS: AUTOPSY, QUANTITATIVE IMMUNOHISTOCHEMICAL AND MORPHOMETRIC FINDINGS

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Background: Primary afferent neurons of the nodose ganglion significantly contribute to the sensory innervation of abdominal organs. Chemosensitive vagal afferents may also be significantly involved in the pathogenesis of inflammatory processes of both the exocrine and endocrine pancreas. In our study, we have performed human autopsy dissections of the vagus nerve and the nodose ganglion. In animal experiments, by using retrograde axonal labelling and immunohistochemistry we identified and characterized neuronal populations of nodose ganglion neurons innervating the rat pancreas. Materials and Methods: Dissections of the vagus nerve and the nodose ganglion were performed in a craniocervical cadaver torso. For histological studies adult male Wistar rats (n=4) were used. Immunohistochemistry was used to demonstrate transient receptor potential vanilloid type 1 receptors (TRPV1), insulin receptors (InsR), substance P (SP) and calcitonin gene-related peptide (CGRP) in frozen sections of the rat nodose ganglion. Results: Quantitative analysis of retrogradely labelled neurons showed that 18,6% of nodose ganglion neurons projected to the pancreas. The cross-sectional areas of the labelled neurons amounted to 513,2±154,8 μm^2. Of the labelled neurons 64% showed TRPV1-, 49% InsR-, 31% SP-, and 22% CGRP immunoreactivity. Colocalizations of TRPV1 and InsR, SP and InsR, and CGRP and InsR immunoreactivities were demonstrated in 35%, 17% and 8% of the labelled neurons, respectively. Discussion: Our human autopsy work contributes to the responsible and laceration free exploration of the nodose ganglion, and helps post-mortem research work. Our histology work provides quantitative data on the chemical phenotypes of pancreatic vagal afferent neurons, and indicates that insulin may participate in inflammatory processes mediated by SP, CGRP and TRPV1.

THE INFLUENCE OF TYPE OF VASCULAR ANASTOMOSIS ON POSTOPERATIVE HAEMODYNAMICS – COMPUTER SIMULATION METHOD

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Background: Every vascular anastomosis is inevitably subject to formation of certain grade of neointimal hyperplasia at suture line. That process narrows the anastomosis itself and more or less influences hemodynamics. Eversion endarterectomy of carotid artery is a commonly performed procedure in vascular surgery as it is in our clinic. Due to technical reasons in some cases we were forced to modify the incision shape. Aim of this study was to compare hemodynamic characteristics of standard eversion endarterectomy and the one with modified incision shape using computer stimulation. Material and Methods: We used SolidWorks&#174 Premium 2010 computer program to simulate the flow through the bifurcation of ACC. Computer model simulated standard shape of suture line and the modified incision shape. Furthermore, we simulated the development of neointimal hyperplasia at suture line by narrowing the blood vessel lumen along the suture line by 0.5 millimetres at a time and afterwards we measured flow velocities in ACI, ACE and at the point of stenosis. Results: In conditions of ideal anastomosis without residual stenosis and no neointimal hyperplasia development there is no difference in flow velocities between the two models. By narrowing vascular lumen at suture line by 0.5 mm gradually, which simulates the development of different grades of neointimal hyperplasia, there appears a difference in flow velocities between the two models. At stenosis of more than 1.5 mm there is detectable higher flow velocity at anastomosis and flow reduction through the ACI in both models. Discussion and Conclusion: This model may influence everyday clinical practice. Our findings suggest that implementation of this modified shape of incision provides better hemodinamical characteristics, but further clinical studies need to be done.

AGING EFFECTS ON PHRENIC NERVE MORPHOMETRY

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Background: Aging affects peripheral nerve function in experimental models but few literature reports deal with animals aged up to one year. Also, age related changes to peripheral nerves are not linearly progressive with age. However, in aging studies, differences between adult and old animals have often been based on comparisons of only two experimental

groups, whereas the life span and the duration of growth periods should be carefully taken into account to ensure specifically that adult and old animals are compared. We investigated the morphological and morphometric aspects of the phrenic nerve in aging rats. Methods: Female Wistar rats 30, 90, 180 and 360 days old were killed, and proximal and distal segments of the right and left phrenic nerves were prepared for light microscopy and computerized morphometry. Results and Discussion: Morphometric differences between proximal and distal segments and between right and left sides at the same levels were found in 90 days old animals only, probably due to the most striking body weight growth observed from 30 to 90 days old animals. Postnatal growth continuously and symmetrically affected the phrenic nerves fascicles and myelinated fibers and body weight and morphometric parameters got stable at 180 days. No difference in total myelinated fiber number was observed between groups but myelinated fibers density dramatically decreased from 30 to 90 days and continued to decrease less pronouncedly on older ages. A tendency towards a decrease in the axon size was observed on the 360 days old animals, with an impact on the G ratio values. This is a morphometric suggestion of axonal atrophy in older animals. Conclusion: The phrenic nerve is long and constant in its morphology and presents a continuous and symmetrical growth, more pronounced between 30 and 90 days of age, thus providing a good model for experimental neuropathies.

VENOUS VALVES OF THE SUPERIOR MEDIAL GENICULAR VEIN

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Introduction: The superior medial genicular vessels are widely used for free vascularized corticoperiosteal flaps of the medial condyle in cases with scaphoid nonunions. Due to the small diameter of the artery and the therefor demanding surgical procedure, this study aimed at the possibility of retrograde perfusion of the graft. Material and Methods: The superior medial genicular vessels (artery and veins) were extracted from 18 formalin-fixed specimen of the anatomic institute. The samples were severed proximal at the level of the intermuscular septum and traced as far as possible towards the periosteum of the medial condyle of the femur. The veins were inspected macroscopically with help of a surgical microscope. Occurrence, distance and number of venous valves were documented. Results: The samples measured 5,1 ± 1,8 cm, each artery was accompanied by two veins in most cases (one vein in six specimen, three veins in one specimen, 31 veins in total). These veins had several intervenous connections. Of the 31 veins, 13 veins showed a venous valve, situated 1,6 ± 1,4 cm from the proximal end of the specimen. In 14 of the 18 superior medial genicular vessels existed at least one vein without any venous valve. Conclusion: Provided previous intraoperative examination of the veins, retrograde perfusion of the free vascularized cortico-periosteal flap of the medial condyle and therefor arteriovenous anastomosis seems possible.

EXPERIMENTAL HYPOTHYROIDISM INDUCES DECREASED EXPOSURE OF ADMAN AND ALFUC CARBOHYDRATE DETERMINANTS IN RAT ADRENAL GLAND

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Background**:** Thyroid disorders are currently among the most wide-spread endocrine pathologies, affecting about 3% of the world's population. Although thyroid gland actively interacts with other endocrine organs, including pituitary and adrenal glands, many intimate aspects of these feed-back influences remain obscure. In the relevant literature we found no data concerning hypothyroidism-induced remodelling of adrenal gland glycoconjugates. Therefore the aim of present investingation was to study influence of experimental hypothyroidism on exposure of glycoepitopes in rat adrenal glands by means of lectin histochemistry. Materials and Methods**:** Hypothyroidism was induced by daily diet supplementation of experimental animals with 5 mg/kg mercazolil (1-methyl-2-mercapto-imidazole) during 30 days. Formalin-fixed paraffin-embedded adrenals were labeled by lectin-peroxidase conjugates with subsequent visualization by diaminobenzidine-tetrahydrochloride. The lectin panel included four mannose-specific (GNA, PSA, LCA, Con A), and two fucose-specific (PFA, LABA) lectin preparations. Results: The most significant influences of hypothyroidism were detected in blood vessels. They included dilations of adrenal medulla vascular bed, perivascular oedema, increased LABA reactivity of vascular endothelium of both medulla and of all three cortical zones. Hypothyroidism induced decreased exposure of αDMan and αLFuc sugar determinants in parenchymal cells, this phenomenon apparently depending on incomplete glycosylation – i.e. impairments in the processing of oligomannosidic N-glycans and of fucose-containing glycopolymeres. It was also revealed the increased count of cortical cells with retention of secretory granules in cytoplasm, presumably due to hypothyroidism-induced imbalance of biosynthesis and accumulation of bioactive compounds in these cells. Conclusions**:** Hypo-thyroidism possess significant influence on adrenal gland glycoconjugates, inducing decreased exposure of αDMan and αLFuc carbohydrate determinants.

CLINICAL ANATOMY OF HEART AND THE MAIN VESSELS OF A MEDIASTINUM OF THE PERSON IN THE EARLY FETAL PERIOD OF HUMAN ONTOGENESIS

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Now the demand of a detailed information on fetalny topographical anatomy of an internal organs of the person at stages of pre-natal development, including his heart and the main vessels of a mediastinum raise. In this regard obtaining new data on topographical

anatomy of heart and the main vessels of a mediastinum of the person in the early fetal period of human ontogenesis became the purpose of the real research. Materials and methods: Material of research torsos of 100 fetus of the person of both sexes as term of development 16-22 weeks received as a result of interruption of pregnancy on social indications at healthy women served. In work the complex of morphological methods of research is used: macro-microscopic preparation, method of sections according to Pirogov and a gistotopographical method. On preparations the heart morphometry as a whole, its cameras, partitions, an aorta, a pulmonary trunk, the superior cava vein, an oval foramen and an arterial duct at a fetus, a quantitative assessment of all sections of their topography – skeleto-, holo- and sintopiya was carried out. Results of research. The obtained data testify that in the early fetal period of human ontogenesis hearts is already almost complete, but there is a formation of its topography. By the end of the studied period (22 weeks of the pre-natal period) change as position of all heart in a chest cavity and its separate cameras. Versions of the provision of heart are described. dimensional characteristics of auricles and ventricles of heart, interatrialar and interventricular septums are studied. Detailed morphometric data on a quantitative sintopiya of heart and its cameras, added with complex data on projective anatomy of each camera and a septum are obtained. Besides, anatomic parameters of ascending department of an aorta, its arch and chest department of a descending aorta, the superior cava vein, a pulmonary trunk are studied. Relationship of these vessels on "a cut through three vessels" is in details described. Conclusions. 1. The Fetal topographical anatomy of heart and the main vessels of a mediastinum of a fetus considerably differs from morphology of the newborn child. 2. Heart and the main vessels of a mediastinum have the expressed age and individual distinctions in skeleto-, sin- and holotopiya. 3. At this stage of ontogenesis the organogenesis of hearts it is almost complete, but formation of its topography proceeds.

BRAIN SECTIONAL ANATOMY TEACHING USING SLAUGHTERED COW'S BRAIN TO RESIDENTS OF RADIOLOGY, NEUROLOGY AND NEUROSURGERY

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Objectives: One of the main problems in teaching sectional brain anatomy to students is lack of human brain to dissect and also its ethical problems are very remarkable. Due to lots of similarities between human and cow's brain, this study was designed in order to evaluate the efficacy of teaching sectional anatomy using animal models. Methods and materials: Residents were divided into two groups; in first group students provided slaughtered cow's brains. Cow's brains were sliced using a slicer and then all parts of brain including white and gray matter, brain ventricular system and also brain nuclei were taught to students. In the second group residents were taught of sectional anatomy of brain using traditional method by teaching on schematical images on power point slides. At the end an exam was given in order to evaluate students. Results: Results showed that grades were higher in first group than the second. And all residents stated that this method was very effective and help them to have 3D imaging of brain. Conclusion: This study showed that using animal models to teach anatomy is very effective and can be used to teach anatomy. Also in this new method of teaching anatomy the problems of lacking human brains and also its ethical problems are all solved.

ASSISTING OF APOPTOTIC GENES EXPRESSION HIPPOCAMPUS IN ADULT RAT (BCL-2, BAX, CASPAS3, P53) FOLLOW THE TRANSIENT ISCHEMIA

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Objective: To recognize genes that are involved in ischemia response of the brain, we have evaluated changes of gene expression in rat hippocampus after 15, 30 min global ischemia, followed by reperfusion for 24h and 72 h. Material and Method: Transient global cerebral ischemia was induced in Wistar adult male rats for 15 min by bilateral occlusion of the carotid artery, followed by reperfusion for 24 h and 72h (four animals per group). Four sham operated animals that had been treated under the same conditions served as controls. The transcription and expression of Bcl-2 family genes were detected by reverse transcription–polymerase chain reaction. Result: Irrespective of the etiology of Cerebral ischemia, cellular and molecular processes trigger a cascade of events that terminate in a ''final common pathway,'' resulting in ischemic neuronal injury. A detectable neuronal loss was induced in brain by 15, 30 minutes of bilateral common carotid artery occlusion. Transcription and expression of Bcl-2 and Bax were improved after global ischemia, which increased the RNA fragmentation induced by transient ischemia. and also expression of P53 is increased and caspase-3 expression just changed in one group and needs to evaluated with other techniques. Conclusion: the findings demonstrate that global cerebral ischemia activates apoptotic genes, and these genes play role in regulating cell death in CA1 region of hippocampus.

A TWO-HEADED (BICEPS) SARTORIUS MUSCLE IN A MALE CADAVER

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This presentation aims at presenting a detailed description of a two-headed sartorius muscle. The variation was observed on the left femur of a male body donator after removing the fascia lata for exposing the femoral triangle. Once the variation was recognized, the specimen was secured and carefully dissected. Important features were photographed with

a digital camera. The sartorius muscle had two heads. One head originated from the anterior superior iliac spine. The second head (thickness: 0.5cm) originated with a laminar tendon from the pectineal fascia, the iliopectineal arch, and the lacunar ligament. This head passed the medial circumflex femoral vessels superficially. For 6cm it continued with the femoral artery and vein on its lateral side. Then the femoral artery overcrossed the muscle head to reach its medial side, turned in a screw like manner and undercrossed the muscle head to again reach its lateral side approximately 14cm proximal to the begin of the adductor canal. On its further way, the muscle head overcrossed the membrana vastoadductoria still separated from the second head. Finally it joined the other head 13cm proximal to its junction with the gracilis and semitendinosus muscles. Screening of the literature did not reveal any other case of a two-headed sartorius muscle that forced the femoral artery to take a screwed course around its accessoric head. We speculate that the topographic relation between the artery and the muscle head we observed in our specimen might have been responsible for serious hemodynamic disturbances in the femoral artery.

HISTORICAL OVERVIEW OF PARANASAL SINUSES' ANATOMY

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The paranasal sinuses, and especially the maxillary sinus, have a long history in the field of anatomy. Between 3700 and 1550 B.C., ancient Egyptians were familiar with the structure of the maxilla. Astonishing is also the fact that in order to mummify human corpses they used instruments to remove the brain through the ethmoid sinuses. Later, ancient Greek physicians, including Galen, identified the paranasal sinuses as a system of cavities draining the mucus produced by the brain. In the Middle Ages, the paranasal sinuses were thought to serve even more peculiar functions. Specifically, they were either thought to contain some kind of "grease" which facilitated the movements of the eyeballs, or to "drain from the brain its bad spirits" and provide them with a vent to the outer world. The first accurate anatomical description of the paranasal sinuses along with elaborate drawings, belongs to Leonardo Da Vinci (1452-1519). Leonardo pointed out the projection of the teeth into the maxillary sinus' floor and assumed that this sinus contained a humour which nourished the roots of the teeth. Soon after, Andreas Vesalius gave only a cursory description of the maxillary sinus in his "De Humani Corporis Fabrica" (1543), identifying its location and its contribution to the formation of the voice. Next stop was Nathaniel Highmore (1613-1685), who for years was mistakenly believed to be the first to describe the maxillary sinus, still known as "Highmore's antrum". In his work, "Corporis Humani Disquisito Anatomica", Highmore described thoroughly the maxillary sinus and its relation with the dentition of the maxilla. After Highmore, in 1660, Schneider was the first to realize that the mucus in the paranasal sinuses was not a product of the brain but of the paranasal structures themselves. Until today, the anatomy of the paranasal sinuses and their surgery have been a subject of research for many investigators, like Drake and Cowper, Jourdain, Lamorier, Mikulicz-Radecki, Zuckerkandl, Messerklinger, Mosher and Proetz.

ANTHROPOLOGICAL, HISTOLOGICAL AND IMMUNOHISTOCHEMICAL STUDY OF CASTELSARDO'S MUMMIES

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Background: In 2011, during the restoration of Sant'Antonio Abate Cathedral in Castelsardo (Sassari, Italy), in a crypt numerous human remains were found, including some mummified bodies dating from the eighteenth to nineteenth century. Our work is an anthropological and morphological study focused on analysis of mummified human rest. Our aim is to obtain sex, death-age, height and paleopathologies analysis and to verify muscular and cutaneous tissues conservation status using histological and immuno-histochemical methods. Materials and methods**:** Six partially mummified corpses have been identified; among of these, the last two of the burial and the best preserved mummies have been studied. In order to establish sex we worked following Ferembach's lines (Ferembach et al, 1980). The estimation of death-age was essentially based on diaphysis'size (Uberlaker, 1989), on the cranial sutures obliteration (Meindl and Lovejoy, 1985). Stature in adult life has been measured directly on the mummified body. Tissue sections were subjected to usual histological and immunohistochemical procedures. Results: Mummies conditions were generally fair, although very variable in different points of the body. The Mummy 1 is male, with death-age between 45-55 years. His height is about 171 cm. An anatomical peculiarity detectable on the skull, both under visual inspection and on radiographs, is the presence of wormian bones. The Mummy 2 is female, with death-age between 60-67 years. Her height is about 157 cm. She shows reduction of some intersomatic spaces, high grade of spondyloarthropathy, with widespread marginal osteo-phytosis and "Italic S" scoliosis with right convexity of thoracic spine and left convexity of cervical spine. The muscular and cutaneous tissues show a good conservation, in particular the first presents a fibrillar structure well-preserved, boundaries free between cells. Discussion: This study allowed us to obtain paleoanatomy and microanatomy informations and to describe the morphological characteristics of skin and muscle mummified.

STUDY OF SKIN TEXTURE IN CENTENARIES WITH A NEW 3D TECHNIQUE

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Background: The skin surface non-invasive study in aged skin is going to be important in dermatology, especially to research staging paremeters of the aging skin level. In literature, many profilometer analysis cutaneous techniques are described but none author studied skin in subjects of fifth-age. The aim of our work is to compare centenarian subjects skin with young subjects to understand aging process and to demonstrate the efficiency of a new 3D technique that allows to choose area and range to study. Materials and methods: For our work were recruited 80 volunteers, all from Sardinia, men and women, divided into 2 groups: one of 40 subjects, between 14 and 30 years old and another one of 40 subjects, between 90 and 110 years old. To each of them has been taken a silicone replica, then observed at SEM Fei Quanta 200; images obtained were elaborated by a software, MeX® Alicona. Results: In the centenarian subjects, differences of the profilometric parameters compared with young subjects, result statistically significant: it is possible to discriminate differences between age and area, as well as differences between chronologically aged skin and photo aged skin. Comparing skin between genders of the centenarians, the increasing of several values in given body area is due at the expense of the female gender, whereas in other area parameters change more in male subjects. Discussion: Results confirm that in centenarian subjects skin texture is more altered, as literature records about old subjects demonstrate, for ormonal phenomenons and for activities done during the lifetime by the subjects; some of them, they've done jobs that caused a more photo-exposed skin and that contributes to create differences between fifth-age subjects of different gender. We can affirm aging it's a process that modifies skin and that MeX® Alicona can be used to understand this process.

CLINICAL REMARKS AND META-ANALYSIS TO THE ARTERIAL SUPPLY OF THE THUMB

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Background: The thumb reconstruction belongs to the leading topics of plastic surgery. Nowadays, it is generally accepted to perform the microsurgical tissue transfers. The necessary condition of these microsurgical thumb reconstructions is detailed knowledge of vessel anatomy. The term *arteria princeps pollicis* is firmly anchored in both anatomical and surgical literature concerning short and thick artery, terminal branch from *arteria radialis*, supplying the majority of the thumb tissues. But when viewed in detail, there is no proper definition of this artery. Material and methods: The systematic vessels description of the thumb itself and their sources in the first interdigital space was performed. The consistent recherché of classical as well as modern literature sources of specific data meta-analysis was done. The available results synthesis of both old and new works in order to provide new accurate description of systematic thumb vessels anatomy and its variations was made. Thorough meta-analysis of classical and recent anatomical and clinical works was performed. Results: Particular overview of all arteries supplying the thumb comprises the deep, superficial and dorsal systems. The thumb is supplied by four major arteries – the two of them are located on palmar side of thumb, the two others are located on dorsal side. Whereas palmar arteries are strong and they occur practically constantly, dorsal arteries are thinner and they are often absent. The most constant are the *arteria palmaris ulnaris pollicis* and *arteria palmaris radialis pollicis* (more than 99% of cases). Conclusion: There are three systems contributing to thumb vessels riverbed – superficial, deep and dorsal. These systems form anastomoses. Every single system can be dominant. The results of the overview indicate the redundancy of the term *arteria princeps pollicis,* usually assigned to the largest artery supplying the thumb but not specifying which exact vessels is meant.

JULIUS TANDLER - A MID-EUROPEN

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Julius Tandler (1869-1936) is well known as politician – one of the frontmen of social democracy in the interwar period in Austria and one of the leaders of Red Vienna. He was born in Jihlava (Iglau), now Czech Republic, in a Jewish family and was a real visionary in the issues of the public health service. Some of his reforms lapped time and were decades ahead. However, it is not well-known that his former occupation was developmental and clinical anatomy and in years 1914-1917 he was dean of the medical faculty in Vienna. Next to his worldwide known acts in the public health, his anatomical works concerning development and clinical anatomy of the hand arteries can easily disappear in the dust. His „Zur Anatomie der Arterien der Hand“ (On Anatomy of Hand) was the first detailed and comprehensive study mapping the variability of the arterial supply of the hand. The formal quality and precise descriptions enable to use this work as a recent material during surgical procedures oh the hand. This contribution informs on Tandler as a man, anatomist with the emphasize of his clinic-anatomical work of the hand vascular anatomy, summarizes his public health service reforms in Red Vienna and methods of fight against infectious diseases which bothered the Austrian capital at his times. Further, it brings his controversial opinions about euthanasia, eugenics and race purity, his

emigration from Vienna, death in hard times and rehabilitation after fall of fascism.

MORPHOMETRIC ANALYSIS OF PALATAL RUGAE AMONG JORDANIANS: FURTHER EVIDENCE OF PALATAL RUGAE INDIVIDUALITY

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Background: Palatal rugae are ridges situated in the anterior part of the hard palate. These ridges are distributed on both sides of the median palatal raphe behind the incisive papilla. This study investigated the morphology and individuality of palatal rugae patterns in a sample of Jordanians. Materials and methods: The assessment of palatal rugae was carried out on 327 dental casts. The palatal rugae within each cast were outlined using a pencil and then classified according to their length, shape and orientation. The test of individuality was performed on a subset of 50 casts that were selected randomly from the study sample. Results: Statistical analyses revealed that the only rugae type that was significantly different between males and females was the anterior rugae type ($P<0.05$). The predominant types of palatal rugae were the primary ($P<0.05$), the anterior ($P<0.05$), and the wavy ($P<0.05$). Moreover, none of the compared palatal rugae patterns were identical. Conclusions: The study provided reference data regarding the morphological patterns of palatal rugae among Jordanians. It also provided an evidence of the individuality of palatal rugae which may facilitate their use as an alternative fingerprint.

MENISCOFIBULAR LIGAMENT: MACROSCOPIC AND MICROSCOPIC MORPHOLOGY AND FUNCTIONAL SIGNIFICANCE.

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Background: The meniscofibular ligament (MFL) is a relatively unknown ligamentous structure of the posterolateral corner of the knee joint. In the present study, the macroscopic morphology, functional anatomy and histological features of the meniscofibular ligament were investigated. Materials and Method: The MFL was exposed on 27 fresh-frozen unpaired knee joints. The microscopic morphology of the MFL was examined utilizing for comparison the fibular collateral and the popliteofibular ligament. Results: The MFL was encountered in 100% of the specimens as a thin strip-like fibrous band that was extended between the lower border of the lateral meniscus and the fibular head. The MFL became tight during knee extension and external rotation of the tibia. The histological features were similar to those of fibular collateral and popliteofibular ligament. Conclusions: The presence of the MFL was constant. According to the histological examination the MFL represents a true ligament. Analysis of the functional anatomy of the MFL revealed that it presumably provides an additional protection to the lateral meniscus during the last stages of knee extension, as well as to the lateral coronary ligament reducing the possibility of a potential rupture.

AN ANATOMICAL STUDY OF THE OSSIFIED SPHENOID LIGAMENTS NEAR THE FORAMEN OVALE: THEIR CLINICAL RELEVANCE

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Background: The ossified ligaments (pterygospinous and pterygoalar) in the extracranial region of the foramen ovale are bony formations located at the lateral lamina of the pterygoid process of the sphenoid bone. The aim of this study was to investigate the incidence and morphology of the pterygospinous and pterygoalar bony bridges, the foramina resulting and their variations among Greeks and compare the findings with those available for others populations, underlying their clinical relevance. Materials and methods: In the present study, 71 Greek adult dry skulls (41 males and 30 females) investigated for the presence of pterygospinous and pterygoalar bony bridges. Results: Completely and incompletely ossified pterygospinous ligaments were found in 2.8% on the right, 4.2% on the left and in 8.4% on the right and in 7% on the left sides, respectively. Also completely and incompletely ossified pterygoalar ligaments were found in 2.8% on the right, 1.4% on the left, in 29.6% on the right and in 31% on the left sides, respectively. The pterygoalar and pterygospinous ligaments were completely ossified only in male skulls. Particularly, a completely ossified pterygospinous bar found in only one male skull, bilaterally. Conclusion: The knowledge of the detailed anatomy of these structures may increase the success of diagnostic evaluation and approaches to the region. The types of these osseous variations can cause mandibular neuralgia, impede anesthesia of the trigeminal ganglion, or cause entrapment of the lingual nerve and compression of the deep temporal, lateral pterygoid and buccal nerves, resulting in variant symptoms.

OSSIFIED BONY BRIDGES OF THE MIDDLE CRANIAL FOSSA IN GREEK SKULLS: THEIR CLINICAL RELEVANCE

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Background Along with the pterygospinous and pterygoalar ligaments, the caroticoclinoid and

interclinoid ligaments comprise a group of intrinsic ligaments of the sphenoid bone that occasionally ossified partially or completely. The aim of the study is to investigate the incidence of the sphenoid bony bridges, intracranially, their variations among Greeks and compare the results with those available for other populations. Materials and Methods One hundred and fifty four (154) Greek adult dry skulls of unknown sex (308 sides) aged between 18 and 90 years were investigated for the occurrence of the caroticoclinoid and interclinoid bony bridges. The study was conducted in the Departments of Anatomy of Aristotle University of Thessaloniki and National and Kapodistrian University of Athens. The number of ossified ligaments and their side were observed. Results The complete caroticoclinoid bony bridge was observed in 8.4%- 13 skulls (in 9 skulls bilaterally, 2 on the right and 3 on the left) and incomplete in 1.3%- 2 skulls (in a skull bilaterally and in a skull on the right). The complete interclinoid bony bridge was present in 1.9%- 3 skulls (in two skulls bilaterally and in a single skull on the left) and incomplete in 0.6%- 1 skull bilaterally. Complete ossified caroticoclinoid and interclinoid bridges were detected in two skulls bilaterally (1.3%). Conclusion The ossified ligaments of the skull are of great importance, when they tend to obstruct the surgical approach and when they appear on radiographs, they must be differentiated from some pathological processes. In addition, they may cause compression of the anatomic structures related to them, producing symptoms. The complex anatomy surrounding the clinoid processes is important for the neurosurgical approach to the cavernous sinus. The knowledge of the variable anatomy of these ossified structures can increase the success of diagnostic evaluation and approaches to the region.

SUPRACLAVICULAR NERVE PERFORATING THE CLAVICLE: ANATOMICAL STUDY IN 71 CADAVERS.

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Background. A branch of the supraclavicular nerves may course through an osseous tunnel of the clavicle in about 1-6% of the population, according to literature reports. In the current study the presence of this variation and its clinical significance was investigated. Materials and Methods. Anatomical dissection of the supraclavicular and subclavicular region was performed in 71 formalin-embalmed cadaveric specimens (142 hemi-regions, 37 male, 34 female). The clinical significance of this variation was recorded after a detailed literature review. Results. Two cases (2.8%) of a supraclavicular nerve coursing through an osseous tunnel of the clavicle were documented. In the first case, of a male 70 year-old cadaver, the left intermediate supraclavicular nerve perforated the middle third of the left clavicle. After leaving the osseous tunnel it was divided into two branches that supplied the subcutaneous tissue of the subclavicular region. In the second case, of a 67 year-old male cadaver, the left medial supraclavicular nerve perforated the middle third of the left clavicle, and divided thereafter into three branches for the subclavicular region. Conclusions. A supraclavicular nerve may perforate the clavicle in 2.8% of the Greek population. Although it is usually asymptomatic, knowledge of this variation is important for orthopaedic surgeons because it should be differentiated from a clavicular fracture in the x-ray. Moreover, a clavicular fracture or during the fracture's reduction or internal fixation may cause injury or transection of the nerve, accompanied by pain in the neck, clavicle, thorax and shoulder region and by sensory disorders in the subclavicular region. It is also important both for thoracic surgeons and the general practioners, because traction or overuse neuropathy may occur causing pain in the neck and shoulder region.

ECTOPIC ORIGIN OF A BRONCHIAL ARTERY: CASE REPORT AND CLINICAL SIGNIFICANCE

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Background: Anatomical variations of the bronchial arteries are not rare. Both the origin and amount of branches may be affected. Normally, they arise directly from the descending thoracic aorta, at the level between the fourth and sixth thoracic vertebrae. Ectopic bronchial arteries may originate from the aortic arch, abdominal aorta, coronary arteries, subclavian or internal mammary arteries, or the thyrocervical trunk. In the present study, we describe a cadaveric finding of a rare type of ectopic right bronchial artery along with its clinical significance. Materials and Methods: The neck region and the thoracic cavity of a 72-year-old formalin-embalmed male cadaver were dissected for researching and tutorial purposes. A review of literature relative to ectopic bronchial arteries was performed. Results: An ectopic right bronchial artery originating from the right subclavian artery through a common stem with the right internal mammary artery was revealed. It followed a route behind the vagus nerve at its upper half, passing in front of it and in front of the right main bronchus at its lower half, till the lower edge of the right main bronchus. There, it formed an almost right angle turning to the right, continuously following the lower edge of the right main bronchus, before dividing into two branches for the right superior and right inferior lobar bronchi respectively. Discussion: Ectopic origin of a bronchial artery from the internal mammary artery and/or the subclavian artery appears in 0.2-0.7% according to the literature. Recognition of this anatomical variation is important in bronchial embolisation due to haemoptysis, in coronary bypass grafting, and in lung transplantation.

THE HUMAN BASAL FOREBRAIN IN PSYCHOSURGERY - ANATOMICAL AND IMAGING STUDY

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Background: The Nucleus Accumbens (Acc) is a major basal forebrain structure, still poorly identified in the human brain. Due to its connections with the limbic system the Acc has been implicated in neuro-psychiatric disorders such as Obsessive-Compulsive Disorder and addiction. It has become a target for deep brain stimulation for some of these disorders, when refractory, however it is controversial which target is the best and similar results have been achieved with stimulation of neighboring structures, such as the Bed Nucleus of Stria Terminalis (BNST). Previous studies performed by our group have established the stereotactic anatomy of the human Acc, but there were some difficulties concerning it´s posterior sub-commissural limit. It is now our purpose to clarify the anatomy and MR imaging of this region, giving the importance of the exact identification of the targets in psychosurgery. Material and Methods: Ten Acc from 5 human brains were collected by autopsy, fixed, dissected, embedded and cut in coronal 5µm slices, every 0,5mm, until 1cm caudal to the AC. The slices were stained with haematoxylin-eosin, marked with anti-D1/anti-D2 antibodies and analyzed in a microscope. The imaging characteristics of this area were analyzed in a 3TMRI, using conventional sequences and Diffusion-Tensor-Imaging (DTI), in 5 patients. Results: The sub-commissural area is histologically indistinct from the Acc, with the Nucleus Basalis of Meynert in ventro-lateral position, the anterior hypothalamic nuclei ventro-medially and the BNST merging above. The human Acc has the same cellular structure as the dorsal striatum, except in its posterior sub-commissural part where voluminous neurons prevail, similar and contiguous with the BNST. All these structures are better defined in MRI T1 Inversion Recovery sequence, in the coronal plane. DTI color coded maps are useful in the definition of the nuclei. Conclusions: The Acc is longer than previously described, with a sub-commissural extension, behind the AC, continuous with the BNST. These structures are easily defined in conventional and DTI MRI.

THORACICOABDOMINAL DISSECTION SIMULATOR. 4D ANATOMY RECONSTRUCTION

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Background: Interactive multidimensional photo reconstruction is a revolutionary technique and powerful tool to simulate anatomic dissections in a virtual environment. Users are able to rotate tilt and dissect specimens on the computer screen. Its imagery as opposed to animations or illustrations is based on photography. A thoracoabdominal specimen has been dissected and reconstructed using a novel technique to create a state of the art education tool. Methods: A human thoraco-abdominal specimen have been obtained and fixed in 5% formaldehyde for 2 months. NeurorArc spatial scanner (4D Anatomy Inc., Phoenix, USA) has been used to capture images of dissection in spherical mode throughout stages of meticulous anatomic dissection. All images have been reconstructed intoa single multidimensional interactive moduleusing 4D Anatomy Editor Software (4D Anatomy Inc., Phoenix, USA). Results: We have dissected the chest and abdominal region of in 8successivestages. All stages have been scanned (1000-1500 photos/layer) and reconstructed into an interactive multidimensional simulation module. The Thoracoabdominal Simulator offers freedom of image navigation and manipulation in the thoracic and abdominal region. Muscular layers neurovascular elements and organs of the region under review can be studied virtually manipulated. Stages of dissections can be reviewed at viewers' discretion and own timeframe. Discussion: 4D Anatomy reconstruction of the Thoracoabdominal region is a powerful simulation tool to teach and study intricate details of anatomy. The closest to reality virtual environment created by the technology brings the vivid experience of lab dissections onto the computer screen.

DUAL INNERVATION OF THE TRAPEZIUS MUSCLE BY THE SPINAL ACCESSORY NERVE AND THE CERVICAL PLEXUS: A CASE REPORT

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Background: The spinal accessory nerve (SAN) is the 11th cranial nerve and consists of a cranial and a spinal root. Both sternocleidomastoid and trapezius muscles receive motor supply from the SAN, although the innervation of the trapezius is quite controversial. Case Presentation: During a routine dissection of a female cadaver for educational purposes, variability in the anatomy of SAN was observed over the right posterior triangle. In the presented case, two nerve branches were encountered exiting the posterior border of the sternocleidomastoid muscle and entering the trapezius. Both branches presented similar course and distribution to the SAN, although the antero-inferior one was thicker and longer and eventually found to consist of C3 root fibers. Discussion: It is well-documented in the literature that SAN may present various anastomoses and receive branches from the cervical plexus, while the existence of supernumerary large-sized branches involved in the trapezius nerve supply has been uncommonly described. In case that additional cervical nerve branches contribute to the muscle innervation, it is essential for head and neck

surgeons to act more carefully, as the operation field is limited. Surgical preservation of the one branch identified as SAN could lead to iatrogenic injury of the other nerve branch, jeopardizing muscle palsy and postoperative pain. Conclusions: Surgeons of the neck area, particularly while performing modified radical and selective neck dissections, should acknowledge the contribution of the cervical plexus in trapezius motor supply and be aware of the anatomical variability of the region, in order to avoid postsurgical complications.

DISTRIBUTION OF VAGAL AND SYMPATHETIC EFFERENT NERVE FIBERS WITHIN EPICARDIAC NERVES AT HUMAN HEART HILUM

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Background: Any disbalance between sympathetic and parasympathetic inputs may facilitate cardiac arrhythmias, including the lethal ones. Although morphology of human epicardiac ganglionated nerve subplexuses (ENsubP) was previously identified in detail, distribution of functionally distinct axons within epicardiac nerves is not examined to date. The study aim, therefore, was to assess quantitatively the distribution of adrenergic and cholinergic axons within human epicardiac nerves at the level of heart hilum where these nerves are regularly injured during treatment of atrial fibrillation by radiofrequency catheter ablations or cardiac transplantations. Material and Methods: Tissue samples with epicardiac nerves were obtained from eight human hearts and examined employing fluorescent immunohistochemistry for tyrosine hydroxylase (TH) and choline acetyl-transferase (ChAT). Results: ChAT-immunoreactive (IR) fibers were evidently predominant in nerves of dorsal (DRA) and ventral right atrial ENsubP. Within left dorsal and both coronary (LC, RC) ENsubP, TH-IR fibers were the most plentiful. Typically, ChAT-IR fibers did prevail in comparatively thinner nerves. At the level of heart hilum, LC subplexal nerves were found to be the thickest ones, whereas the thinnest nerves concentrated in DRA subplexus. Density of ChAT-IR axons was the highest in nerves of DRA subplexus (6.5±0.2/100μm^2), while TH-IR axons displayed the highest density within RC nerves (20.8±3.2/100μm^2). Conclusions: (1) The principal intrinsic sympathetic neural pathways in the human heart proceed via LD and both coronary ENsubP that supply mostly cardiac ventricles; (2) majority of cholinergic nerve fibers access the human heart through DRA and VRA ENsubP, which nerves extend toward the right atrium, including the region of sinuatrial node.

ANATOMY OF EPICARDIAC NERVE PLEXUS: IMPLICATIONS FOR CARDIAC ELECTROPHYSIOLOGY AND SURGERY

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Background: As intrinsic prolongation of mediastinal vagal and sympathetic nerves, epicardiac nerve plexus (ENP) extends from heart hilum to heart apex. ENP forms the complex ganglionated neural networks within epicardium, cardiac conduction system, endocardium, atrial and ventricular myocardium. Despite its pivotal functional significance, anatomy of ENP remains not enough determined so far. The aim of this presentation is to review the distribution and regional anatomy of the ENP exposing its structural and histochemical diversity. Material and Methods: Intrinsic cardiac neural structures of human and different mammalian species were revealed employing histochemical and immuno-fluorescent methods for acetylcholinesterase and diverse neuropeptides. Results: Mediastinal vagal and sympathetic nerves enter the heart throughout the venous and arterial parts of heart hilum in specific locations only and extend epicardially by 5-7 pathways named by us as subplexuses. These epicardiac nerve subplexuses (ENsubP) spread to different heart regions by its specific pathways and contain intrinsic ganglia with cholinergic, adrenergic ir biphenotypic neurons in restricted cardiac locations. In human and other mammalians, some ENsubP are numerously ganglionated, while another one may be exclusively comprised of sympathetic and/or parasympathetic nerves. Cardiac conductive system and coronary vessels are supplied by distinct ENsubP. In conclusion, the right atrium of human and other mammalians is typically innervated by 2 ENsubP, while the left atrium and both ventricles - by 2 or 3 ENsubP. The comparative analysis of ENsubP demonstrates the distinguished species-dependent topography of ENsubP. Structural organization of ENsubP varies from heart to heart, is age-dependent and deserves further anatomical investigations.

ANATOMICAL VARIATIONS OF THE CARDIAC VENOUS VALVES IN HUMAN HEART

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Introduction: Cardiac veins are provided with ostial and parietal valves and antivalves. Material and methods: These investigations we made on preparations of 200 human hearts from cadavers of adults of both sexes. The hearts showed no macroscopic pathological changes and there was no history of any cardiac disease. Classic anatomical techniques of macro-dissection of fresh and formalin-fixed specimens and microdissection of cardiac tissue hardened in paraffin, were performed.The histological preparations were sliced longitudinally and stained with hematoxylin-eosin for microscopic examination. Results: The valves and antivalves of cardiac veins are determined as ostial and parietal. Ostial valves /OV/ were present at the ostium of the great cardiac vein as it entered the coronary sinus /CS/ (93%), at the ostia of the left marginal vein (9%), the CS (82%), the middle cardiac vein /MCV/ (76%), the posterior veins of the left ventricle /PVLV/ (67%), the left atrial veins (20%), the oblique vein of the left atrium (9%), the small cardiac vein (5%). Parietal valves /PV/ (16%) were present in the PVLV (9%) in the CS (4%), in the MCV(3%). Ostial

antivalves /OAV/ (8%) were present at the ostia of the MCV(6%), the PVLV(2%). Parietal antivalves /PAV/ were also present (1%). The Thebesian valve sometimes arises from the Eustachian valve (20%) and it is sometimes, by its position the OAV for the MCV (14%) it is sometimes common with the OV(4%) or the OAV(4%) of the MCV. In two cases there was a compound valve, consisting of interconnected Eustachian, Thebesian and the OV of the MCV. The Eustachian and Thebesian valves, the OV of the MCV, the valve of Vieussens and PV or PAV in certain cases contain muscular fibres. Conclusions: Numerous variations of ostial valves and ostial antivalves of cardiac veins, the existence of parietal, accessory valves and antivalves and their muscular structure indicate their active haemodynamic role.

EFFECT OF SOCIO-ECONOMICAL STATUS ON STATURE ESTIMATION FORM HAND DIMENSIONS

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Accurate determination of the biological profile of an individual is without doubt of importance for forensic investigators especially in mass disasters in which great amount of people had been killed. Stature is one of the main four criteria that are required for a reliable identification besides sex, age and ethnicity. Though the most accurate estimates on stature are calculated by using the formulae based on the measurements from the long bones of the limbs many other different parts of the skeleton or body may also provide an alternative. It is generally accepted that formulae calculated for stature estimation should be population specific. However body proportions of the individuals could be affected by several environmental factors even in the same population. In the present study effects of socio-economical status on stature estimation had been evaluated. 238 female, 133 male, a total of 371 students were included in to the study. The mean age was 19.74 ± 2.02 for female and 20.65 ± 2.41 for male subjects. Eight measurements were taken on each hand besides the stature measurement. Stature prediction accuracy using hand length was 0.353 for the right hand and 0.343 for the left hand in female subjects and 0.328 for the right and 0.348 for the left hands for males. The ratio of hand length to stature was evaluated related with socio-economical status (SES) for both hands and significant differences were observed between SES groups ($p<0.001$). Different regression equations for different SES groups were devised and their reliability was evaluated.

ANATOMICAL DIFFERENCES IN THE SHAPE OF THE MALE AND FEMALE CARPAL TUNNEL

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Background: Women have a higher incidence of Carpal Tunnel Syndrome than men and understanding anatomic factors that may predispose women to developing Carpal Tunnel Syndrome may be informative clinically. Using ultrasound others have shown that the ratio of the depth to the width of the carpal tunnel is higher in patients with Carpal Tunnel Syndrome than in controls. Materials and Methods: In this study the investigators examined digital photographs of transverse sections made through the carpal tunnels from 8 female and 9 male cadavers, and measured cross sectional area, width and depth of the carpal tunnels. Results: No significant differences were found between the age, weight, body mass index or radius-derived stature of the female and male cadavers, but the male cadavers were significantly taller ($p < 0.05$) than the females. The cross sectional area of the female carpal tunnels (1.34 ± 0.16 cm^2) was significantly less ($p < 0.01$) than the area of the male carpal tunnels (1.64 ± 0.20 cm^2). The depth of the carpal tunnel was not significantly different between the sexes, but the average width of the female carpal tunnel (2.04 ± 0.14 cm) was significantly shorter ($p < 0.01$) than the average width of the male carpal tunnel (2.35 ± 0.15 cm). Conclusions: The depth to width ratio of the carpal tunnel was significantly greater ($p < 0.05$) in the females (0.50 ± 0.07) than in the males (0.43 ± 0.07). Thus, the "squarer" carpal tunnels of females may contribute to the higher incidence of Carpal Tunnel Syndrome in women.

AN ANATOMICAL STUDY OF WORMIAN BONES IN A GREEK MODERN POPULATION

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Background: Wormian bones are accessory bones of variable shape and size which occur from independent ossification centers within the cranial sutures and fontanelles. These bones' formation is under the control of genetic background, epigenetic traits and environmental stressor factors. The aim of the study is to investigate the incidence and topographical distribution of wormian bones according to side and gender in a Greek modern population. Materials and methods: 80 adult dry skulls of Greek origin (40 males and 40 females) from the bony collection of our institutions were examined. Results: Wormian bones were observed in 67 skulls (83.75%), in 36 male (90%) and 31 female skulls (77.5%). The remaining 13 skulls (16.25%) did not present any sutural bone. Supernumerary ossicles were observed at the lambdoid suture in 50% (40 skulls), at the coronal

suture in 41.25% (33 skulls), at the parietomastoid suture in 26.25% (21 skulls; 9- bilaterally; 5- right and 7- left side), at the asterion in 20% (16 skulls; 4- bilaterally; 4- right and 8- left side), at the squamosal suture in 15% (12 skulls; 2- bilaterally; 6- right and 5- left side), at the sagittal suture in 11.25% (9 skulls), at the pterion in 10% (8 skulls; 6- right and 2- left side) and at the occipitomastoid suture in 8.75% (7 skulls; 2- bilaterally; 4-right and 1- left side). Also, wormian bones were found in unusual sites, such as the anterior and posterior fontanelles, the frontonasal suture, and the sutures into the orbit, the frontal and sphenoid bones. Conclusion: The remarkable high incidence of wormian bones and their uncommonly location, compared to other reports, probably indicates racial variations. The meticulous knowledge regarding the location, incidence, number and sexual dimorphism of wormian bones may be useful to neuroanatomists, neurosurgeons, orthopedic surgeons, pediatricians, anthropologists and radiologists.

EMISSARY FORAMINA OF THE SKULL: AN ANATOMICAL STUDY OF THEIR INCIDENCE MORPHOLOGY AND CLINICAL IMPORTANCE IN A GREEK POPULATION

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Background: Emissary foramina of the skull represent pathways for emissary veins that connect the venous sinuses of the skull with extracranial venous systems. The aim of this study is to describe the incidence and morphology of the emissary foramina of the skull in a Greek population, underlying their clinical importance. Materials and methods: In the present study, 80 adult dry skulls of both sexes were examined for the existence of mastoid, occipital, parietal and Vesalius' foramina. Results: Mastoid foramina were present in 97.5% of the skulls (11.3% unilaterally and 86.3% bilaterally). A single mastoid foramen was observed in 28.8% of the skulls, double in 33.1% and multiple (three, four and five) mastoid foramina in 28.8%. Posterior condylar foramina were present in 81.3% of the skulls (25% unilaterally and 56.3% bilaterally), 7.3% of which were double. The parietal foramina were present in 57.5% of the skulls (25% unilaterally, 28.8% bilaterally, 2.5% on the sagittal suture and in a single skull, one foramen at each side and one on the sagittal suture). The Vesalius foramen was observed in 36.25% of the skulls (13.8 unilaterally and 22.5% bilaterally). Only one Vesalius foramen was double. Conclusion: The clinical importance of the emissary foramina lies in the fact that they carry the emissary veins which, being valveless, possibly represent a route for the spread of infections. In addition, knowledge of the incidence and morphology of these foramina will be of great use to neurosurgeons in avoiding excessive bleeding and air embolism intraoperatively.

INCIDENCE OF THE METOPIC SUTURE IN ADULT GREEK POPULATION OF THE 20TH CENTURY

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Background: The metopic suture is a vertical suture, occurring as a result of failure of ossification between the two halves of frontal bone. The persistence of complete metopic suture until an advanced age is named metopism and can be related to abnormal growth of the cranial bones, mechanical causes, hormonal dysfunction and genetic factors. The aim of this study is to investigate the incidence and morphological variations of the metopic sutures in relation to gender. Materials and methods: 80 Greek adult dry skulls (40 males and 40 females) from the bony collection of our institutions were examined. Results: The complete metopic suture was observed in 12.5% of the skulls (10/80), in 12.5% of males and females (5/40, respectively). The incomplete suture was found in 68.8% (55/80), with higher frequency in males, 72.5% (29/40) and in 62.5% of females (25/40). The incomplete suture showed morphological variations, the linear type being the most frequent, in 42.5% of the skulls (17/80), U-type in 12.5% (10/80), V-type in 11.25% (9/80), H-type in 10% (8/80), double type in 8.8% (7/80) and the Y-type in 3.8% of the skulls (3/80). The absence of metopic suture was seen in 20% of the skulls (16/80), 25% in female (10/40) and 15% in male skulls (6/40). Although in the majority of the skulls appeared sutural bones, no metopic sutures were associated with them. Conclusion: Comparing our findings with those of other studies, we observed a higher incidence of the presence of the complete metopic suture, probably indicates racial variations. The morphological knowledge of the metopic suture is essential for the neurosurgeons, paediatricians as far as is related to craniofacial disorders and mal-formations of size and shape. In addition, the radiologists may misdiagnose the metopic suture as a vertical skull fracture of the frontal bone.

HEAD AND NECK INJURIES IN HOMER'S ILIAD

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Background: The Iliad is an epic poem written by Homer and describing the siege and battle of Troy during a 10 years war between the Greeks and the Trojans. We report all injuries to the head and neck region depicted in Homer's Iliad. Materials and

Methods: We studied the text of Iliad in ancient Greek and in modern Greek and English translations, found, and analysed all injuries to the head and neck. The references to the injuries, the combatants involved, and the weapons used were recorded. The site of injury and its consequences were also documented from the narrative. The clavicles were considered as the lower border of the neck. Results: Of the 55 injuries, 52 occurred during battle. Thirty injuries involved the head, 22 the neck and 3 both regions. Forty-three of the wounded were members of the Trojan army and 9 of the Greek army, whereas 2 injuries happened during fights between Greeks, and an injury took place during a fight between two Olympian Gods. Conclusion: Statistics are of minor importance, as the great pleasure for everybody and particularly for surgeons and anatomists is to read Iliad. The outstanding description of Homer and the vividly reported events, make clear that the knowledge of anatomy of the head and neck was sufficiently developed in those old times.

MAPPING DOPAMINERGIC D1 AND D2 RECEPTORS OF HUMAN LOCUS CERULEUS

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Background: The Human Locus Ceruleus (LC) is the main noradrenergic brainstem nucleus. On a recent publication we showed that human LC is narrower and longer (± 14mm) than previously reported. Its dopaminergic afferents play a key role on wakefulness-promoting effect and come mainly from ventral tegmental area (mesocoerulear pathway) and periaqueductal gray matter. The objective of this study was to map its dopaminergic D1 and D2 receptors. Material and Method: 10 LC obtained from 5 normal human adult brainstems collected within the first 48 hours post-mortem. Brainstems were fixed, dissected and embedded in paraffin, then cutted in a microtome perpendicularly to the midsagittal and IV ventricle floor planes. The slices were labelled with fluorescence immunohistochemistry for D1R and D2R and analysed by fluorescence microscopy; semiquantitative evaluation of immunoreactivity was done with ImageJ® program and descriptive statistics with SPSS®. Results and Discussion: D2R revealed to be present in most neurons with a relatively homogeneous distribution along the entire cranio-caudal LC axis whereas D1R have a much sparser distribution. D2R were mainly found in cells rich in neuromelanin, in large areas of the cytoplasm extending beyond the neuromelanin zones. D1R are mainly found in more restricted cytoplasmic areas of cells with low neuromelanin. This was present along the entire LC length. Co-localization of both neuroreceptors subtypes was often seen. Semiquantitative immunoreactivity comparison of D2R and D1R in 3 out of 5 cases was 14/1, 20/1 and 307/1 (p=0,109, Wilcoxon test); the D2R/D1R cell proportion immunoreactivity was 8.4/1, 28.9/1 and 11.76/1, respectively. D2R was always most dense near LC center, while D1R were mainly on the LC superior half, with no immunoreactivity on the center.

DEVELOPMENT OF AN ONLINE UNDERGRADUATE SYSTEMIC HUMAN ANATOMY COURSE WITH LABORATORY

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An online version of an existing undergraduate anatomy course with a laboratory component (Systemic Human Anatomy) is in its inaugural year at Western University Canada. Lectures for face-to-face students are broadcast in live and archived format to online students using Blackboard Collaborate (virtual classroom software). Laboratory demonstrations are facilitated online by a teaching assistant who manipulates 3D anatomical models in Blackboard Collaborate for the students to see. Students may independently study the virtual models on their own computers. Eleven anatomy software programs were reviewed to determine the suitability of their virtual models, on the basis of: quality of digital models (resolution, comprehensiveness of anatomical structures and labels, inclusion of cross sectional anatomy), volumetric data used to create models, manipulation of models (virtual dissection, rotational axes, vantage points, rendering speed), program functionality (saving and sharing dissections, querying for structures, ease of use of the menu) and cost. The software we reviewed did not meet all of our online teaching needs as no program was found to have sufficient anatomical detail and visual clarity for the central nervous system (CNS). Supplementary online materials for the CNS component of the course will be developed in house to use in conjunction with Netter's 3D Interactive Anatomy. Working with our Instructional Technology Resource Centre, interactive, fully rotatable (360°) images of dissected brain specimens were created and made available on an open website. Preliminary data indicates that student academic performance in the course is not negatively impacted by the online delivery format. Student perceptions of the learning experience in the online and face-to-face course formats will be revealed in future studies that analyze student interviews and surveys.

ABOUT THE ABSENCE OF MUSCULOCUTANEOUS NERVE

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Background: The musculocutaneous (MC) nerve derives from the lateral cord of brachial plexus (90,5%) at the level of lateral border of pectoralis minor. MC nerve pierces the coracobrachialis muscle and descends between the biceps brachii and brachialis to the lateral side of the elbow and terminates as the lateral cutaneous nerve of forearm. It supplies the biceps brachi, the coracobrachialis and the brachialis.

Its terminal branch is purely sensory. Variations in the MC nerve course, distribution and termination have been reported. The most frequent variations are the presence of communicating branches with the median nerve and the nerve not perforating the coraco-brachialis muscle. Total absence of MC nerve is less frequent (1.4 to 15%). Materials and Methods: 25 upper limbs from 12 cadavers. Dissection protocol: skin incision on deltopectoral groove and arm midline exposing brachial plexus and MC nerve. Results: In two specimens, the MC was not demonstrable. In these cases, the nerve branches to the coraco-brachialis muscle and the lateral cutaneous forearm nerve originated directly from the median nerve. Discussion: During embryogenesis MC nerve is derived relatively late, thus its absence may correspond to an incomplete differentiation of the brachial plexus. We believe this anatomical variation noteworthy because clinical procedures as plexus block or Latarjet's procedure may be affected from MC anomalies.

ULTRASOUND GUIDED CARPAL TUNNEL RELEASE THROUGH A ONE MILLIMETER APPROACH: ANATOMIC STUDY

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Background: Three fibrous layers are described at the carpal tunnel: superficial, intermediate and deep. The deepest layer has proximal, central and distal portions. Histological studies suggest a mechanical function for the deepest and a proprioceptive role for the intermediate layers and a denser innervation at palm than forearm approaches. Complete decompression after carpal tunnel release (CTR) is observed releasing the deep distal and central portions. To our knowledge, CTR has not been performed through a 1 mm forearm approach (Ultra-MIS CTR). The purposes of this study were to define in volunteers a safe zone and a path for performing a safe and effective Ultra-MIS CTR in cadavers for reducing surgical morbidity. Materials and Methods: Axially, the safest theoretical cutting point (CP) for CTR was set bisecting the space between the median nerve and the closest ulnar vascular structure. MRI was used in volunteers for, axially, determining the limits of the sectors (origin at CP) that did not enclose structures at risk (arteries and nerves) and, coronally, for determining if our release path (RP) could follow directions that could potentially compromise safety (origin at the pisiform's proximal pole). In cadavers, we performed an Ultra-MIS from an intracarpal position through a 1 mm antebrachial approach. Efficacy (transverse carpal ligament release rate, RR), safety (absence of neurovascular or tendon injury) and damage to any anatomy superficial to TCL were assessed thru dissection. Results: Our 11 volunteers (22 wrists) had large safe axial sectors (≥80.4º) located volar and radially from CP. RP directions were safe (almost parallel to the longitudinal axis of the forearm). In our 10 cadaver wrists, Ultra-MIS was effective (100% RR) and safe without signs of intrusion into the superficial anatomy. Conclusion: Ultra-MIS CTR is clinically feasible. The technique preserves the superficial anatomy and diminishes the damage of a surgical approach.

PECULIARITIES OF STRUCTURAL RECONSTRUCTION AND MINERAL CONTENT DYNAMIC OF HARD TISSUES OF DENTOMANDIBULAR AREA IN AGE ASPECT.

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Aim of Investigation: The purpose of our research was of complex character, namely the study of changes occurring in a structural and mineral content of jaw bone tissue and hard tissues of the permanent teeth during different age periods. Materials and Methods: The research was hold in two directions – hard tissues structural reconstruction was investigated by the radiovisiographical method applied with the use of the dental radiovisiograph Siemens with the software Trophy Radiology, mineral content of the investigated tissues was detected by the anatomic-emission spectral analysis. The research was held on radiovisiograms of maxillofacial area of 120 individuals at the age from 5 till 70 years. The material for mineral content study was postextractional material (teeth, fragment of jaw bones) from Lviv dental clinics. Investigated material was divided into such age groups: 1) 5-12; 2) 13-20; 3) 21-35; 4) 36-50; 5) 51 and up. Results:

1) Density of bone tissue of jaws during the investigation period is lower than density of teeth hard tissues;
2) Teeth crowns density is higher than density of their roots;
3) Teeth crowns density is the highest in 21-35 years-old individuals with its gradual decline;
4) Dynamic of certain mineral elements content corresponds to density of maxillodental components that drives to the conclusion of the existence of correlation between them.

Conclusion: Age dynamic of hard tissues density and mineral content of maxillodental apparatus is different during the investigation period and is typical for each certain object. It is also characterized by existence of correlation between them.

ANALYSIS OF THE POSTERIOR RAMUS OF THE LUMBAR SPINAL NERVE

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Background: Knowledge of neural anatomy is fundamental for safe, efficacious use of regional anesthesia. Spinal column procedures, like a facet joint block require an accurate understanding of neural pathways relative to anatomic structure. After Bogduk's report, we know that human lumbar posterior ramus of the spinal nerve (PRSN) comprises three, equally-

sized primary branches. However, inconsistencies and controversy remain over the exact locations and pathways of the peripheral portions of the PRSN branches. Here, we investigated the detailed anatomy of the human PRSN. Methods: We performed ventral dissection in seven cadavers to determine the layout of the PRSN between T10 and L4 spinal segments. We captured 3D image with a laser scanner. For fine detail analysis, specimens from another cadaver were subjected to a modified Spalteholz technique to render all non-nerve tissue transparent. Computer graphics were used to create a 3D structural model. Results: All three PRSN branches emanated from an ipsilateral origin, and passed posterior to the transverse process. The medial PRSN branch consistently passed between the mammillary and accessory processes under the mammilloaccessory ligament. The intermediate branch passed between the longissimus and iliocostalis muscles and extended to the skin. The lateral branch traveled far lateral from the origin. Conclusion: We created a 3D model of the PRSN in the lumbar segment, which may be useful for planning surgical approaches to dorsal areas of the vertebral column. Additionally, this knowledge may improve the accuracy of procedures involving the spinal column, particularly radiofrequency neurolysis of the facet joint.

AN ANATOMIC STUDY OF THE ATTACHMENTS ON THE CONDYLAR PROCESS

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Background: The lateral pterygoid muscle is generally accepted to insert into the pterygoid fovea that is situated on the anterior surface of the condylar process. On the lateral side of the fovea, bony ridge is described. However, the relationship of the ridge and surrounding structure is not fully understood. Materials and Methods: In this study, we investigated 24 head halves of 13 Japanese cadavers. After observation of the impressions and ridges on the process by using the micro CT (SMX-100CT, Shimadzu, Kyoto, JAPAN), we dissected and removed the muscles to investigate areas of the insertion to the process. Results: Impression was observed on anterior-medial surface of the condylar process, and the ridge was observed lateral to the impression in all the specimen. The lateral pterygoid muscle was mainly inserted to the medial two thirds of the anterior impression of the process. The capsule did not attach to the border of articular cartilage. The inferior part of the capsule was extended to the ridge which was situated lateral to the lateral pterygoid muscle. The midmedial muscle bundle of the temporalis attached to the fibrous extension from the ridge. Among the muscles around the temporo-mandibular joint, the midmedial muscle bundle was the most lateral one attached to the condylar process. Lateral muscle bundles such as main part of the temporalis were restricted to the articular disc. Conclusion: Based on the present results, the insertion of the lateral pterygoid muscle is situated medial to the area that is generally described. The ridge would suggest the position for the attachment of the midmedial muscle bundle, and is also considered to be closely related to the jaw movement.

ANATOMICAL AND TERMINOLIGCIAL KNOWLEDGE OF PARAMEDICS IN AUSTRIA

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Background: As the Emergency Service System in Austria is mostly run by volunteers, there are two grades of Emergency trainings for the paramedics in Austria: the “Rettungssanitäter” who provides Basic life support, and the “Notfallsanitäter” who provides advanced life support and assists the emergency physician. These Trainings are identical educated all over Austria to establish similar quality in the EMS. Aim of this study is to evaluate the anatomical and terminological knowledge in an random group of Austrian Paramedics. Material and Methods: An Online Survey was created and the link was set in restricted paramedic internet platforms. There were four epidemiologic and 37 single choice (out of 5 possible answers) knowledge-specific questions. There was also one question to define if the participant had an additional medical education or profession (such Medical Students, Nursing, etc.)The Survey started in September 2012 and was closed in October 2012. Data Examination was done via Microsoft Excel 2010. Results: In total 145 participants were “Rettungssanitäter” and 48 were “Notfallsanitäter”, 66 of these two groups specified an additional medical education or profession. The average correctness was 76,81% [range 6,63% to 98,49%]. Discussion: Data analysis shows bad performance in anatomical and terminological knowledge in Austrian paramedics. For instance, only 56,87% knew the latin terminus “Radius”. Only 71,94% knew the approximate position of the kidneys. As anatomical terminology is a secondary aim in paramedic training and daily work, the terminological results are actually not concerning. But the bad performance in anatomical knowledge, which is important for the work of paramedics, shows that there is need for action in paramedic training in Austria. We hope that the alarming result of our study will be integrated in paramedic education and training in Austria.

DOES THE BODY MASS INDEX INFLUENCE THE POSITION OF THE INTERNAL JUGULAR VEIN?

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Background: The central venous cannulation of the internal jugular vein in morbidly obese patients, even ultrasound-guided, represents a new challenge in anaesthesia and critical care medicine. Aim of this study is to gather information about cervicovascular structures in correlation to the Body Mass Index (BMI). Material and Methods: Twenty-nine patients have been included in the investigation so. Following cervico-vascular parameters and anatomical structures in patients undergoing general anaesthesia were measured by using ultrasound: Age, sex, BMI, depth of the internal jugular vein (IJV) and the diameter of the IJV. Validity is further enhanced by investigating 32 cadavers and to match those to the parameters of interest. Results: Epidemiologic measurements of the in vivo group were: ♂: n= 10; ♀: n= 19; average age 44,4 [range 20 to 69]; average BMI: 35,1 [range 19,2 to 57,0]. The average diameter of the IJV was 1,27cm [range 0,62cm to 1,99cm]. Epidemiologic measur-ements of the cadaver group were: ♂: n= 13; ♀: n= 19; average age 78,0 [range 50 to 99]; average BMI: 24,31 [range 17,9 to 34,4]. Matching the ultrasound determined depth of the IJV (average depth, measuring the middle of lumen was 2,11cm [range 1,07cm to 3,50cm]), separated and non-separated by sex, to the BMI shows a linear correlation between these parameters in the in vivo group. Discussion: As there have only 29 patients and 32 cadavers been included in the study so far, no significant statement about the cervicovascular anatomy in correlation to the BMI can be postulated. But the results show clear trends. This could give Anaesthetists background knowledge in their daily operations with central venous cannulation, even in obese patients.

DETECTION OF SECRETORY IMMUNITY AND MORPHOLOGICAL CHARACTERIZATION OF THE *EQUINE* URETERIC GLANDS

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Background: Infections of the lower urinary system is mainly found in the urinary bladder caused by ascending uropathogenic bacteria from the urethra. These pathogenic germs sometimes invade also the kidney where they induce severe diseases until renal failure. In this respect signs of inflammatory infections of the equine lower urinary system are less in common, compared with other domestic animals. This is mainly attributed to the high concentration of semi-fluid secretion products in the equine urine which is one component of the protective effects against pathogenic bacteria in the ureter. To find out if other antibacterial properties are attributable to the unique equine ureteric glands, we examined the expression of secretory IgA and secreted mucins that inhibit bacterial adhesion and infections. Materials and Methods: Ureter probes of 18 horses with an average age of 16 years were characterized by scanning electron microscopy (SEM) and the expression of secretory IgA, MUC1 and MUC2 in equine ureteric gland cells were examined by immunohistochemical methods. Results and Discussion: Our SEM-investigations of the ureteric luminal surface clearly show a tremendous and characteristical network of microridges after removing the semi-fluid secretions. Sections of different ureteric areas also exhibits fully developed ureteric glands in the proximal section whereas their number and size decreases in distal direction towards to the urinary bladder. In the subepithelial layer they show tightly branched tubuloalveolar structures and their epithelial layer are build up by serous and mucous cell types. Immunological active secretory products such as MUC1, MUC2 and secretory IgA are found in different areas of the equine ureteric mucosa. MUC1 and MUC2 are strongly expressed in different ureteric gland cells as well as in most superficial cells of the ureteric epithelium. In contrast IgA-producing cells are mainly located in subepithelial regions near to the ureteric glands which also express high amounts of the secretory component (SC). Conclusions: The high density of ureteric glands found in the equine ureter explain the almost perfectly immunological protection against pathogenic bacteria attributed to the high output of semi-fluid secretion containing several important immunological active proteins such as mucin, IgA and its corresponding secretory component.

ANALYSIS OF BIOMECHANICAL PROPERTIES OF PATELLAR LIGAMENT GRAFT AND QUADRUPLE HAMSTRING TENDON GRAFT

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Background: There are two types of transplants commonly used in the surgical management of the anterior cruciate ligament lesions: the central part of the patellar ligament and quadruple tendons of the gracilis muscle and semitendinosus muscle. The aim of this study was to determine biomechanical characteristics of the patellar ligament transplants as well as the transplants of the quadruple tendons of the ischiocrural muscles under the tensile force in laboratory circumstances, and to compare the obtained results in each group of patients. Material and Methods: The study comprises 160 specimens as follows: 40 specimens of gracilis muscle tendons, 40 specimens of semitendinosus muscle tendons, 40 specimens of quadruple tendons and 40 specimens of the patellar ligament, approximately equally distributed according to sex, age (50 to 70 years) and the side of the body from which the specimen had been taken. Results: The working curve analysis of the specimens under tensile load under the maximum force of 30 N has shown the lowest level of elongation (0.31%) in the quadruple tendons specimen, followed by the gracile muscle tendon (1.48%) and patellar ligament tendon specimen (3.91 %). Discussion and Conclusion: The quadruple tendons specimen showed greater strength and higher elasticity module compared to the patellar ligament specimen which proved the starting hypothesis of the dissertation.

REGULARITY OF AGE-RELATED CHANGES IN OSSEOUS TISSUE DENSITY OF LOWER JAW IN PERSONS OF DIFFERENT SEX

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Aim of Investigation: The objective is to determine the regularity of age-depended dynamics and correlation of normal BMD indices in persons of different sex. Materials and Methods: The regularity of changes in lower jaw bone density of persons of different sex in the aspect of age was determined using the radiological (panoramic X-ray diffraction), digital visual and analytical (Digora digital system for X-ray processing) and mathematical-statistical techniques. Results: BMD age-related dynamics is evident, dissimilar and specific for every investigated area in men and women. In cervical and apical areas in men of 20-30 years of age up to 30-40 years the BMD lowers, then in the age of 40-50 it grows, and later – lowers again. With age in women the BMD in cervical area gradually lowers, in apical area changes depending upon the segment: between 42-41/31-32 teeth the BMD is stable and lowers only after 50 years; between 45-44/34-35 teeth it remains unchanged till 40 years, later it lowers; between 47-46/36-37 teeth it grows till 40-50 years, then it lowers. BMD in cervical and apical areas in men is higher than in women of the same age. The highest BMD in men and women is between 42-41/31-32 teeth, and the lowest - between 47-46/36-37 teeth. Conclusion: This investigation enabled to determine the regularity of age-depended dynamics and correlation of normal BMD indices in persons of different sex.

COMPARISON BETWEEN R40 BRAIN SLICE AND CT IMAGES

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P40 plastination technique is usually used for making transparent brain slices for studying the anatomy of the brain. This course has a very large effect when these slices are considered simultaneously with computed tomographic images of the same brain areas. We apply this method in the clinical training of medical students in the Neurosurgery and Radiological Clinics and in Radiological Anatomy. Brain plates are produced by the classic P40 technique described by von Hagens (1994), Weiglein and Feigl (1999) and Henry and Latorre (2007). The resin is placed in two steps with intermediate partial drying. Matrix is in a horizontal position and the light source is below. Hardening the resin perform with UV rays, using the device-source of ultraviolet light made by us. The results are shown in the photos.

DEVELOPMENTAL THEORY OF THE ORIGIN OF THE SUPERIOR GLUTEAL ARTERY

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The superior gluteal artery, previously referred to as the gluteal artery, is the largest subdivision of the posterior trunk of the internal iliac artery. Within the pelvis, it arises between the lumbosacral trunk and the S1 root of the sciatic nerve: it has an extremely short tortuous course. It leaves the pelvic cavity to enter the gluteal region by passing through the suprapiriformis foramen, i.e. between the bony edge of the greater sciatic foramen and the superior edge of piriformis. Within the pelvis, the superior gluteal artery gives muscular branches to iliacus, piriformis, and obturator internus, and just prior to leaving the pelvis a nutrient artery to the ilium. Based on current anatomical study of 342 specimens, of which in 68 there was a sciatic artery, the superior gluteal artery was observed to have a variable origin and course in the presence of a coexisting sciatic artery. When the sciatic artery was present the superior gluteal artery was observed to arise from the posterior trunk (17.3% of specimens) and from the persistent sciatic artery in 3.6% of specimens. The sciatic artery was also observed to compensate for an absent superior gluteal artery in 0.7% of specimens. The superior gluteal artery is therefore rarely absent in presence of a sciatic artery, which does not agree with the accepted embryological theory of the sciatic artery. As a result, the current study proposes a new theory concerning superior gluteal artery development which accounts for variations in its origin and course.

ANATOMICAL STUDY OF THE COURSE OF THE SENSORY NERVES OF THE LUMBAR PLEXUS IN THE INGUINAL AND LUMBAR AREA

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Background: Intraoperative injury of the four main sensory branches of the lumbar plexus may end up in debilitating groin pain. Aim: To delineate the course of the iliohypogastric, ilioinguinal, lateral femoral cutaneous nerve of the thigh and femoral branch of the genitofemoral nerve, from their point of emergence from the psoas major muscle, to their point of perforation of the anterior abdominal wall, and measure distances from bony landmarks along their course. Materials and Methods: Inguinal and retro-peritoneal dissections of 11 adult cadavers-8 formalin embalmed and 3 fresh, as well as additional retroperitoneal dissection of 8 more formalin embalmed cadavers were performed. Results: The iliohypogastric and ilioinguinal nerves perforated the internal oblique muscle medial to the anterior superior

iliac spine and cranially to the pubic tubercle. Considering the retroperitoneal dissection, the ilio-hypogastric and ilioinguinal nerves pierced the transversus abdominis aponeurosis lateral to the midline, inferior to the tip of the 11th rib, and posterior to their point of exit from the psoas major/quadratus lumborum muscles junction. The iliohypogastric, ilioinguinal, lateral femoral cutaneous and femoral branch of the genitofemoral nerves perforated the transversus abdominis muscle aponeurosis at various distances from the tip of the 11th rib and the anterior superior iliac spine. Conclusion: Thorough knowledge of the course of the sensory nerves of the lumbar plexus is warranted in order to avoid their injury. This study provides the surgeon with useful information in order to avoid nerve injury intraoperatively, and trace the injured nerves postoperatively so as to treat neuropathic pain.

INCREASED LRP1 (LDL RECEPTOR-RELATED PROTEIN-1) EXPRESSION IS ASSOCIATED WITH ENDOMETRIAL REMODELLING IN THE PIG

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Background: The low density lipoprotein (LDL) receptor-related protein-1 (LRP1) is a multifunctional cell surface receptor that plays an important role in the endocytosis of several ligands. Some of these ligands, such as matrix metalloproteinases and plasminogen activators, are produced by the human endometrial stroma and are involved in cyclic remodelling events and during trophoblast invasion, respectively. Endometrial LRP1 is thought to prevent any excessive extracellular matrix degradation by ligand binding and internalization. However, in species with non-invasive implantation like the pig, it is currently not known whether LRP1 is actually expressed in the endometrium. Materials and Methods: Uterine samples were obtained from 26 German Landrace pigs slaughtered at different stages of the estrous cycle and pregnancy, respectively. Pregnant animals were killed at days 1-3, days 13-14, days 18-22, and days 65-71 after artificial insemination. Pregnancy was confirmed by flushing oviducts and uteri and subsequent recovering of embryos using a stereoscopic microscope. The localization and distribution of LRP1 was evaluated on paraffin-embedded tissue sections using immunohistochemistry. Results and Discussion: LRP1 immunostaining was found in all endometrial specimens examined of both cyclic and pregnant pigs. Localization of LRP1 was thereby concentrated to stromal cells underlying the luminal epithelium. A particular pronounced abundance of LRP1 was observed in endometria of such cyclic and pregnant animals which have a high tissue remodelling activity in dependence of differing steroid hormone concentrations. Especially, number of LRP1-positively stained cells was comparable high within the subepithelial stroma of metestrous and early pregnant pigs suggesting marked extracellular matrix degradation by divergent proteinases occurring at these time points of the estrous cycle and pregnancy, respectively. Conclusions: Even in species with non-invasive implantation, LRP1 may be involved in endocytosis of different ligands, which are produced by the endometrium and play an important role in endometrial remodelling and receptivity to implantation.

IMORPHOLOGY: A BLENDED-LEARNING SCENARIO FOR INTEGRATED TEACHING OF ANATOMY AND DIAGNOSTIC IMAGING

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In systems based, integrated curricula anatomy teaching is frequently sheduled in parallel with clinical subjects, but fails to integrate with regard to contents and didactic setting. The iMorphology-concept fully integrates in form and content, at a small group-teaching level, anatomical dissection classes with diagnostic imaging. In terms of teaching/learning formats, the concept blends e-learning with tutor-guided on-site practical training and e-testing for cohorts of up to 720 students. In advance, students prepare on a self-study basis using web-based e-media (videos, atlases, text guides). In the on-site phase, students switch between anatomical preparation of an organ system at the dissection hall and case-based learning of diagnostic imaging of the respective organ system guided by radiologists. In the dissection hall, ceiling mounted iMacs and large-screen interactive whiteboards provide the students with supplementary e-media (clinical cases, preparation-videos, videos of surgical interventions, animated visualizations of development processes, and anatomical 3D-visualizations). The diagnostic imaging case-presentations are provided in an Moodle™ e-learning environment, supplemented by internet-discussion-fora, that are supervised by radiologists. Assessment combines immanent evaluation of dissection and respective background knowledge, mutual cooperative teaching of students among each other, and diagnostic imaging-tests using the Moodle™ e-testing facility. The "*iMorphology*" didactic setting enables accelerated comprehensive understanding of complex spatial relations and their clinical implications, and is readily adopted by the students. The diagnostic imaging e-tests provide teachers with immediate, valuable, and objective feedback about the clinical diagnostic competence of the students. With this approach, we on the one hand achieve faster and indepth morphological knowledge base, and on the other hand become able to rapidly adjust contents and objectives to the students actual level of competence.

INFLUENCE OF MATERNAL EXPERIMENTAL HYPOTHYROIDISM ON QUANTITATIVE-QUALITATIVE INDICATOR OF RAT PROGENY SKIN MAST CELLS IN AGE ASPECT ACCORDING TO HISTOCHEMICAL INVESTIGATION RESULTS AND ON THE BASE OF LECTINS' GNA AND PNA RECEPTORS CYTOTOPOGRAPHY

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Background**:** Amount of thyroid pathology patients in Ukraine increased 3.7 times from 0.9 to 3.5 per 1000 population within a decade. The main reason of most of organs damage associated with hypothyroidism is decreased synthesis of number of cellular enzymes because of thyroid hormones deficiency. Mast cells (MC) play leading role in inflammatory processes, allergic reactions and in autoimmune diseases pathogenesis, since they produce various cytokines. Influence of maternal hypothyroidism on the progeny skin histogenesis and MC correlation is poorly studied. Materials and methods**:** Hypothyroid condition was modeled in Wistar female rats by adding thyreostatic drug mercazolilum (methimazole) 5 mg/kg body mass. Thyroid glands and progeny skin pieces from the back on the 1, 10, 20 and 40 postnatal development days were fixed in 4% neutral formalin and embedded in paraffin. For MC detection slides were stained by Bismark brown, alcian blue (pH 2.5), toluidine blue. D-Man and β-DGal carbohydrate determinants were studied by use of GNA and PNA lectins labeled with horseradish peroxidase. Lectin receptors visualization was conducted in 3'3-diaminobenzidine tetrahydro-chloride system in H_2O_2 presence. Counting the MC number and thyroid glands' morphometric parameters were conducted on 5 μm thin sections by using UTHSCSA "Image Tool for Windows. Version 2.00" (USA) computer program. Statistical analysis was performed using Student t-test. Results: Body mass increase, changes in thyroid cells parameters and colloid structure were stated in experimental animals. The biggest MC amount was detected in control animals skin on the 1 day of postnatal development, slight decrease on 10 day and gradual increase till 40 day. MC amount with signs of degranulation increased in experimental animals skin at all stages of the research. Simultaneously, D-Man and β-DGal glycol-polymers expression similarity was noted on MC surface. Conclusion: According to MC quantitative-qualitative indicators in skin, hypothyroid female rat progeny should be included into the risk group of immune status change and allergic reactions beginning.

THE ANALYSIS OF FREQUENCY OF DIFFERENT KINDS OF MAXILLODENTAL ANOMALIES IN AGE ASPECT

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Aim of Investigation: The purpose of our research was to determine frequency of dentomandibular anomalies among individuals of different age and their interconnection with different kinds of adentia and temporomandibular joint pathology. Materials and Methods: There were analyzed panoramic X-rays and computer tomograms of maxillofacial area of 300 individuals of both male and female sexes in the age group from 15 till 45 years. All examined individuals were divided into 3 age periods (15-25 years, 26-35 years and 36-45 years). Results: It was established that bite anomalies among individuals of the first group were in 76 persons, adentia – in 27 (11 cases were on the upper jaw and 23 – on lower), temporo-mandibular joint pathology was in 7 individuals; bite anomalies among the second age group were in 65 individuals, adentia – in 58 (42 cases were on upper jaw and 49 - on lower), joint pathology – in 12 individuals; bite anomalies among the third age group were in 72 individuals, adentia – in 83 (87 cases were on upper jaw and 89 - on lower) and 28 cases of the joint pathology. Conclusion: The received data of the investigation allow ascertaining that premature teeth loss on a background of uncorrected bite anomalies was caused by loading redistribution on different teeth groups, consequently provoking pathological changes in temporo-mandibular joint; the frequency of maxillo-dental anomalies increases in every next age group (with the exception of the bite anomalies, frequency of which was the highest in 15-25 years-old and the lowest in 26-35 years-old individuals).

CORRELATIONS BETWEEN CEREBRAL OXYGEN DESATURATION AND NEUROPSYCHOGYGICAL DYSFUNCTION IN PATIENTS UNDERGOING CARDIAC SURGERY

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Background: The prospective and observational study evaluates the relationship between cerebral oxygen saturation and neuropsychological dysfunction after cardiac surgery. Materials and methods: *Setting*: Operating room and cardiac floor of a university hospital. *Participants*: 101 patients undergoing elective cardiac surgery with cardiopulmonary bypass. *Intervention*: Bilateral noninvasive cerebral oxygen saturations were monitored over the forehead. The anesthetic and surgical techniques were performed as usual, and no interventions were attempted based on the monitor. Neuropsychological outcome was assessed by MMSE and the ASEM. All patients were monitored with NIRS (INVOS 4100) during the entire procedure. Results and Discussions: In this study, 90% of patients had some areas of rSO2 <50% during CPB. The initial dip in cerebral oxygen saturations usually improved slightly once adequate pump flow was established. However, during CPB, almost all patients had cerebral oxygen saturations below prepump values because of hemodilution by the non-blood priming solution and relatively low blood pressure and pump flow. However, only 24 patients had

postoperative ASEM impairment and 18 patients had postoperative MMSE impairment. In conclusion, cerebral oxygen desaturation (rSO2 <40%) is associated with early postoperative neuropsychological dysfunction in patients undergoing cardiac surgery with cardiopulmonary bypass. Therefore, it seems prudent to monitor and maintain adequate cerebral oxygenation during cardiac surgery. However, it remains to be determined whether interventions to maintain adequate cerebral oxygenation during cardiac surgery can improve cognitive outcomes. Moreover, the effects of cerebral oxygen desaturation on long-term postoperative cognitive dysfunction using a more sophisticated neuropsychological test battery may be warranted.

THIEL CADAVER FLEXIBILITY: IDENTIFYING THE FACTORS RESPONSIBLE

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Background: The primary motivation for the preservation of cadavers is to facilitate teaching, research and understanding of anatomy. The way in which a cadaver is preserved impacts on the way it can be utilised within the context of anatomical research and teaching. The Thiel method of embalming produces cadavers with more life-like qualities; however there is a distinct paucity of information as to how the method works. The aim of this study is to identify factors responsible for the flexibility observed in Thiel embalmed cadavers by using histological investigations to understand how the Thiel embalming solution affects skeletal muscle and tendon tissue. Materials and Methods: Mice preserved using either formalin or Thiel solution, via cardiac perfusion, were sampled for skeletal muscle and tendon tissue. Using standard histological methods, the tissues were embedded in paraffin wax, sectioned, stained and examined in the light microscope to assess differences between tissue preserved in the two solutions. Results and Discussion: Clear differences are present between the formalin-fixed and the Thiel-fixed tissues. Formalin-fixed samples display a regular appearance, with cell integrity and alignment remaining substantially intact, visible nuclei and no apparent distortion in the size or shape of the cells. In comparison the Thiel-fixed samples show an apparent increase in cell volume, a lack of nuclei, large intercellular spacing and fibre fragmentation; however cell alignment and membrane integrity appear to remain intact. This suggests that the Thiel solution significantly alters the tissue structure at a cellular level; however which component is responsible is as yet unknown. Further investigations are on-going in which it is anticipated that these changes are driven by high concentrations of chemical salts present in the Thiel embalming solution. The findings will provide an improved understanding of why the Thiel method produces such flexible and life-like cadavers.

THREE-DIMENSIONAL (3D) IMAGING OF MULTILAYER SKIN SUBSTITUTES – A PILOT STUDY

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Background: Full thickness skin defects have in most circumstances been covered by the use of autologous skin grafts. Recent advances in biotechnological design have introduced dermal substitutes into daily clinical practice, notably employed for mimicking full-thickness coverage (eg. in areas of joint proximity or exposed to particular mechanical forces). We aimed in this anatomical pilot study to evaluate the suitability of high-resolution episcopic microscopy (HREM) imaging technique for visualising the revascularisation of dermal substitutes. Material and Methods: In a porcine model a full-thickness injury was created by surgically removing skin and subcutaneous tissue down to the muscle fascia. The defect was covered with a commercially available bovine collagen-elastin matrix and an autologous split-thickness skin autograft on top of it. 5, 10, 15 and 28 days after coverage biopsies were taken and HREM volume data generated following modified standard protocols. Data was analysed by using virtual resection and volume rendering algorithms, and in selected specimens three-dimensional (3D) surface models of the arteries growing into the layers of the substitute were created. Results: Overall, HREM generated digital volume data, which was appropriate for analysing the architecture and revascularisation of dermal substitutes. The generation of surface-rendered 3D models was time consuming and the standard HREM protocols required adaptation for generating quantifiable digital volume data. Conclusion: HREM is a promising method for imaging the tissue architecture and revascularisation of skin substitutes. However, the HREM specimen preparation and data generation protocols need optimisation before considering routine application.

TWO LARGE PROCESSES AT THE ACROMIAL END OF A CLAVICLE: AN UNUSUAL OSTEOLOGICAL FINDING

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Background: The acromial end of clavicle typically presents three bony protrusions, the trapezoid line, the conoid tubercle and the deltoid tubercle. Purpose of the current study was to present two unusual and large bony processes at the acromial end of a dried clavicle.

Materials and Methods: The study included 236 Caucasian dried clavicles which were examined for the existence of any anatomical variations. Results: The acromial end of the right clavicle of a 75-year-old male, presented two large bony processes. Namely, a quadrilateral process having an articular surface at its free end was found at the anterior border of the bone. At the posterior part of the clavicle inferior surface there was a large conical process, which replaced the conoid tubercle. The length of the conoid process was measured 1.8 cm and there was no articular surface at its free end. Discussion: The present study described two bony anatomical variations of the acromial end of a clavicle, due to their rarity and impressive appearance. Although a large conoid process of the clavicle usually articulates with the coracoid process of the scapula, in our finding the conoid process presented a sharp tip without any joint surface. On the other hand, it was interesting that the quadrilateral process found at the anterior border of the clavicle was probably forming an accessory joint between the clavicle and the humeral head.

OSTEOLOGICAL ANATOMY IN THE ERA OF PRESHAPED OSTEOSYNTHESIS PLATES

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Background: Preshaped osteosynthesis plates have been developed based on the bone geometry. However, it is impossible to fit anatomically on every human bone, due to anatomical variations. Although it is common practice to shape plates intraoperatively, they cannot bend unlimitedly, especially in the transverse plane. Therefore, design of preshaped plates should represent the average angulations of the bone. Purpose of the present study is to identify the potential contribution of osteological anatomy in further improvement of preshaped osteosynthesis plates design. Materials and Methods: Seventy pairs of dried clavicles, ulnae and radii, which belonged to 34 Caucasian men and 36 women, were studied. Quantitative measurements of the geometrical features of clavicle, proximal ulna and distal radius were performed using a digital caliper and goniometer. The geometrical features of several osteosynthesis plates were obtained from the manufacturers and compared to those of the bones. Plates were placed on bones to demonstrate the plate-to-bone fit. Results: Apart from the two curvatures in the transverse plane, clavicle is curved in the coronal plane too. Thus, shorter plates present better fit on the superior surface of the clavicle. A preshaped olecranon plate should have both varus and anterior angulation on its design. The olecranon part of the plate should primarily not exceed the olecranon height and secondarily be close to the average olecranon angle. Even when a juxta-articular distal radius plate is used, the styloid fragment may not be adequately stabilized and it may need fixation either with Kirschner wires or a second radial column plate. Perhaps a juxta-articular distal radius plate, having a proper lateral extend of the transverse part of the plate, could adequately stabilize the styloid fragment too. Conclusions: As basic science is fundamental to clinical progress, so osteological anatomy is in progress and may lead to further improvement of preshaped osteosynthesis plates and better postoperative clinical results.

NUCLEUS CAUDATUS - DEVELOPMENT, HISTOLOGICAL AND IMMUNOSTAINING CHARACTERISTICS

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The caudate nucleus as a part of the basal ganglia is involved in motor control and memory processes. Ontogenetically, the head of the caudate nucleus is derived from three parts: the medial elevation, which is localized in the side wall of the cerebral vesicle, the lateral elevation, which overtakes the medial one in length and volume, and finally a third component, termed the intermediate elevation, which wedges between the medial and the lateral elevation and which overgrows the lateral one. The tail of the caudate nucleus is formed by the posterior regions of the medial and lateral elevation, the second being the greater contributor. Immunostaining of the caudate nucleus reveals common characteristics between the ventral and dorsal part of it, but also some differences. The dorsal caudate nucleus shows the typical distribution of markers, which means there is a matrix rich in choline acetyltransferase (ChAT), calbindin and tyrosine hydroxylase (TH) immunostaining with striosomes that express less intensely ChAT and TH than the matrix, but are enriched in enkephalin and substance P (SP) immunostaining. In the ventral caudate nucleus the boundaries of the ChAT-stained regions not always being in register with stains for calbindin, enkephalin and SP, the neurochemical architecture of the ventral part of the caudate nucleus appears to be more complex.

COMBINED VARIATIONS OF SUPERIOR MESENTERIC ARTERY BRANCHES

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Background Variations of aorta branches are of major anatomic interest since they affect a large number of surgical and invasive procedures. Although intensively researched they still present points of interest for anatomy, embryology, physiology and surgery. Materials and methods During dissection of a Caucasian male cadaver at the laboratory of Surgical Anatomy, National and Kapodistrian University of Athens, Greece, a rare variation of the superior mesenteric artery branches was observed. Results Common hepatic artery occurred from superior mesenteric artery. Two right colic arteries were present. Discussion Occurrence of common hepatic artery from superior mesenteric artery is rare (1,5%) and corresponds to type V of Hiatt's classification.

Occurrence of double right colic artery is more common. These variations are important for surgeons because they might interfere in a variety of procedures and can potentially cause complications. They are not always predicted before surgery and thus knowledge and a high level of suspicion are necessary.

BILATERAL ABNORMAL ORIGIN OF THE ANTERIOR BRANCHES OF THE EXTERNAL CAROTID ARTERY

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Background: Anatomic variations of neck region can have an important impact on a number of surgical and invasive procedures. In this paper detailed description of a rare variation is provided alongside with a mini review of the literature with special references to anatomical, embryological and clinical issues it may create. Methods: During dissection of the neck region of a male cadaver a rare prototype in the branching patter of the anterior branches of External Carotid Artery was observed. Results: Superior thyroid artery occurred from common carotid artery bilaterally and lingual artery occurred from carotid bifurcation on the left side. No other variations concerning neck region were observed on this cadaver. Conclusions: Superior thyroid artery originating from common carotid artery or carotid bifurcation is a common variation but lingual artery originating from common carotid artery or carotid bifurcation is a rare one (<1%). This branching pattern, although rare, can have important clinical consequences and requires attention.

STRUCTURE OF THE WALL OF THE HEALTHY GREAT SAPHENOUS VEIN

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Aims: The aim was the histological examination of the vein wall of the healthy great saphenous vein (GSV) in relation to the venous valves. Methods: Ten GSVs of ten unembalmed cadavers, without an evidence of varices, were investigated. Three transverse (above, below, and at the venous valve) and four longitudinal series were produced. These were stained with hematoxylin and eosin, Masson's trichrome, Weigert's elastic, and immunohistochemistry (α-SMA) and then evaluated by light microscopy. Results: The wall of a healthy GSV consists of three layers: the tunicae intima, media, and externa. The intima-media limit corresponds to the internal elastic lamina (IEL), whereas the media-externa limit is formed by the outermost circular muscle layer. The intima has a variable thickness and consists of an endothelium, thin elastic fibres (EF), collagen fibres (CF), single smooth muscle cells (SMC), and the IEL. The media is composed of two muscular layers: An inner media longitudinalis (longitudinal SMC bundles), and an outer media circularis (5-8 circular SMC layers). Between those SMC bundles and layers, we found CF and semi-dense, longitudinal EF. The externa consists of dense CF, longitudinal, dense EF, and longitudinal SMC bundles. Differences in wall construction can be found at the venous valve: The IEL is orientated along the luminal part of the wall, the agger and the valve's cusps. The sinusal wall contains a much thinner IEL with no connection to the first one. Single α-SMA positive cells were seen within the valve cusps. SMC bundles can be found in the Agger, representing a thickened media longitudinalis. At the site of the agger, the SMC-layers within the media circularis become disorganized. Conclusions: The wall of a healthy GSV has a uniform structure. There are delicate distinctions in the wall at the site of venous valves in comparison to the rest of the wall.

VESSELS WITH A HIGH RISK OF INJURY IN PELVIC FRACTURES – AN ANGIOGRAPHIC STUDY

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Background. Familiarity with vascular anatomy is important for every physician, especially for surgeons. Bleeding in pelvis fractures is life threatening situation in people after car accidents, falling and other high energetic trauma to the pelvis. Anatomy of blood vessels in lesser pelvis was evaluated by many authors on cadaveric studies but an angiography is able to easily uncover relation of these vessels to bones. We assume that intimate contact of an artery with bone is a risk factor for bleeding in fractures of the pelvis. As intimate contact we considered distance lesser than 1 cm. Material and Methods. Records of 31 patients who underwent CT angiography in Department of Radiodiagnostics in Teaching Hospital Královské Vinohrady in Prague in 2012 were examined. In total 60 hemi-pelvises on CT angiography (Siemens AS+ CT scanner) using 1 mm sections were evaluated. For description of the contact localization the pelvic bone and sacrum was divided in 40 segments. The distance from bone, diameter and length of intimate contact with bone were measured. This technique detected arteries larger than 1 mm in diameter. Results. The arteries that were in intimate contact with bony structures were branches of internal (IIA) and external iliac artery (EIA). In total 9 branches with intimate contact were registered. Stem of IIA was found to have an intimate contact in 18 cases (30%) and average length of the contact with sacrum was 12 mm. Posterior stem of IIA, iliolumbal, lateral sacral, superior gluteal, anterior stem of IIA, obturatory, inferior gluteal and internal pudendal arteries were described in the same parameters too. Conclusion. The vessels near the pelvic ring which are very likely to get injured were described. The comparison of the course of the pelvic fracture lines with our findings may indicate to the surgeon a higher risk of bleeding.

CADAVER PRESERVATION IN CLINICAL ANATOMY – PLASTINATION VERSUS GRAZ EMBALMING PROCEDURE

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Clinical anatomy is anatomy relevant and applicable in diagnostic and therapeutic procedures in sick patients (clinic: inclining, laying, sick). Therefore, clinical anatomy developed in close relation with surgical and radiological techniques. Within the last three centuries, sectional anatomy gained more and more importance due to the development of computer assisted (1972) and magnetic resonance imaging (1977), and the development of new minimally invasive surgical techniques and fiberglass endoscopes (1990) created a demand for another different anatomical viewpoint: the inside-outlook or endo- and arthroscopic anatomy. Human anatomy does not change, however the view changes and creates the demand for a reliable overview of gross anatomy down to the ultra- structure for correct interpretation of medical images (cross-sections of real patients) and real but microbiologically safe training models (lifelike cadavers) to test and train new invasive procedures. The most important step in preservation was the introduction of formalin by Blum in 1896. Formalin consolidates tissue and stops rapidly the decomposition processes. Disadvantages to formalin fixation include unnatural hardening and discoloration of tissues. The introduction of formalin was followed by the color-preserving embalming solutions by Kaiserling (1900) and Jores (1930). In 1992, Thiel published an article on a new method of color preservation that preserved the human body in lifelike conditions (color and flexibility). In addition to the development of embalming solutions that allow preservation for dissection and particularly for training surgical and other invasive procedures, methods were developed for demonstration of human anatomy in steady state for comparison to radiological images and museum specimens. In museum specimens preserve-ation of flexibility is not essential. Paraffin impregnation was performed by Hochstetter in 1925. Embedding of organic tissue in plastic was introduced in the 1960's. In 1978 Gunther von Hagens invented plastination. This technique utilizes both impregnation and embedding, transforming the tissues into plastic with the respective mechanical properties. Thus, plastinated specimens are more or less inflexible. In this process, water and lipids in biological tissues are replaced by curable polymers (silicone, epoxy or polyester). While silicone produces mainly museum specimens, epoxy and polyester resins are used for thin, transparent body and organ slices excellent for comparison to scans produced by medical imaging techniques. In conclusion it can be said, that no preservation technique is generally better than the others. However, if pros and cons are considered carefully, different preservation techniques serve different viewpoints of clinical anatomy.

VISUALIZING WHOLE 14.5 DAYS OLD MOUSE EMBRYOS WITH THE HIGH-RESOLUTION EPISCOPIC MICROSCOPY (HREM) TECHNIQUE

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The high-resolution episcopic microscopy technique (HREM) permits detailed three-dimensional (3D) analysis of the morphology of the heart and great intrathoracic arteries of mouse embryos. In this presentation we aim at presenting the results from evaluating the potential of HREM for visualizing the micro-anatomy and tissue architecture of all organ systems of 14.5 days old embryos. We modified the standard HREM procedure and created digital volume data of 37 whole embryos of the C57BL/6 strain. Each HREM data volume consisted of a stack of 3 000 to 3 500 inherently aligned images (2494 to 1821 pixel). Voxel size was 3x3x3µm^3. We visualized and analyzed the data with the aid of the orthogonal and oblique slice tools and of the surface and volume rendering modalities of the Amira software. We were able to accurately analyze the topology of all the important morphological and histological features of 14.5 days old mouse embryos. This even included small and hard to detect structures, such as cranial nerves, ureters, paranephric ducts, brain nuclei, and the internal capsule. Our results impressively demonstrate that HREM data excellently fit for phenotyping and detecting tissue defects in embryos of knock-out mouse strains produced in large scale gene knock-out projects.

THREE DIMENSIONAL ANALYSES OF THE SPINAL ARACHNOIDAL VILLI

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Background: Spinal arachnoid villi (SAV) is the arachnoidal clusters and projections into and through the dura mater in the region of the dorsal root ganglia. However, its morphology and relationship between the venous vessels in the region remain unclear. In this study, we tried to understand the three dimensional structure of the SAV and its positional relationship among surrounding structure such as veins. Materials and Methods: One human cadaver, donated TMDU was used for this study. The eighth and ninth thoracic vertebrate was took out en bloc, demineralized, and embedded in paraffin. The serial transverse sections with 5 micrometer thickness were made including the intervertebral foramen and examined histologically. Positional relationships among spinal nerve roots, dura mater, venous plexus and SAV were analyzed with three dimensional reconstruction model by SrfII (Ratoc, JAPAN).

Results: There were three holes in dura mater near the spinal nerve root. Arachnoid membrane was observed continuously outside of the dura mater through this hole to form SAV. Thus, SAV completely pierce into interstitium surrounding the spinal root. SAV were observed at both left (two) and right (one) sides. Two of them were observed between the ventral and dorsal roots, and one was observed at anterior to the ventral root. SAV extended inferiorly along the venous plexus. There was no arachnoid villus staying within dura mater. The diameter of the SAV was about 0.3mm in the transverse plane, whereas its length was 3mm vertically. Vertebral venous plexus was observed around the spinal nerve root. Conclusion: According to these observations, SAV seems to be larger structure than that described in the previous literature. Positional relationship between the SAV and venous plexus indicates the possibility of the important role in cerebrospinal fluid absorption.

ETHICAL APPROACH OF MEDICAL STUDENTS TO ANATOMY PRACTICE

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Though the word “anatomy” first connotes cadaver, in other words dead body, anatomy as a science defines how a human body holds on life. However anatomy dissection room is probably the first place where a medical student first feels what death is. Though the dissection of human bodies was forbidden for years because of social and religious compulsions cadavers have been used for medical education more than 500 years. Even though the body had been dispensed by the consent of the individual himself or by his family using the human body as a dissection material for education still causes some ethical problems. Besides the social pressure, before entering the anatomy dissection room knowing that the first patient he/she will examine is a dead one causes an anxiety and stress. On the other it may be a valuable experience for the medical students to feel and understand death and to evaluate the respect that they should pay to their patients even though he/she is dead. In the recent years the difficulties in obtaining cadavers and the production of improved artificial models causes a decrease in the value of anatomy dissections. However dissection will certainly keep its place in medical curriculum helping the students to learn the details of human body and to understand that it is not a standard structure. In the present study a three-point Likert scale questioner containing 20 questions were prepared by the departments of anatomy and medical ethics and distributed to 250 term II medical students. The results of the study indicate that though the anatomy practice irritates the medical students at first they certainly believe that it is necessary for a qualified education.

THE OPINIONS OF MEDICAL STUDENTS ON PHASE I ANATOMY EDUCATION: A PRELIMINARY STUDY

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Anatomy was the unshakable foundation of medical curriculum for hundreds of years and is still fundamentally important in medical study and practice and forms the basis of medical education. However anatomy education became a controversial area in the last ten years. In recent years clinical states that rather than spending time for teaching clinical medicine on a qualified background they try to rebuild the basic science knowledge of the students. Not only the medical tutors but also the students emphasize the deficiencies in their anatomical knowledge when they start clinical training. In the present study the opinions of the students in the clinical courses on the basic anatomy education they had been given were evaluated. 102 medical students in the clinical courses were included in to the study. All the students were given a five-point Likert scale questioner on basic anatomy education prepared by the departments of anatomy and medical education. The results of the study indicate that students give more importance to practical education rather than classical lectures, and prefer a clinically oriented anatomy education. They also emphasize the importance of vertical integration and add that they forget their basic knowledge on anatomy long before they begin clinical courses.

LECTIN HISTOCHEMICAL RESEARCH OF CHORIONIC VILLI OF HUMAN EMBRYOS IN EARLY PREGNANCY LOSS

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Background: A critical role in human fetal development plays placenta, the fetal part of which is represented by chorionic villi (CV). During embryogenesis process chorionic villi pass three development phases. Primary CV consist of cythotrophoblast core and integumental syncytiotrophoblast layer; secondary are characterized by mesodermal invasion into cythotrophoblast core ; in tertial CV capillary system is formed inside the mesoderm. In normal cases forming of tertial CV ends at the end of third week of gestation. Aim of this study was to investigate lectin hystochemical properties of chorionic villi cells in embryos, that faded at 4-5 weeks of gestation.The initial concept of this work based on theory, that the stage of chorionic villi development can be evaluated by histological methods with the use of lectins that have different carbohydrate specificity. Materials and methods**:** CV tissue was seleted from 4-5 weeks pregnancy loss material, obtained after curettage and conservated in 4% neutral formalin solution and embedded in paraffin blocks. CV glycol-

polymers were studied by lectin-peroxidase technique with the use of PFA-, PNA-, GNA- and WGA-lectins. Results and discussion: High tropism of PFA-, PNA-, GNA- and WGA-lectins to the histological elements of CV in 4-5 week pregnancy loss embryos is shown. Lectin-peroxidase technique helped to differentiate secondary and tertial CV. Secondary CV are surrounded by syncytiotrophoblast layer with high expression of lectins and cythotrophoblast cells with less exposure and are filled by mesoderm with rudiments of capillary development; tertial CV are characterised by a developed system of capillaries and presence of GNA-positive Hofbauer cells in mesoderm tissue. These results are discussed from the perspective of the possible role of pathological processes, associated with the modification of glycopolymers of chorionic villi structural components, which probably leads to embryo trophic violation and can be one of the causes of pregnancy loss before the 5th week of gestation.

MORPHOLOGICAL DISPLAYS AND CLINICAL-EPIDEMIOLOGICAL ASPECTS OF MORBIDITY OF MUMPS I. ZUBKO, O. ADAMOVYCH, L. ZUBKO, I. PASKA
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Aim of Investigation: The purpose of our research was to study morphological changes which are taking place in parotid salivary glands and in other organs, particularly in pancreas and testicles during mumps. Materials and Methods: We used archived data histories of diseases of the Municipal Infectious Clinical Hospital of Lviv, regional sanitary-epidemiological stations and the Institute of Epidemiology Ministry of Health of Ukraine, where the information about the morbidity of mumps in Ukraine was taken, to analyze frequency of morbidity and its complications with affection of other organs. A clear tendency of decreasing of morbidity was observed during last years. In spite of this, group outbreaks of mumps are sometimes still taking place. Results: We analyzed a group outbreak of mumps among organized group aged 18-21 (five young men entered the municipal Infectious Clinical Hospital of the city within 15 days, none of the diseased was vaccinated against mumps at the age of 15). Among ill the moderate form of the disease was observed in 4 men and the heavy form - in one. The disease was accompanied by severe toxic syndromes in all patients; a significant enlargement of parotid salivary glands was noted during the palpation and ultrasonic examination; the signs of pancreatitis were confirmed by laboratory means. Orchitis developed in one patient. Conclusion: We consider that this group outbreak was caused by lack of proper post-vaccination immunity due to gross deviations from the immunization schedule. Signs of pancreatitis and orchitis, which were present in all patients, showed the need for careful clinical and laboratory examinations in patients with mumps.

