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SUMMARY

The following abstracts are some of those presented at this International Congress whose authors chose the European Journal of Anatomy as the vehicle for publication of their works.

Anatomical evaluation and the place of 3-quarter views in new face-detection technologies

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Recognizing others is mostly looking at their faces. Due to technical progress in the information technologies, computers have been able to distinguish faces for some time. Standard biometric recognition technologies use full-fledged frontal face view analysis. In our study we aimed to contribute to these systems by defining the dynamic anatomical parameters of complimentary 3-quarter views. Fifty volunteers, 25 male and 25 female, compiled the protocol were included in the study. High-resolution pictures of the volunteers were taken on three axes; full frontal, full side and 3-quarter views. Same volunteers were asked to show 5 basic facial expressions (happy, sad, afraid, angry, and surprised) for recording as high-definition individual portrait videos. The data collected were analyzed with the corresponding facial biometrics of the volunteers and archived to allow them to be used by systems applying advanced algorithms. Facial recognition techniques are usually based on biomechanics and anatomical features of the facial tissue. However, it is a tough task for recognition systems to distinguish a face with a changing appearance such as various facial expressions or hair lines, beards and moustaches different from those filed earlier. Advanced systems should be able to distinguish these different facial expressions and analyze the biometrics of anatomical structures beneath the facial muscles when stretched. Our findings show that such advanced analyses can be made even easier and better with 3-quarter views of the face. Analyzing and applying dynamic anatomical parameters of the 3-quarter view into new-generation facial recognition systems holds huge potential for the future.

Key words: facial recognition, facial anatomy, anatomical biometry.

Anatomical disposition of renal plexus structures in relation with the renal arteries. A preliminary study

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Catheter-based renal denervation aims at reducing blood pressure in patients with resistant hypertension. Successful application of the technique requires an exact knowledge of the anatomical arterial substrate and the disposition of the renal plexus in relation to the renal arteries. The goal of the present study was to describe the relationship between such structures.

Dissections of retroperitoneal region in 12 cadavers (six men and six women) from diaphragm to

iliac bifurcation were performed. The renal arteries and nervous structures were dissected out under microscopy for the visualization of ganglia and nerve fibers. The renal arteries were considered subdivided into the proximal, middle and distal thirds.

In 41.66% (10/24) of cases, the arteries showed variations in relation to the normal pattern. Homolateral ganglia were joined by neural strands and surrounded the proximal or middle third of the renal artery. Nervous structures constituted a complete ring in 37.5% (9/24) cases. Fibres from the semilunar ganglion were directed towards the middle and distal third of the arteries in 95.83% (23/24) of cases. In 16.66% (4/24) of cases, fibres from the mesenteric superior ganglion were observed on the proximal third of the arteries. Both groups of fibres were located on the superior, anterior and posterior arterial faces. Fibres from the sympathetic lumbar chain coursed along the inferior face of the artery in 95.83% (23/24) of cases. The lesser and lower thoracic splanchnic nerves were generally located in relation to the posterior ganglion. Fibres of all origins interconnected above all the arterial faces. The disposition of the nervous structures defines a general pattern, adapted to arterial variation.

Computer-assisted learning improves the imaging of anatomical structures

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Anatomy is taught in different courses for first year students at university. Accordingly, in recent years this educational anatomy has been modified in many universities. One of the modern methods used to teach and learn anatomy involves computer-assisted learning (CAL). The aim of this study was to determine the effect of anatomical software on imaging and a profound learning of anatomical structures.

30 BSc students of radiology at the Kashan University of Medical Sciences were selected for the anatomical course addressing the upper and lower limbs. The course on the upper limb was selected as control group and that on the lower limb as the case group. The lesson plan of each class was the same but the lower limb was presented on the computer by different software programs, such as locomotion and animation. The students in lower limb course were working with the computer in the class and used anatomical software. At the end of the course a standard questionnaire form was filled out by the students and the scores were compared.

The statistical analysis was processed by SPSS. The results of the questionnaire confirmed that students who used the computerized software showed better detailed imaging of anatomical structures and were better able to analyze the kinesiology and locomotion of the limbs (P<0.05). Our study confirms that computer-assisted learning encourages the students in the imaging of anatomy structures.

Hospitals can help anatomy teaching if they modern techniques in anatomy courses

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In the first years (3 years) of medical education in Iran students do not visit hospitals. Their scientific experience is limited to the classroom and basic science laboratories. In the present experiment, this characteristic of medical education is discussed as regards the anatomy of the limbs. We selected two sections of a hospital intimately related to limb anatomy: Orthopedics (in particular, surgery and radiology).

Seven students volunteered to spend time at a hospital. They were there to gain a better concept of limb anatomy, and were taught anatomical variations in the clinical setting.

Their experiences at the hospital were collected via questionnaires, and their data were compared with those of another 7 students who did not go the hospital. In the questionnaires we focused on the regions and sections observed in the operation room and radiology sections. The data were then analyzed.

In limb anatomy, like other areas of anatomy, we encountered some complex proximities and variations that are difficult to teach. Memory exercises are required but if these can be complemented by experience at a hospital, it is possible to transform experience into useful basic knowledge that will be attractive for medical students. They will find themselves facing the true realities of anatomy and this can help to solve many other issues toughing on anatomy.

We conclude that students' time at a hospital can be a good way to co-teach anatomy.

Dorsal column tracts of the spinal cord: clinical significance

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The dorsal column tracts are involved in the discriminative qualities of sensation and conscious awareness of movements of the body position of joints. In the literature there are controversial descriptions of the synapsing fibres of dorsal column tracts within the spinal cord. The aim of the present study is to study the synapsing fibres of the dorsal column tracts and discuss their clinical significance.

Three adult spinal cords were used. The spinous processes and laminae of all vertebrae were removed. The spinal cord specimens from the cervical, thoracic and lumbar levels were excised. Transverse sections were cut and stained with Luxol Fast Blue. Observations were made under light-microscopy.

Most posterior column tracts enter the spinal cord without synapsing in the dorsal horn. However, 5-10% of posterior column tracts synapse at lamina III and V and Clark's nucleus. Cervical spinal nerves synapse with lamina V and a few with lamina III. The postsynaptic fibres were arranged topographically. The upper thoracic spinal nerves (T1-T4) synapse at lamina V, whereas at lower thoracic levels (T5-T12) they synapse with Clark's nucleus. Lumbar spinal nerves synapse at Clark's nucleus. No synapses were observed with lamina III in lumbar spinal levels. Clark's dorsal nucleus extends as far as L5.

Textbooks sometimes contain contradicting and misleading statements in regard to these synapsing fibres and hence knowledge of the precise course of the tracts can be of utmost importance in neurological and neurosurgical treatments.

A new approach for the assessment of the degree of scoliosis: projection areas per length squares

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There are some methods for the assessment the degree of scoliosis. The methods available measure the angles of the tangential lines of the certain vertebral bodies, which limits the value of the results. In the present study we describe a practical method for evaluating the degree of thoracic and lumbar scoliosis on antero-posterior roentgenograms.

Antero-posterior roentgenograms were taken in 15 patients. The spinous processes of the T1, L1 and L5 vertebrae were marked and straight lines were drawn between these points. The curvatures of the vertebral bodies were drawn with respect to the landmarks established. The projection area per length squared (PAF) of the thoracic and lumbar regions were obtained in percentages.

The mean PAF value of the thoracic region was 12.28% (min-max: 10.56-13.97); the figure for the lumbar region was 24.52% (min-max: 19.85-28.01). Thoracic scoliosis was seen to be more severe than lumbar scoliosis.

In the present study we have tested a new approach to the assessment of the degree of scoliosis. In the future we plan to increase the number of subjects and compare the method with other tangential measurement techniques.

Are the interarytenoid muscles supplied by branches of both the recurrent and superior laryngeal nerves?

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It is generally accepted that the branches of the internal laryngeal nerve to the interarytenoid muscle are exclusively sensory. However, some experimental studies have suggested that these branches may contain motor axons and hence that the interarytenoid muscle is supplied by both the superior and recurrent laryngeal nerves. The aim of this work was to determine whether motor axons to the interarytenoid muscles are present in both laryngeal nerves.

Twelve human internal laryngeal nerves were dissected out and their branches to the interarytenoid muscle were removed and processed for choline-acetyltransferase immunohistochemistry; a method not previously used in studying the nerve fibre composition of the laryngeal nerves.

The internal laryngeal nerve gave off from 2 to 5 branches to the interarytenoid muscle. All branches contained motor axons, the proportion of motor axons varying from 6% to 31%.

The present study confirms that the internal laryngeal nerve provides a motor innervation to the interarytenoid muscles.

Evaluation of software for anatomical brain segmentation and parcellation

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Quantitative analyses of the brain and its structures are made to evaluate the relationship between structure and function. To accomplish this, magnetic resonance (MR) images of the brains of the subjects are taken and processed with brain segmentation and parcellation software. In the present study, we evaluated the advantages and disadvantages of three types of software for anatomical brain analyses.

The MRIStudio, BrainSuite and FreeSurfer softwares were evaluated. The setup steps, system requirements, processor speed, minimum RAM, user friendliness, processing time, and range of output data were evaluated.

MRIStudio is easy to set up and is user friendly; it does need a high-speed processor and a large RAM. Running time is approximately 30 minutes. However, it also needs a pipeline and the data are limited to the volume. BrainSuite software requires careful installation, a high-speed processor, and large RAM and up to 2 hours of processing. However, it is user friendly and it does not need a pipeline and provides data on volume, thickness and surface area. Installation of the FreeSurfer is difficult and needs knowledge of code. It requires a high-speed processor, large RAM, and up to 20 hours processing. However, it provides volume, thickness, surface area, folding patterns etc. together with group comparisons.

Researchers can chose the most appropriate software, depending on the hardware of their computers and computer knowledge and the data needed for the study.

Acute haematogenous multifocal osteomyelitis with Panton-Valentine leukocidin positive MRSA strain (MRSA-PVL) in an 11-year-old child: a case report and review of the literature

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Staphylococcus aureus (SA) is a common cause of disease in children. PVL is a major toxic virulence factor secreted by community-acquired methicillin-sensitive/methicillin-resistant SA. SA-PVL can be responsible for life-threatening infections in healthy children, with a broad spectrum of clinical presentations involving lung, skin, soft tissues, bones, and joints.

Here we report a case of a previously healthy 11-year-old boy who was taken to the hospital after a fall during a football game. No abnormal findings were detected at examination in A&E, and hence no X-rays were performed, the child being discharged with a prescription of analgesics.

Seven days later the child was admitted to orthopaediatric ward with increased pain in his left shoulder, high inflammatory markers and malaise. Initial X-rays & MRI identified a left upper haematoma (6 x 6 x 1.5 cm) on this humerus, with no signs of bone marrow infiltration. Subsequent MRI and isotope bone scanning revealed left proximal and distal humerus and right knee osteomyelitis. Initial antibiotherapy with IV Flucloxacillin proved inefficient. MRSA isolated from skin swabs, blood and synovial fluid was PVL-positive. Multiple surgical drainages and debridement, along with aggressive long-term IV Clindamycin, were implemented and there were no chronic osteomyelitis or sequelae at 18-months follow-up.

Few similar cases have been reported in the literature. Osteomyelitis caused by SA-PVL-positive strains should always be considered in severe infections. This is associated with more severe local disease and a greater systemic inflammatory response in comparison with with negative strains.

Acute multifocal haematogenous osteomyelitis in children needs early diagnosis with a high index of clinical suspicion, aggressive IV antibiotic treatment, and timely surgical intervention.

Aromatase P450 could be involved in the maintenance of the population of LH-positive pituitary cells in mice

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To determine the relevance of aromatase in the modulation of pituitary function, mainly associated with reproduction, a study of LH-positive cells in the pituitary of female and male mice knocked-out (ko) for aromatase was carried out. On considering all the LH-positive cells, significant increases in the cellular, nuclear and cytoplasmic areas were found in the ko animals with respect to the wt. Moreover, LH-positive cells were more abundant in the ko than in the wt mice. In all regions of the gland, LH-positive cells in the ko mice were characterized by a higher intensity of cytoplasmic reaction than in the wt mice. In general, LH-positive cells were more polygonal and exhibited more short and thick cytoplasmic prolongations in the ko than in the wt mice. Moreover, the LH-positive cells showed a greater proliferative rate in the ko than in the wt mice. All the findings observed are signs of morphological cellular hyperactivity, associated with an increase in the size of the cell and nuclear areas and an increase in the percentage of LH-positive cells. They suggest that the local production of estradiol mediated by pituitary aromatase is necessary for the regulation of LH gonadotropic cells, exerting an inhibitory auto-paracrine regulation. The results obtained suggest that by means of the aromatization of testosterone to estradiol, aromatase could modulate the pituitary population of LH-positive cells in males, and perhaps also in females, and could explain the higher pituitary aromatase expression observed in male mace t