

OSTEOPOROSIS AND LIFESTYLE FACTORS

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Osteoporosis is a disease characterized by low bone mass and deterioration in the microarchitecture of bone tissue, leading to an increased risk of fracture. Osteoporosis is associated with a number of lifestyle factors, including nutritional factors such as intake of calcium, protein, dairy food, fruits and vegetables and vitamin D status, and behavioral factors such as physical activity, smoking and alcohol consumption. Ensuring adequate calcium intake and vitamin D status and having regular weight-bearing physical activity throughout life are important for bone health and the prevention of osteoporosis and related fractures. Studies have shown that smoking and excessive alcohol intake have adverse effects on bone health and increase the risk of fracture. There is evidence suggesting that adequate protein intake and higher intake of fruits and vegetables are

beneficial to bone health. Good nutrition fuels our bone health by providing our body with the necessary quantities of vitamins, calcium, and high quality proteins that are required to maintain bone and muscle strength. Calcium is a key nutrient for all age groups but the amount needed varies at different stages of life. Demands are particularly high during the rapid period of growth in teenagers. As well, when bone density is decreasing in later years, a calcium-rich diet helps us to maintain bone mineral density. This applies to men and women of all ages. Vitamin D has been found to be of particular importance to bone health. It is known, we raise awareness of the broad prevalence of vitamin D deficiency and recommend supplementation with vitamin D in all adults age 60 years and older for its proven reduction of falls and fractures. Notably, vitamin D plays a critical role in bone development in children and correlates positively with bone density in younger adults. Apart from its benefit on calcium uptake in the bowel, vitamin D has a direct effect on muscle. As sufficient vitamin D is not obtained from an otherwise healthy diet and direct daily sun exposure, which is the main stimulus from vitamin D production in the skin, is limited in most adults, supplementation should be considered.

Keywords: Osteoporosis, Lifestyle Factors, Calcium, Vitamin D as Physical Activity.

ABOUT A CLINICAL CASE OF SECONDARY GROIN LYMPHOCELE TO ECMO

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The Authors describe the clinical case of O.S., aged 45, who came to their observation for the appearance of lymphocele in left groin region after ECMO procedure. The patient, suffering from idiopathic pulmonary fibrosis with very serious impairment of lung function, waiting to receive bilateral lung transplantation, underwent the extracorporeal membrane oxygenation procedure to the worsening of his clinical condition and the appearance of an ingravescent breathlessness, which put his life in serious danger. After undergoing a lung transplant the postoperative course took place regularly with the patient's discharge and resumption of her normal daily activities after an adequate period of convalescence. In April 2018,

about two months after the surgery, a clinical check highlights the presence of a lymphocele of the approximate size of 8 x 5 cm in the left groin region. The common femoral vein is unscathed by endoluminal thrombosis with negative CUS, but the caliber is reduced likely by compression of the lymph accumulated in the subcutaneous tissue of the inguino-crural region. It is decided not to intervene surgically in the removal of the lymphocele, but to treat it more conservatively with multiple evacuative punctures of the lymph, followed by endocavitary injection of lauromacrogol 400 to 3% and then compressive bandage left inguino-crural region. After 3 sessions of endocavitary sclerosis 15 days apart, the lymphocele gradually decreased in volume until its total disappearance after 3 months of treatment. In conclusion in our experience, as in that similar of other Authors, the non-aggressive treatment of the post ECMO groin lymphocele, using in consecutive sessions the endocavite injection of lauromacrogol 400 to 3% after insuction of the lymph and subsequent local compression of the inguino-crural region, proved to be an effective and safe method in achieving the patient's healing without resorting to surgical treatment of the lymphocele itself.

Keywords: extracorporeal membrane oxygenation, lymphocele, sclerotherapy.

THE PROSTATE: MYTH, MORPHOLOGY AND FUNCTION

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The Prostate (προστάτης, "in front of" in the pelvis) is usually known for the urinary and mictional symptoms caused by the diseases that affect it, while little is known about how its anatomy and physiology were discovered. Erofilo of Calcedonia, physician of the 4th century b.C. and founder of the Alexan-

dria medical school, was the first to describe this gland and, according to Aulo Cornelio Celso, he also coined the name.

Very little was known about this gland during the following centuries, until Vesalio described it (De Humani Corporis Fabrica) identifying the two lobes placed under the bladder neck; a similar description of the prostate was reported in the Historia Anatomica Humani Corporis Partes written by André du Laurens.

The modern anatomy of the gland was described in the 1970s by McNeal, who studied it on corpses and surgical samples. Bladder neck, ejaculatory ducts and urethral rbdomyosphincter were used as anatomical landmarks. He also described some regions of the prostate: central region, transitional re-

gions (which are the site of the BPH) and peripheral zones (the most common site of a carcinoma). This anatomic description made it possible to identify the sites of the prostatic diseases more precisely, improving the bioptic procedure and the surgical procedures regarding the gland.

The anatomic structure of the prostate can be described as numerous tubulo-acinar glandular groups, immersed in a stromal tissue composed by connective and fibromuscular cells; the secretive component becomes increasingly sparse in extreme periphery of the gland and it is replaced by stromal tissue. This area is crossed by the vessels and nervous fibers (erigentes nerves) controlling the erectile function.

Physiologically, the prostate is a secretive organ, producing 30% of the ejaculate.

This secretion contains enzymes, especially acid prostatic phosphatase, which produces coline from phosphorylcoline and PSA, a callicrein allowing a lysis of the ejaculated clot. The

secretive cells of the prostate produce corpuscles –the prostasomes- which contain enzymes, proteins appertaining to the Rho and RAS systems and electrolytes (Zn,Mg,Ca).

The prostasomes support the sperm in the capacitation and acrosomal reaction.

The fibromuscular cells of the prostate, controlled by α -adren-ergic system, interfere with the urethral resistance, thus co-operating in the regulation of the urinary flux and, in case of prostatic diseases, causing mictional troubles.

To conclude, the effects of prostatic diseases are widely known, unlike the morphology and function of the gland. However, this small organ is crucial for sexual/reproductive and mictional functions. The subject deserves therefore more recognition, in order to promote further research protocols and enrich the scientific knowledge of this normal and physiological domain.

Keywords: Prostatic anatomy, prostatic physiology, hystory of the prostate

EXPLORING THE PHYSICS OF SENSES

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Our knowledge of nature relies on sense experiences and perceptions enter in our modelling of reality. The everyday thinking of reality is often far away from the description that emerges from the scientific knowledge taught in school. To explore the physics of senses can be an effective way of improving the students' motivation and connect science to the real world that they experience. The discovery of the mechanisms that allow perceiving reality can make science interesting and useful because it satisfies questions that are deeply rooted. Many topics are involved in the physics of each sense, both to characterize the physical quanti-

ties that the sense perceives both to understand the physiological mechanisms that allow the perception. It is not unusual that advanced topics, such as resonance, can be introduced in this context in a very natural and easy way. To achieve a deeper student involvement, specific learning paths have been developed and tested. These paths are usually interdisciplinary and rely on many lab activities to favor active learning in students. Examples of the motivational strategy for some senses are given (sight, hearing, and touch). Preliminary tests with various groups of students (full classes, small groups in optional laboratory and a summer school) are presented. The main results indicate the effectiveness of these learning paths. Some difficulties emerge in expanding them at school whereas there is little habit of teachers to work closely together in interdisciplinary projects. Curricula in secondary school allow selecting topics by teachers and specific projects which enhance motivation are encouraged. How to promote and realize this motivational strategy in this context is discussed.

Keywords: Physics Teaching and Learning, Motivational strategies, Interdisciplinary learning paths

ECOTOXICOLOGY APPLIED TO SEDIMENT DREDGING FROM HARBOURS: DEVELOPMENT OF ITALIAN LAW

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Harbors are affected by high sedimentation rates that require frequent dredging operation to allow navigability. On the other hand, coastal areas located near to harbors are often affected by severe erosion processes, and represent the perfect place for the final disposal of dredged sediments. In spite of that, trace elements and organic chemicals could significantly pollute sediments collected from harbors also producing significant ecotoxicological effects on aquatic species. For this reason dredged sediments are often considered as wastes in spite of the fact that they represent a huge resource to manage coastal erosion. As sediments represent both a potential threat and a resource in coastal areas;

recently Italian Law (D.M. 173/2016) ruled general features for the evaluation of the quality of sediments before the release of authorization for dredging of bottoms from harbor ecosystem. Furthermore, for the very first time, the requirement to preferentially evaluate ecotoxicological effects as key aspect on the basis of which sediment classifications are performed and to consider dredged sediments as the preferentially resource to manage coastal erosion phenomena were both introduced by the Law. This paper highlight the evolution of Italian Law for concerning sediment dredging in coastal ecosystems focusing, in particular, on: i) operative procedures for the characterization; ii) quality evaluation of sediments; iii) classification of characterized materials and management options according to the resulting class of quality; iv) definition of environmental monitoring strategies. This paper highlights, in particular, recent advances in the sediment management coming from the introduction of the D.M. 173/2016 and the principal weaknesses, which must be implemented by future regulatory updates.

Keywords: ecotoxicology, sediment dredging, environmental quality.

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