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Electrocardiographic changes in junior athletes

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Recently, considerable efforts have been made to update the ECG interpretation guidelines in athletes. Whereas there is a significant amount of information regarding senior athletes, there is a slightly lack of data on ECG modifications in junior athletes.

The aim of the present display is to review the existing data in the literature concerning ECG changes in athletes under 18 years old. Two studies comparing groups of elite junior athletes aged 14-18 years with control groups showed higher prevalence among athletes of most of the ECG changes noticed in senior athletes: sinus bradycardia, sinus arrhythmia, first-degree atrioventricular block, longer PR interval, incomplete right bundle branch block, longer QT interval and higher Sokolow-Lyon index.

The ECG abnormalities that may indicate an underlying cardiovascular pathology in junior athletes are: ST segment depression or deep TWI in any lead, minor TWI in any lead in athletes older than 16 or in any lead except V1-V3 in athletes less than 16, pathological Q wave patterns, left axis deviation or complete bundle branch block. Furthermore, the significance of T wave inversion (TWI) in young athletes has been a subject of investigation lately. The term 'juvenile' ECG is used to denote TWI or a biphasic T-wave in V1-V3 leads in adolescents who have not reached physical maturity. Based on current evidence, TWI in anterior precordial leads up to V3 in athletes under 16 years of age should not require further investigations in the absence of symptoms, signs or a family history of cardiac disease. In conclusion, most of the ECG abnormalities found in junior athletes reflect either the 'juvenile' repolarization pattern or the physiological ECG changes related to the cardiac adaptation to physical exercise (the athlete's heart).

Key-words: ECG abnormalities, athletes, adolescents, repolarization pattern.

Therapeutic compensatory nutrition for athletes - particularities of gut microbiome of the athletes

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The athletes specific nutrition, as well as to the ones undergoing to severe physical and psychological efforts, must focus on the vital organs and systems protection, on the post effort recovery and on adjusting their body to future demands. After training, the body is weaker and exhausted, but will become stronger in the overcompensation phase when the body's functional reserves are restored to a level superior to the pre-training. Specific nutrition, as the numerous clinical trials already concluded, (even if many of them still in research), are the most important part of the recovery process and of improving performance. Therapeutic nutrition programs also play a role in maintaining health and facilitating growth processes. Dedicated researches over the past two decades show that intestinal microbial affects the body's health significantly, from the immune system's functions, metabolism, and body resistance to disease. Intestinal microbiota controls the oxidative stress and immune function of the inflammatory response and adjusts energy consumption during intense exercise. The probiotics (the brine pickles, the home-made Sauer borsch), which positively influence the intestinal microbiota, baobab powder (strong remineralizing, added during (re)hydration and millet (digestive engine, strong alkaline, antifungal, energizing) are the therapeutic nutritional tools to improve the general health of the athlete, increase their performance and ability to control inflammation and redox processes.

Key words: athletes, recovery, intestinal microbiota, probiotics.

Sleep and athletic performance

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Aim. This review tries to put together current information regarding sleep and its impact on motor and cognitive skills in athletic performance, as well as analyzing the impact of sleep hygiene in elite athletes. *Results:* Sleep takes almost a third

of our lives and it is considered critical to human cognitive and physiological function and yet its true function remains uncertain. The effects of sleep loss on physiological responses to exercise also remain ambiguous; however, it appears a reduction in sleep quality and quantity could result in an autonomic nervous system imbalance, simulating symptoms of the overtraining syndrome. Additionally, increases in pro-inflammatory cytokines following sleep loss could promote immune system dysfunction. Regarding sleep hygiene, general measures revealed irregular sleep-wake patterns, psychological strain and activating pre-sleep behaviors. At the daily level, blue-light exposure and late-evening consumption of heavy meals were frequently reported. Optimizing regular sleep-wake patterns and reducing psychological strain, may facilitate sleep improvement process. *Discussions.* Due to the complexity of sleep function, the limited availability of athletes to participate in sleep studies, especially in team sports, and the variability in the individual requirement for sleep, the effects of sleep loss on specific athletic performance are poorly understood. *Conclusions.* There are mixed opinions regarding performance decline in current scientific literature. Tasks requiring short-term high-power output seem largely unaffected, while endurance performance seems to decrease after sleep deprivation. Sleep initiation is influenced by numerous factors, reinforcing the need for future research to identify such factors. There is ample room for optimization, specifically in onset latency and in wake after sleep onset. Optimizing regular sleep-wake patterns and reducing psychological strain, may facilitate sleep improvement process.

Key words: sleep, athletic performance, elite sports.

Apnea in professional athletes - biomechanical and biochemical aspects

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Introduction. Although there are a lot of research articles regarding apnea during sleep in professional athletes, there is little literature of the role of apnea in athletic performance. There is evidence showing that prolonged states of apnea in deep sea divers change the physiological response of breathing in all the levels of the respiratory control mechanism: central nervous system, peripheral nervous system, chemoreceptors and mechanical receptors. Also, knowing that the muscles involved in breathing, besides the diaphragm, are also involved in postural and other compound movements with direct or indirect role, we can suppose that apnea has a role in athletic performance and can be further investigated. *Material and Method.* A systematic review of several studies that address this topic indirectly and hopefully will raise further questions and will make the subject of a case study.

Conclusions. With existing evidence that intermittent apnea during sleep and prolonged apnea in certain athletes (deep sea divers, swimmers and particular branches of martial artists) and non-athletes (yoga masters), changes the carbon dioxide sensitivity of the respiratory chemoreceptors, in such a way that the body can delay the physiological reflex of breathing and continues to perform in hypercapnic and hypoxic conditions. This means that an athlete with decreased sensitivity to CO₂ via specific training can postpone his normal breathing reactions and be focused on his activity without being concentrated on breathing. Keeping in mind that most team sports have both aerobic and anaerobic requirements, and the anaerobic part is responsible for most of the major game changing decisions and highlights (cross-overs in basketball, football, rugby), all these increased athletic abilities are made in a mechanical induced apnea due to contractions of the muscles involved in breathing.

Key words: intermittent sleep apnea, athletes, training, sensitivity to CO₂.

Sudden death associated with ventricular arrhythmias in athletes

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Introduction. The effort to reduce the risk of sudden cardiac death (SCD) has materialised over time in consensus recommendations for athletes with rhythm disturbances. Ventricular premature contractions (PVCs) and ventricular tachycardia (VT) may be the first manifestation of a structural disease with arrhythmogenic potential (hypertrophic cardiomyopathy, myocarditis, arrhythmogenic right ventricular dysplasia (ARVD), etc.). However, the two major milestones of athletes' rhythm disorders management - the Bethesda Conference # 36 and the ESC consensus recommendations does not present a firm and clear indication for electrophysiological study (SEF) in athletes with ventricular arrhythmia. *Material and Method.* Ninety-seven young, competitive and recreational athletes (mean age 17.3±6.2 years) with ventricular arrhythmia, were evaluated in the electrophysiology laboratory during 16 years (between 2002 and 2018). The study included patients addressed with positive history of arrhythmia (including history of palpitations and syncope) and one or more of the following criteria: ECG documented VA, Holter monitoring showing a number ≥2000 PVCs/24h, non-sustained or sustained VT. All patients were evaluated by resting 12 lead ECG, effort testing, echocardiography and electrophysiological study (EPS). *Results.* Ventricular arrhythmia was

prevalently documented on Holter monitoring (62p, 63.9%) and in the remaining cases during exercise testing (23p, 23,7%) and based on the resting 12-lead ECG (12p, 12.3%). From all patients, 83p (85.5%) presented with right VAs and 14p (14.4%) presented with left VAs. In the right VA group, 16p (19.2%) were diagnosed with sustained right ventricular outflow tract (RVOT) tachycardia, 1p (1.2%) with ARVD and multiple forms of sustained VT originating outside the RVOT from which 2 were associated with hemodynamic deterioration and the rest of 66p (79.5%) with PVCs from the RVOT (83.1% monomorphic, 16.9% polymorphic). Regarding the left VA group, a number of 2p (16.66%) presented with sustained LVOT tachycardia and the rest of 12p (83.3%) were diagnosed with monomorphic LVOT PVCs. A clear risk of SCD was identified in 3p (3,09%) - 1p with RVOT monomorphic PVCs which presented with cardiac arrest by ventricular fibrillation during the EPS, 1p with multiple forms of fast right VTs associated with ARVD and 1p with very fast RVOT monomorphic VT associated with hemodynamic collapse and syncope which occurred during a football match, reproduced during the EPS. *Conclusions.* In symptomatic athletes with VAs, the evaluation by EPS should be mandatory for the identification of electrical instability and for stratifying the risk of SCD.

Key words: *athletes, rhythm disturbances, sudden cardiac death.*

Antioxidants and physical performance – focus on α -lipoic acid

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Despite the frequent use of antioxidant supplements among athletes, until now there has been no convincing scientific evidence to prove the presumption that antioxidant supplementations enhance sport performance, increase the health benefits of exercise or decrease sports injuries. Due to the different structure and biological effects of the antioxidant compounds, generalizing any individual supplementation result to all antioxidant supplements may be problematic. The reasons behind the contradictory findings or inconsistent results among the studies could be explained by several factors: differences in exercise protocols, characteristics of the subject population (sex, age, prior training and physical activity status), dosage, form, duration, timing of the supplementation and the method used to assess the outcomes of the intervention.

α -lipoic acid (also known as thioctic acid) is a natural thiol antioxidant and redox modulator that is widely used as a therapeutic agent in many oxidative stress-associated diseases (eg. diabetes and diabetic neuropathy). The two enantiomers of the α -lipoic acid are the Sform and the Rform. In addition to its potent antioxidant properties as a direct scavenger of various reactive oxygen species (ROS), it also increases glutathione (GSH) synthesis and act together with vitamin C to contribute to the regeneration of vitamin E. Despite the favorable data in the animal models, the result in athletes are inconsistent. Many of the studies done in athletes investigated miscellaneous co-ingestion formula containing also different quantities of α -lipoic acid. So far, no study evaluating intravenous α -lipoic acid in athletes was performed.

Key words: *α -lipoic acid, athlete, physical performance, antioxidant.*

The electrocardiogram in children – normal pattern, specific features

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The interpretation of the electrocardiogram in children must follow the same principles as for the adults, rigorously following the same steps in reading the ECG tracing, but taking into account the variability of the normal pattern with age. The hallmark of the ECG changes in the normal child are the age-related transitions of QRS morphology, QRS duration, and the pattern of the ST segment and T wave. During normal development, there is a gradual decrease in heart rate and an increase in P-wave duration, PR interval, and QRS duration. There is a change in the QRS voltage as well. A special interest should be given to the QT interval, which must always be corrected to the heart rate – measurement of the QTc. Special attention should be given in interpretation of the ECG repolarization in children, teenagers.

Key words: *children, ECG repolarization, pattern.*

The potential of Magnesium Orotat like safely performance enhancing compound

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Magnesium is one of the most popular mineral supplements amongst athletes and general population. Being involved in many enzymatic systems, magnesium is necessary for protein synthesis, functioning of nervous and muscular systems, regulation of blood pressure and glycaemia, bone metabolism.

In athletic performance, magnesium supplements showed to increase the physical endurance, force indices and muscle metabolism, even if it is still uncertain whether the positive effects are due to pharmacological actions of magnesium itself or to the reversal of a pre-existing magnesium deficiency. Anyway, athletes are a group at risk from magnesium deficit owing to metabolic depletion linked to physical exercise.

Besides of the amount of elemental magnesium in supplements, the aspect of the chelating amino acid or anion to which it's bound is very important on the bioavailability of the magnesium itself. The magnesium bound to orotic acid not only create a product with a very high bioavailability but a supplement with additive and synergistic interactions of these two nutrients. Magnesium Orotate is not just a magnesium supplement because it's benefit derives from the orotic acid as much as it does from the magnesium itself. There are a variety of studies showing the potential of orotic acid as an ergogenic aid to exercise. In this presentation we will review the necessary qualifications for the Magnesium Orotat to be used as a natural and safely ergogenic aid for athletes.

Key words: magnesium, orotic acid, ergogenic, athletes, supplement.

Pain tolerance in elite athletes

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Pain for the athlete is an inseparable element of the training process, a sign of pushing the physiological limits. The perception of pain in sport indicates the limit which should not be exceeded for exercise to remain safe and it is different for each athlete. In sport performance it's about how the athletes perceive pain, how they overcome pain and how they distinguish between being, non-harmful pain, pain for growth and potentially damaging pain.

In terms of gender differences, although the general perception is that women have a higher capacity of coping with pain. The pain tolerance in women is significantly increased during menstruation, as compared to other moments of the cycle.

Morgan and Pollock have identified two strategies that athletes use when dealing with pain: - *dissociative*: external factors – listening to music, focusing on the opponent, on the competition; used by women - *associative*: focusing on sensations in the body, complete monitoring the pain. The athletes don't fight the pain, they fraternize with it – use by men athletes. In our experience, women athletes tend to train longer on acute pain, so they have a longer period of rehabilitation after injury, both from a medical and psychological point of view.

If the pain appears during the competition, somehow it has a facilitating role in high-performance athletes. So the pain has a role in diminishing the competition pressure a positive attitude and internal dialogue are very significant in increasing pain tolerance. The athlete can, to a certain degree, prepare for pain. His success can be also attributed to his ability to tolerate pain!

Key words: athletes, pain perception, competition, pain tolerance.

Preparticipation evaluation (PPE) of type 1 diabetic athlete – the diabetologist point of view

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As highlighted by all the professional organizations around the globe, regular exercise (both aerobic and resistance) improves insulin action, increases cardiorespiratory fitness, improves psychosocial status and reduces the risk of

diabetes-related complications in persons with type 1 diabetes (T1DM). Based on current research and literature, creating a personalized management care plan (in which PPE has a central role) is the recommended approach in the case of T1DM athletes. When evaluating a T1DM athlete, the health care team must focus on the patient's knowledge of the disease and initiation of habitual monitoring of blood glucose. Education on the possibility of hypo- and hyperglycemia and its symptoms should be reviewed in detail. After thoroughly general physical examination, a careful screening for diabetic specific microvascular complications (neuro-, retino- and nephropathy) is required. The screening for cardiovascular disease should occur at intervals recommended by the athlete's endocrinologist or cardiologist. Possible exercise limitations or restrictions for athletes with diabetes-related complications should be determined by the athlete's physician. Newer diagnostic tools like Sudoscan, Cardiosys, Corneal Confocal Microscopy and AGE Reader have improved considerably the early detection of diabetes related complications and silent atherosclerotic cardiovascular disease (ASCVD). Regarding labs exams, these should include: a complete lipids profile, uric acid, urine test and glycated hemoglobin (A_{1c}) every 3 months to assess overall long-term glycemic control. However, A_{1c} should not be used to make day-to-day decisions concerning participation.

Key words: *type 1 diabetes, athlete, preparticipation evaluation, competition*

Procrastination in sports performance

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Procrastination is the tendency of avoidance and hesitation due to conflict or difficulty. This behavior has a great influence in sports performance considering the fact that it can make the difference between being on top or at the end of the ranking. Procrastination may appear due to perfectionism, fear of novelty or the unknown, fear of failure, dynamic instability and inconsistency and much more. In elite-sports procrastination may have a productive role or a debilitating role considering the psychology of each athlete. The debilitating role appears in the context of not trusting their body and mind and in this sense the medical staff and the psychologists have an important role. Our attitude can encourage or discourage procrastination in athletes. The productive procrastination is a fact at elite athletes being their resource for overcompensation. The present paper aims to present the mental dynamics of the athletes considering the age characteristics and taking into consideration the level of athletic development and to emphasize the role of the medical staff and the sport psychologists in each of the stages of development.

Key words: *procrastination, productive, debilitating, athletic development, medical staff.*

The significance of physical training in people with dementia

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Cognitive impairment and depressive symptoms can influence the risks of physical decline and cardiorespiratory fitness (CR) in people with dementia (PWD), increasing mobility impairment and further loss of independence. Dementia is associated with impaired physical skills, showing an inferior performance in this group when compared to healthy older adults. Behavioral changes associated with the disease include reductions in physical activity which in turn may result in reduced fitness level. There is increasing interest in the role of physical exercise as therapeutic strategy for individuals with Alzheimer's disease. Researchers found evidence that improvements in cardiorespiratory fitness were related to benefits in memory performance, functional ability and to changes in bilateral hippocampal volume. Increased cardiorespiratory fitness also attenuates the detrimental effects of cerebral amyloid on cognition.

Greater balance and gait disturbances have been found in people with dementia when compared with older people in general. These have been shown to occur in relatively early stages of the dementia pathway and may explain the increased incidence of falls in people with dementia, and have been shown to be a predictive factor for people with dementia needing permanent nursing facility admission. A virtual reality-training program (with the use of fall-prevention specific exercises) could improve the outcomes in terms of balance, depression, and quality of life in patients with cognitive decline.

Key words: *cardiorespiratory fitness, physical exercise, balance, virtual reality.*

Rehabilitation Issues of the Lower Limb Pathology in Female Futsal

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Introduction. Women soccer is lately in a continuous growing trend. UEFA and FIFA highlight its importance among modern sports and encourage training for young women. The newest soccer branch in Romania is women futsal appeared just from 2017. Futsal contributes to develop players' skills in small spaces and also helps them making best decisions in short periods of time during the match.

The international literature studying the traumatic injuries during futsal shows us a high frequency of lesions in the lower limb, especially the ankle, followed by head, neck and upper limb.

Material and Method. We have studied a group of 10 female athletes with ankle sprain playing futsal one year long from May 2017 to May 2018 for the Romanian National Futsal Team. They were injured during training or competition. Pain and edema were measured immediately after injury and 1 week later. The therapy consisted in ice spray, ice packs, immobilization, NSAIDS, miorelaxants, posture, sport rest. After a period of 1 day, light massage therapy including NSAIDS, antithrombotics and adapted physical therapy were added.

Results. The short term results show a net improvement in symptomatology and the possibility to continue the training or competition. *Conclusions.* Ankle injury is one of the most common sports injuries in contact sports. Ankle sprains occur frequently and can lead to chronic pain and instability. A proper training should work on muscle force, joint stability and proprioception for prevention, therapy and avoid re-injury.

Key-words: futsal, ankle sprain, physical therapy.

Mental training – a possibility to improve individual results

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Mental training is an important component of general training, contributing to an increase in individual performance – this is a well-known fact. It is also known that more and more athletes turn to coaching or to sports psychologists in order to improve their athletic abilities.

The novelty of the present study is twofold: firstly, it brings an actual measure (in centimeters) for this „improvement” - literature written on this subject talks often about the benefits of mental training, but most times this is only connected to influencing certain personality traits that help the athlete motivate himself /herself better. With the present study, we are going to show measurable results.

Secondly, the novelty also lies in the techniques we have used: a combination of elements from Mindfulness and Neuro-Linguistic Programming, allowing the athlete to relax very quickly, to access his / her inner emotional resources for support, to project them over the physical effort and to anchor that state within their body, in order for them to be able to access it at the time when they need it.

The study included 40 students (13 females, 27 males) from the Faculty of Physical Education and Sports, Iasi. We divided the subjects into two units – Group A and Group B. The subjects had to perform three different jumps: squat jump, countermovement jump, free jump (Initial test), then we applied the POLAR Pro Team device in order to monitor their heart rate, followed by a 30-minutes session of mental training, and then the Second test for all three jumps (which were performed in the same order as initially).

The average of the improvement values after the 30 minutes mental training session was: 0.1 cm in Group A & 0.52 cm in Group B for the squat jump, 0.53 cm (Group A) & 0.98 cm (Group B) for the countermovement jump, 0.3 cm (Group A) & 0.05 cm (Group B) for the free jump.

Compared to the common protocol, Group A benefitted from an extra 15-minutes session for recalling the mental training, followed by a Third (final) testing. The difference between the average values for the second and third jumps was 1.10 cm for the squat jump, 1.2 cm for the countermovement jump and 0.67 cm for the free jump – which highlights the fact that repeating elements from mental training increases the performance of those who practice it. Support for this data is also accompanied by a recording of heart rate values – which in this case is an indicator of the athletes' involvement in the mental processes that occur during the 30- and 15-minutes session: statistically significant values ($p \leq 0,001$ $p \leq 0,0001$) are recorded between the resting state (average of 67.2 beats/minute), the 30-minutes session (average of 89 beats/minute) and the 15-minutes session (106.2 beats/minute).

Key words: mental training, coaching, mindfulness, jumping, performance, heart rate.

Secondary rupture after ACL reconstruction - aspects related to graft choice, athletes vs. non-athletes' needs, and post-operative recovery

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Introduction. The current standard of care in the rupture of the anterior cruciate ligament is reconstruction by ligamentoplasty, noting that, although mechanical knee stability is restored, the postoperative results may vary. Consequently, the incidence of a secondary rupture is reported to be 15 times higher in athletes returning to sports than in the nonoperative population with ligament reconstruction.

The purpose of the study is to evaluate the rehabilitation rate of athletes compared to non-athletes after the ACL reconstruction in the first 3 years. We compare the graft choice and discuss the reason for choosing the graft required for athletes and non-athletes reconstruction and its relationship with graft failure. Moreover, we discuss the time to return to sports with cutting movements after surgery, depending on the type of graft.

Material and Method. Our prospective study, conducted over a 4 year period (2013-2016), included a group of 68 patients, non-professional athletes, recreational athletes, and 42 athletes at risk (18 football, 5 Judo, 4 Skiers, 6 Basketball, 9 Handball). The choice of graft type was made by preoperative planning and taking into account the fact that contact athletes, high BMI and need for early recovery are better addressed through the patellar tendon graft, while the remainder were rebuilt with the hamstring tendon. The result was 52 reconstructions with hamstring and 16 Bone – Patellar Tendon – Bone for the non – athletic group and 22 hamstring and 20 BTB reconstructions for the professional athletes' professional group. *Results.* 2 years after the ACL reconstruction, the overall graft failure rate was 21.4 (9 failures) for the group of professional athletes, of which 8 were patients with hamstring and 16.1 (13 failures) the group of professional athletes out of which 9 were the hamstring grafts. The return to sport for the first group was 6.5 months after surgery, while for the second group the average return to sports was 5.5 months.

Conclusion. This study revealed a small increase in ACL recurrence after returning to sports in the first 2 years after reconstruction of ligaments in professional athletes compared to the young active population. The period of rehabilitation of athletes is higher due to the high demand for professional sports, and the graft choice is in favor of the patella – bone tendon graft, due to a stronger fixation and higher traction resistance. In younger patients, recreational athletes, graft choice is usually for hamstring tendons, but combined with a reduced rehabilitation time, seems to have a higher incidence of re-rupture. Overall, it appears that reconstruction with the graft patellar tendon has a lower incidence of failure two years after surgery, compared to the hamstring graft, for both professional athletes and recreational athletes.

Key words: anterior cruciate ligament, ligamentoplasty, graft patellar tendon, athletes rehabilitation.

Contemporary architecture as support for active and healthy ageing with accent on the importance of physical activity

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According to WHO (2002), active ageing is the process of optimizing opportunities for health, participation and security in order to enhance quality as people age. The newest concept, healthy ageing (WHO, 2015) is a process of developing and maintaining functional ability that enables wellbeing in the older age. Physical activity is a significant component for a healthy lifestyle that increases healthy life expectancy, preventing sarcopenia and frailty syndrome in the elderly. Functional ability depends on the individual but also on the environmental as support for active and healthy ageing in community, insisting on supporting physical activity. *Material and Method.* Active ageing refers to continuing participation in all fields, social, economic, cultural, spiritual and civic affairs, but we will focus on the ability to be physically active. Different types of the age-friendly environments are interdisciplinary analyzed, from private to public space, from home to socio-cultural facilities. The concept of age- friendly architecture is verified based on contemporary examples of architecture from Europe and Romania. *Results.* The research reveals good practice in countries that apply active ageing policies and programmes. *Discussion.* Romania is an ageing country also and must taken into account more seriously the importance of built environment for an active and healthy ageing. *Conclusion.* In an ageing society, a shift of paradigm is necessary for contemporary architecture in all levels, from private to public space, from dwelling to social-cultural facilities and furthermore, to city scale. Architecture has a major in changing lifestyle, increasing independence, supporting physical activity for healthy people but also for the disabled, facilitating communication, interaction, promoting active and healthy ageing, being universal.

Key words: architecture, active ageing, healthy ageing, physical activity, age-friendly environment.

The new classification of sports - the Italian standpoint in 2017

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The main purpose of the classification of sports is for allowing the type of exercise (dynamic, static) to be included into a category, in relation to the intensity and duration of the cardiovascular response and adaptation. Consequently, an athlete with a specific cardiovascular anomaly can be (or not) eligible for a particular competitive sport. The actual classification of sports, rely on the dynamic and static exercise with three levels of intensity (low, medium, high).

Experts of the Italian Society of Sport Cardiology (Societa Italiana di Cardiologia dello Sport- SICSport) and the Italian Society of Cardiology realize a new classification, including five categories, accroding to the cardiovascular response to effort. Key words: *classification of sports , cardiovascular response, athletes.*

The cardiovascular assessment of the cardiomyopathies in athletes – a guideline for the practice of echocardiography in the cardiovascular screening of sports participants

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The cardiac arrest and sudden cardiac death, even rare events, have a devastating impact to the athletes, their families and sport communities. The cardiomyopathies are well known causes of sudden cardiac death. The cardiac screening, especially the echocardiographic examination is aimed at identifying these diseases.

British Society of Echocardiography has specific protocols for the young athletes screening.

Case Presentations: Brugada syndrome -young female athlete, 21 yrs aged - syncope. Left ventricular trabeculations vs noncompactation - male, 21 yrs aged , football.

Key words: *sudden cardiac death, cardiac screening, athletes.*