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Theme : SPORTS MEDICINE



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SPORTS MEDICINE

INTRODUCTION



Sports Medicine is "the scientific and clinical testing, manipulation, and care of those who exercise, especially athletes"

Sports medicine is defined as a multidisciplinary field of healthcare that deals with the medical aspects of physical activity and sports. It involves the application of medical principles to promote safe participation, prevent injuries, manage sports-related illnesses and conditions, and improve athletic performance. They provide evidence-based advice on safe participation in sport and exercise, as well as promoting a physically active lifestyle to help individuals improve and maintain their quality of life. There is often a misconception that sports medicine professionals only work with elite and high-level athletes, but these professionals provide services to athletes of all ages and of all levels, as well as to physically active people and those who take part in recreational exercise.

Practitioners in this field include sports medicine physicians, orthopedic surgeons, physical therapists, athletic trainers, nutritionists, and sports psychologists, among others.

HISTORY OF SPORTS MEDICINE

Sports medicine practices in ancient cultures, such as Greece, Rome, and Egypt. Development of sports medicine during this period, including the role of physicians in treating injuries. In Late 19th and Early 20th Centuries emergence of modern sports medicine, including the establishment of the first sports medicine organizations. Recent developments in sports medicine, including advances in concussion protocols, genetic testing, and regenerative medicine.

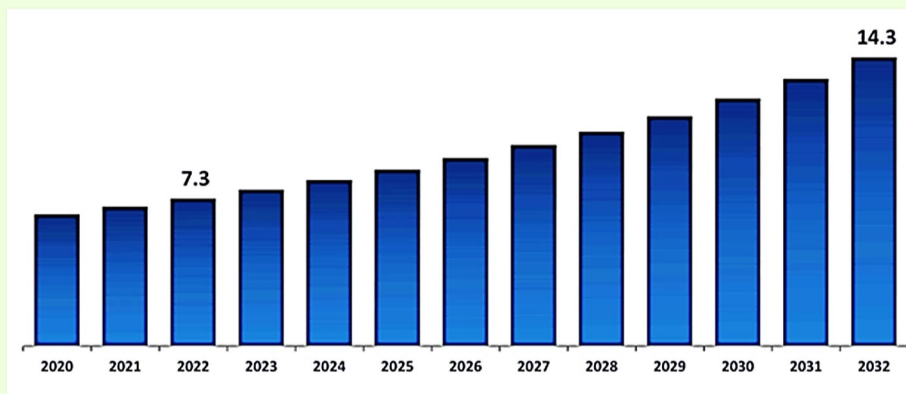
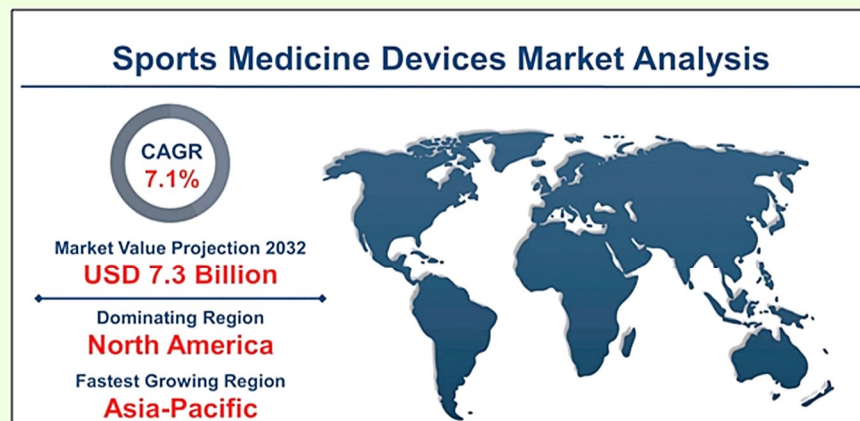


The role of sports medicine in the Olympic Games, including the development of the Olympic Village Polyclinic. History of organizations like the American College of Sports Medicine (ACSM), the American Orthopaedic Society for Sports Medicine (AOSSM), and the International Federation of Sports Medicine (FIMS) are Development of Sports Medicine Organizations. Advances in Diagnostic Technology of imaging technologies like X-rays, MRIs, and CT scans on sports medicine. Sports Medicine and Social Issues of Historical intersection of sports medicine with social issues like racism, sexism, and disability rights Evolution of Sports Equipment and Safety Gear how improvements in equipment design have reduced injuries and improved athlete safety.

SPORTS MEDICINE MARKET SIZE



The Global Sports Medicine Devices Market Size accounted for USD 7.3 Billion in 2022 and is projected to achieve a market size of USD 14.3 Billion by 2032 growing at a CAGR of 7.1% from 2023 to 2032.



Global Sports Medicine Devices Market revenue is expected to increase by USD 14.3 Billion by 2032, with a 7.1% CAGR from 2023 to 2032. North America region led with more than 39% of Sports Medicine Devices Market share in 2022

Asia-Pacific sports medicine devices market growth will record a CAGR of more than 8% from 2023 to 2032. By product, the body reconstruction and repair segment has accounted more than 38% of the revenue share in 2022

By application, the knee injury segment is predicted to grow at the fastest CAGR of 7.8% between 2023 and 2032. Increasing prevalence of sports-related injuries, drives the Sports Medicine Devices Market value

Sports Derived Drugs Market Many drugs and other substances are banned in sport because they may give an athlete an unfair advantage. Athletes might be tempted to use performance and image-enhancing drugs (PIEDs) because of a desire to win. Using drugs to improve performance in sport may lead to an athlete being banned and may also harm their health.

APPROACH TO SPORTS MEDICINE



Injury Prevention: Implementing strategies and training programs to minimize the risk of sports-related injuries.



Diagnosis and Treatment: Assessing and managing acute and chronic injuries resulting from physical activity.



Rehabilitation: Designing and supervising rehabilitation programs to facilitate recovery and return to activity.



Performance Enhancement: Advising on techniques, nutrition, and conditioning to optimize athletic performance.



Education and Counseling: Providing education on safe exercise practices, injury prevention, and healthy lifestyle choices.

SPORTS NATURAL PRODUCTS IN DRUG RESEARCH



In sport, most supplements from herbs or plants were used to enhance muscle growth and fat burning. Different commercial products such as “Sport Pharm” which contains numerous herbals, counting “Thermadrene”, “MaHuang”, “Guarana”, “Caffeine”, “Purple Willow Bark”, “Cayenne”, “pepper” and “Ginger root”, are believed to increase mental vigilance, stimulate fat-burning metabolism, and improves muscle performance.

Herbal supplements are currently used by athletes and non-athletes alike to improve endurance and strength performance, however number of them have not proven safe and effective under current FDA standards.

MEDICAL CARE FOR DIFFERENTLY ABLED ATHLETES

Able-bodied athletes often face various obstacles throughout their careers, but disabled athletes encounter even more significant challenges.

Summer Paralympic Games grew from 400 athletes from 23 countries in 1960 to 3,806 athletes from 136 countries in 2004. This growth demands that sports medicine professionals become more proficient in working with this unique population.

The Federal Rehabilitation Act of 1973 prohibits excluding qualified individuals from participating in federally funded programs, while the Americans with Disabilities Act (ADA) of 1990 extends these rights to the private sector.

The World Health Organization (WHO) further classifies impairment as any loss or abnormality of psychological, physical, or anatomical structure or function.

Sports clubs for the deaf existed as early as 1888 in Berlin, and the World Organization of Sport for the Deaf was founded in 1922.

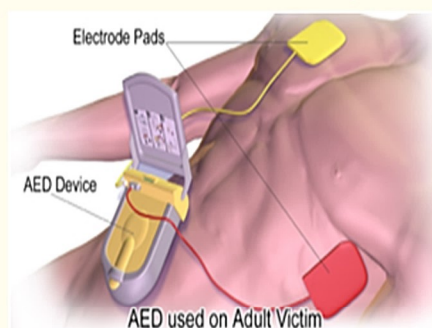
Sports for people with physical disabilities emerged shortly after World War II, primarily to rehabilitate injured veterans, women, and civilians.

The Special Olympics, established in 1968 by Eunice Kennedy Shriver, offers athletic competition for children and adults with intellectual disabilities.

Over time, numerous organizations were established to support disabled athletes, such as the International Paralympic Committee (IPC) in 1989.

MEDICAL RELATED ISSUES IN SPORTS MEDICINE

Sudden Cardiac Death in Sports



Sports Medicine personnel should suspect sudden cardiac arrest (SCA) and impending death when an athlete collapses and is unresponsive. Immediately assess the patient's airway, breathing, circulation, and rhythm if an AED is available. Some athlete may make complaints of dizziness, lightheadedness, or a racing pulse before collapsing. An hour before the incident, athletes may complain of chest pain, shortness of breath, nausea and or vomiting.

Any athlete who is unresponsive after a collapse should be treated immediately and SCA is suspected first until ruled out. CPR protocols should be initiated if breathing and pulse are absent.

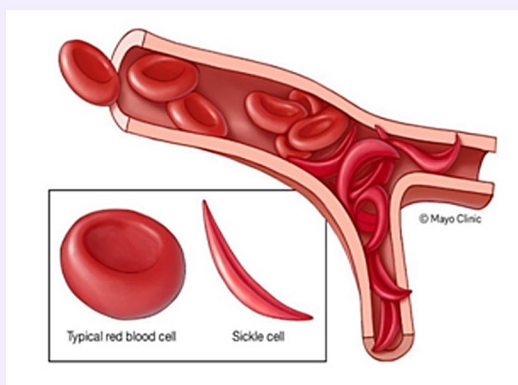
Exercise training also reduces the risk of asthma exacerbations, improves exercise capacity, and decreases frequency and severity of exercise induced asthma (EIB).

To minimize the risk of exercise induced bronchoconstriction [EIB], asthma must be well controlled, and specific pharmacological and non-pharmacological preventative measures can be taken ie athletes must have optimal asthma control and apply preventative measures against EIB, taking into account antidoping regulations for asthma medications.

Asthma in Sports



Sickle Cell Anemia in Sports



Sickle Cell Anemia (SCA) involves a distortion of red blood cells from their typical form, and are more likely to clog blood flow leading to infection, stroke and acute chest syndrome [14]. In the athletic world, sickle cell disease has been most prominently discussed in relation to football.

A sickle cell crisis can occur without warning with pain more severe than childbirth or postsurgical pain. The pain is often described as sharp, stabbing, knifelike, or throbbing. The most common locations for pain exacerbation include the low back region, left arm, abdomen, and chest. Temperature changes, stress, illness, dehydration, and high altitudes often bring on these crises

The athlete's goals, factors related to competitive sports that may affect glucose homeostasis, and strategies that may be employed to allow safe, effective sports participation. Athletes should be appropriately screened, counseled to avoid risky behaviors, and provided with specific recommendations for glucose monitoring and insulin and diet adjustments so that they may anticipate and compensate for glucose responses during sports competition.

Athletes with DM are on a case-by-case basis so their participation in physical activity and insulin regime will have to be modified according to the athlete's individual needs.

Diabetes in Sports



Hypertension in Sports



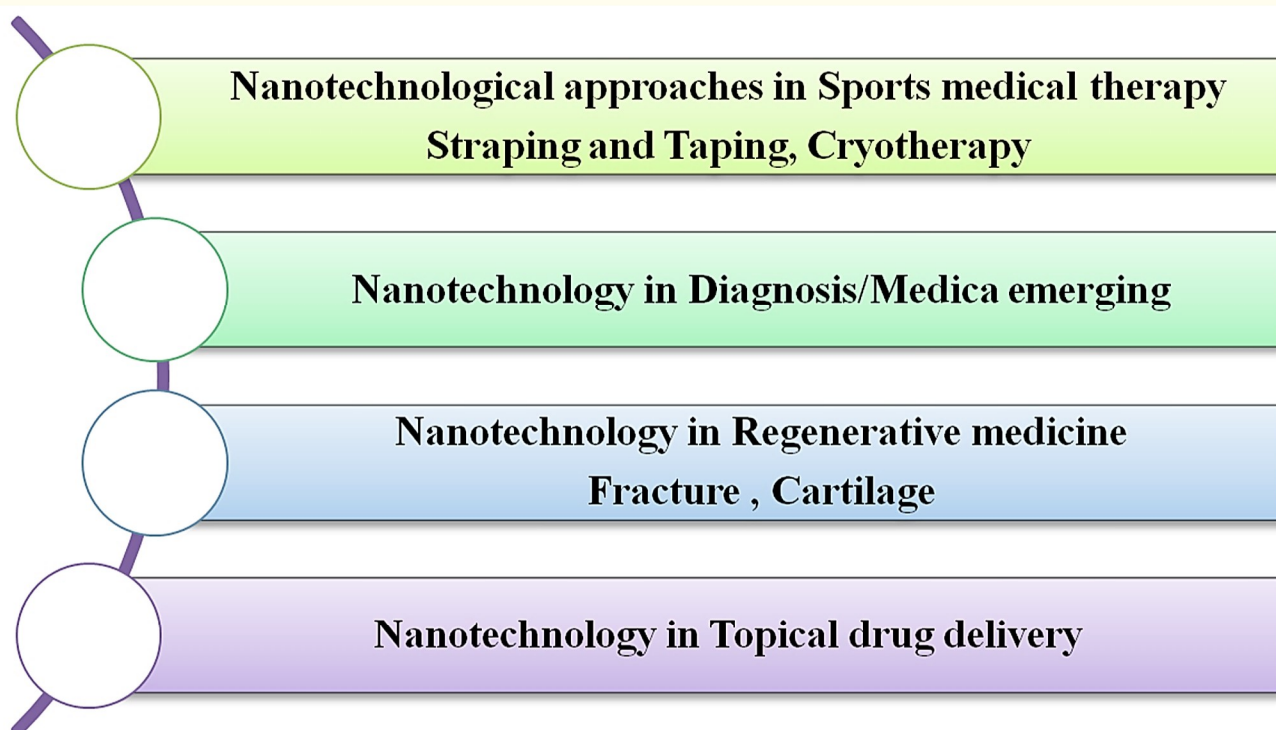
Athletes that are known to have hypertension should monitor their blood pressure prior to physical activity, and should not resume or initiate sports participation until their blood pressure is controlled. Dynamic and isometric exercise have an especially significant effect on blood pressure. Athletic individuals are 52% less likely to develop hypertension than the general population, it can occur.

African Americans, the elderly, people who are obese, and individuals with a history of renal disease, diabetes, or familial hypertension are at a greater risk of developing hypertension themselves. Additionally, wheelchair athletes who sustained a spinal cord injury are more likely to have hypertension due to abnormal autonomic control.

NANOTECHNOLOGY IN SPORTS MEDICINE

Nanotechnology concept has recently entered into the activities of daily living. Nanotechnology in sports medicine can be defined as the adaptation of all kinds of developments in nanoscale into medicinal applications related with sports injuries. The adapted developments can be either directly related with the medical interventions such as regeneration of a tissue, implantation, and drug therapies or supporting elements like imaging, strappings, and tapings.

Nanotechnological Approaches in Sports Medicinal Therapy is too difficult to put some limits over the therapeutical aspects in sports medicine, but some of them can be summarized especially with the frequently used applications. For instance, strapping and taping (nanotextile and adhesive), cryotherapy (nanocryogenicity), electrotherapy, TENS/electrodes, magnetic field/PEMF-SMF, drugs/controlled release, regenerative medicine, and implant applications are some of them.



SUBJECTIVE AND OBJECTIVE SPORTS MONITORING

Subjective and objective sports monitoring are distinct in acquiring information and their interpretations do not always agree. Objective monitoring commonly fragments the scale of observations to permit the quantitative precision of isolated metrics. Instead of fragmenting, subjective monitoring enables re-composition, integration and dimensional reduction, E.g., compression of psychological, biomechanical and physiological information.

The generation of subjective perceptions reflects the blended inputs of multiple channels of information, including the organism–environment interaction, highly relevant for health / performance regulation.

General health, well-being, recovery, happiness, readiness to train, stress and mood, all stand as examples.

Subjective monitoring may also integrate multiple dimensions of awareness, such as proprioceptive, kinaesthetic, body, somatic, interoceptive, environmental. Some authors have defined the in-situ interactions of these various flavours of awareness, as prospective situational awareness, conceptualizing it under the term of informed awareness. In that regard, in comparison with conventional objective monitoring, subjective data collection provides opportunities to capture and integrate online multiple streams of relevant and actionable sensory and perceptual information. The potential of such multidimensional subjective information, dwelling at different timescales, relates to the sensitivity for capturing the relevant changes of the organismenvironment interaction.

PROHIBITED DRUGS / PERFORMANCE ENHANCERS / BANNED DRUGS

Name	Effect	Unwanted Effects
Anabolic androgenic steroids	Increased muscle growth; increased red blood cell production	Decrease in endogenous sex hormones; acne; temporary infertility; rarely, increased aggression; ventricular hypertrophy; liver damage; virilization in females; testicular atrophy and gynecomastia in males; increase risk of prostate cancer
Human recombinant erythropoietin (EPO), darbepoetin	Increase red blood cell production (increases performance in endurance sports)	Can increase blood viscosity to dangerous levels in very high doses, increasing risk of stroke or heart attack
Some stimulants (Mesocarb, Bromantan, Etilefrine, Ephedrine, Amphetamine, Coaine, Adrenaline)	Improved alertness and reaction time; increased stamina;	Cardiovascular stress, increased risk of psychosis (amphetamine); cardiac arrhythmia, insomnia, bradycardia, tachycardia, anorexia
Enhancement of oxygen transfer-blood doping, perfluorochemicals	Increased red blood cell count	Risks identical to EPO or hypoxic training
Cannabinoids such as THC	None known-likely to decrease performance	None known

SPORTS WITH HIGH INJURY RATES



American Football

A study published in the Journal of Athletic Training found that college football players have an injury rate of about 8.1 injuries per 1,000 athlete exposures



Rugby

Research suggests that the injury rate in rugby can be as high as 81 injuries per 1,000 player hours for matches and about 3 injuries per 1,000 player hours during training.



Ice Hockey

study indicated that injury rates could range from about 15 to 35 injuries per 1,000 player-games, depending on the level of play.



Gymnastics

A study in the British Journal of Sports Medicine found that female gymnasts experienced 4.8 injuries per 1,000 hours of practice, with the risk being higher during competitions.



Basketball

A study in the American Journal of Sports Medicine found that the injury rate in men's college basketball was about 9.9 injuries per 1,000 athlete exposures.



Swimming

Swimming, while generally considered a low-impact sport, can still lead to injuries, particularly if proper techniques are not followed or if excessive training loads are imposed.

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