Editorial

Sports Science and Sports Medicine

Dr Golokbihari Maji
MS (Ortho)
Hony Editor, Journal of IMA (JIMA)

Sports science (also sports and exercise science, sports medicine) is a discipline that studies how the healthy human bodies work during exercise and how sports and physical activity promote health and performance from cellular to whole body perspectives.

Study of sports science traditionally incorporates areas of physiology (exercise physiology), psychology (sports psychology), anatomy, biomechanics, biochemistry and biokinetics. Sports scientists and performance consultants are growing in demand and employment numbers, with the ever – increasing focus within the sporting world on achieving the results possible. Through the study of science and sports, researchers have developed a greater understanding on how the human body reacts to exercises, trainings, different environments and many other stimuli.

Sports science can trace its origin to ancient Greece. The noted ancient Greek physician Galen (131-201) wrote 87 detailed essays about improving health (proper nutrition), aerobic fitness, and strengthening muscles.

New ideas upon the working functioning of the human body emerged during the renaissance as anatomist, physician challenged the previously known theories. These spread with the implementation of the printed words, the result of Gutenberg's printing press in the 15th Century. Furthermore, by the middle of the 19th. century, early medical schools (such as the Harvard Medical School formed in 1782) in the United States, whose graduates went on to assume position of importance in academic and allied medical research.

A number of key figures have made significant contribution to the study of sports science.

- Austin Flint Jr., (1835 – 1915) one of the first American pioneer physician studied physiological responses to exercises in his influential medical text book.
- Edward Hichcock Jr. (1828-1915), Amherst College professor of Hygiene and physical education, devoted the academic career to the scientific study of physical exercise, training and the body.
- George Wells Fitz, M.D. (1860 – 1934) created the first development major in anatomy, physiology and physical training in Harvard University in 1891.
- August Krogh (1874 – 1949) won the 1920 Nobel prize in physiology for discovering the mechanism that controlled capillary blood flow in resting or active muscle.
- Per-Olof Astrand (1922-2015), Professor at the Department of Physiology, Karolinska Institute, Stockholm wrote a seminal paper which evaluated the physical working capacity of men and women aged 4-33 years.

Scope in Study of Sports Science :

Higher education degrees in Sports Science or Human Physiology are also becoming increasingly popular with many universities now offering both under graduate, postgraduate and distance learning degrees in the discipline. Opportunities for graduates in this field include employment as a Physical education teacher, Dietician or Nutritionist, Performance Analyst, Sports coach, Sports therapists, Fitness center manager, Sports administrator, Strength and conditioning specialist or retail manager of a Sports store. Graduates may also be well positioned to undertake further training to become a accredited Physiotherapist, Exercise physiologist, Research scientist and Sports Medical Doctor.

The scope of Sports Science in India :

The potential for sports science in India is huge considering India is the fastest growing economy with a growing interest of sports among the youth and middle classes as well as an abundance of raw talent in the country. Sports like shooting, cricket, boxing, archery, badminton, tennis and squash have constantly being putting up good performances at the world stage, which in turn provides a strong motivation to the youth and society at large.

For India to achieve its sports objectives and to be considered one of the leading sporting nation, it needs to build further upon its strength as well as works towards creating a healthy talent pool in the medal-intensive sports such as aquatics, atheletes, cycling, gymnastics and weight lifting.

Indian's sports budget for the financial year 2019-2020 has been increased from Rs. 2002.72 (2018-2019) crore to Rs. 2216.92 crore, a hike of 214.20 crore, which is very less keeping in view the range of Sports segments in the country. It has been well said that the progress of the Nation is reflected to the state of its sports.

India does have the available sports academics and training centers but a majority of the centers lack top class facilities, infrastructure, quality coaches and nutritional support. The policy focus should be to increase participation at the grass root level from a village school to a top ranked university and simultaneously established centers of excellence and high performance centers to condition and polish the talent within the country.

There are many Sports Science Institutions in India. Following are the some important centres.

(1) Institute of Sports Science and Technology (ISST), Pune.
(2) Sports Science India, Bhubaneswar, Odisha.
(3) Center for Sports Science, Chennai, Tamil Nadu.

(4) Indira Gandhi Institute of Physical Education and Sports Sciences, New Delhi.

(5) Institute of Sports Science and Technology, Pune.

(6) Symbiosis Schools Sports Science, Pune.

(7) Institute of Exercise and Sports Science in India, Pune, and many others.

While the sports science deals with the totality of the sports; the Sports Medicine is part of it which is a branch of medicine that deals with the physical fitness and the treatment and prevention of injuries related to sports and exercises. Most sports teams employed team physicians for many years, it is only since the late 20th century that sports medicine has emerged as a distinct field in the health care. Orthopedics is a large part of the sports medicine and knee injuries a common theme.

Sports Medicine physicians have completed basic medical education, specialized in residency training, and then further specialized in sports medicine or sports and exercise medicine (the preferred term at present). Specialisation in sports medicine may be a doctor's first speciality (as in Australia, Norway, Italy). It may also be sub-speciality or second specialisation, following a specialisation such as Orthopedics, Family Medicine, Paediatrics. The various approaches reflect the medical culture in different countries.

Specialising in the treatment of atheletes and other physically active individuals, sports and exercise medicine physicians have extensive education in musculo skeletal medicines. Sport and Exercise Medicine (SEM) doctors treat injuries such as muscle, ligament, tendon, bone problem, but may also treat chronic illnesses that can affect the physical performances, such as asthma and diabetes. SEM doctors also advise on managing and preventing injuries.

SEM doctors / consultants also deliver clinical physical activity, intervention, negating the burden of the disease directly attributable to physical inactivity and the compelling evidence for the effectiveness of exercise in primary, secondary and for tartiary prevention disease.

Sports Injuries :

Sports injuries are injuries that occur during sport, atheletic activities, or exercising. According to a study performed in Snatford university, 21 percent of the injuries are observed in the elite college atheletes, caused the athelete to miss at least one day of sport, and approximately 77 percent of these injuries involved the lower leg, ankle and foot. In addition to those sports injuries, a leading cause of death related to sports injuries is traumatic head and neck occurrences. When an athelete complains of pain or an injury the key to a diagnosis is to obtain a detailed history and examination. An example of a format used to guide an examination treatment plan is a S.O.A.P. note or, subjective, objective, assessment, plan. Another important aspect of sports, injury is prevention which helps to reduce potential sports injuries. It is important to establish sports specific dynamic warming, stretching, and exercises that can help prevent injuries common to each individual sport. Creating an injury prevention programme also include education in hydration, nutrition, monitoring team members 'at risk'.

Top 10 common sports injuries :

- Tennis or Golf elbow
- Hamstring strain
- Sciatica
- Shin splints
- Groin pull
- Concussion
- Anterior Cruciate Ligament (ACL) tear or strain in knee
- Hip flex or strain
- Shoulder injury
- Patello femoral syndrome

Prevention of sports injuries :

Sports injuries generally occur for two different reasons: trauma and overuse. While traumatic sports injuries are usually obvious, dramatic scenes, like when we see a player fall down clutching their knee, overuse injuries are more common. Overuse injuries often occur when the body is pushed past its current physical limits or level conditioning – but poor technique and training errors such as running excessive distance or performing inadequate warmups frequently contribute. To help keep you or your young athele from experiencing a sports related injury the fallowing prevention tips should be followed.

(1) Set realistic goals.

(2) Plan and prepare.

(3) Warm up and cool down.

(4) Take your time.

(5) Listen to your body.

Sports Medicine in India :

A layman think Sports Medicine is a subject that take care of the sportsperson and atheletes. It is still in the infant stage in India where it started to develop in 1970s with the beginning of Indian Association of sports medicine. In 1983 at Patiala, a specialised school for Sports Medicine was started by the name of Netaji Subhas National Institute of Sports. Many distinguished sports medicine specialists are the product of this famous institution. Later in 2010, Master degree in Sports Medicine has been started in Sri Ramchandra University, Chennai and Guru Nanak, Dev University, Amritsar. Gradually other institutions developed like,

(1) Armed forces Medical College, Pune.

(2) Vardhaman Mahavir College, Delhi

Atheletes, sportsman and sports related persons like coaches, management as well as the common people are becoming more aware of exercise and have started recognising the importance of sports medicine. Sports science requires to observe, measure, evaluate, analyse and document different aspects of sports and together with clinical medical practice – will benefit both active people and atheletes.