

Medical Sciences in Sports

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Principles of prevention of sport injuries

Sports is no longer only a physical activity. Whether it is a competitive sport or recreational sport it involves sport sciences. One field of sport science is sport medicine. It helps not only to prevent and manage sports related injuries and diseases, it also helps to enhance sport performances. This field in sports has evolved through decades and now it is an essential part of sports, without which even a small scale sport meet cannot be held. Sports medicine always believes in team effort and has an integrated team approach whether it deals with sports performances or managing injuries or illnesses. When it comes to performances, the sports medicine doctor develops a close relationship with players, coach, fitness trainer, sports massage therapist, physiotherapists, sports nutritionist, sport psychologists, performance analyst, bio mechanical analyst, and management. All these people are involved and have very important roles in modern day sport. When one deals with sport injuries and

diseases, sport medicine get the help of physiotherapist, specialist in relevant field of medicine, biomechanics analyst, and athletic trainer, and manage the injuries and illnesses.

As mentioned above sport medicine team has different roles to play. (Fig1)

In the case of population health, the personal and economic health burden of non-communicable diseases has escalated to such an

extent that it cannot be sustained indefinitely by government health department budgets. There has been a significant global emphasis on sport and exercise as key elements to address this pandemic by organizations such as the International Olympic Committee (IOC), FIFA and other institutes and organizations of Sport and Exercise Medicine which promote physical activity programs in the community. The sports medicine physician has a key role in the promotion, integration and facilitation of exercise as medicine within the primary and secondary

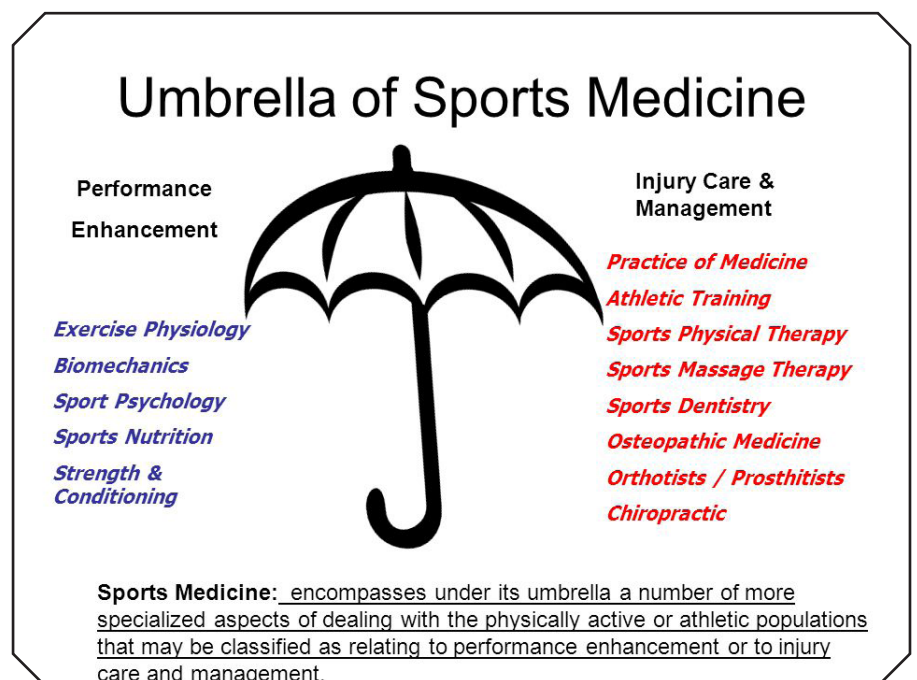


Fig 1: sport medicine team has different roles to play.

healthcare systems.

In addition to ‘the promotion and implementation of regular physical activity in the prevention, treatment and rehabilitation of chronic diseases of lifestyle’, Sport and Exercise Medicine has been defined as that scope of medical practice which focuses on:

- (a) The prevention, diagnosis, treatment and rehabilitation of injuries that occur during physical activity, and
- (b) The prevention, diagnosis and management of medical conditions that occur during or after physical activity.

The words protect, prevent and promote often feature prominently in defining the roles and scope of practice of sports medicine physicians.

Pre-participation health assessment - where each and every athlete who is expecting to engage in strenuous physical activities undergo a thorough medical examination and investigation to find out whether the particular athlete has problems or potential health problem, and if found necessary to provide appropriate remedial measures to avoid injuries and diseases. In addition in some instances pre competition medical tests are done just before the competition, to assess the fitness of the particular athlete for the particular event.

In 2013, while participating in

sporting activities, unfortunately four school children died suddenly. That condition is called sudden cardiac death. That could have been prevented if proper pre-participation medical examination was performed.

During the pre-participation medical examination, it is mandatory to prepare a comprehensive history regarding player and player’s immediate family members. Some families have



Fig 2 : two main indications for the use of braces and tapes

such genetically transmitted heart diseases where most of those who have heart diseases die prematurely. For example hypertrophic cardiomyopathy is a disease, where the heart is unusually bigger than the normal heart. Such persons are prone to premature death. In fact this condition is the most vulnerable cause for sudden cardiac death (36%). Comprehensive

family history even without an examination of the athlete will indicate whether the athlete has a high risk of having sudden cardiac death, in cases like hypertrophic cardiomyopathy. Most of the other common causes for sudden cardiac death also can be diagnosed with a proper history and clinical examination including electro cardio graph (ECG) examination.

Other common diseases like respiratory diseases such as bronchial asthma and exercise induced bronchial asthma also can be assessed and diagnosed with pre participation medical examination. Proper management of such conditions will help to improve sport performances. Some anatomical abnormalities will also make athletes prone to injuries, and these also can be identified during pre-participation medical examination and remedial measures taken before anything serious happens. For example abnormalities of the foot and back if not diagnosed early may lead to many serious biomechanical problems, which can be prevented by taking appropriate remedial measures. In

fact correct biomechanics not only prevent injuries but also enhance performances. “Prevention is better than cure”. The problems and weaknesses identified during pre-participation medical examination will be addressed and sometimes a comprehensive exercise program will be introduced to strengthen weak muscles and joints of the body.

Although different people can have different problems and different diseases, once the problems are identified they can engage in physical activities safely knowing their limitations. That is one of the main advantages of having a pre participation medical examination. Not only pre participation medical examination there are other things that can be done to prevent injuries and improve performances.

Proper warming up prepares the body for exercises. The most effective warm up consists of general and specific exercises. General exercise may include jogging, general stretch and resistance exercises. Specific exercises include stretches and movements appropriate for the particular activity to be undertaken. For example, a hundred meter runner after general exercises do short sprints several times to adequately prepare for the event. Possible benefits of warm up includes, increased blood flow to muscles, increased release of oxygen to muscle, enhanced production of energy in the cells, stimulation of nerves, decreased



Fig 4 : mouth guard

injuries due to increase range of motions of the joints and muscles, increased relaxation and concentration.

When warming up it should be kept in mind that warming up last only for about 30 minutes, so it is important not to warm up too early. Also the time of warming up depends on the environment, cold climate needs warm up for a longer period than warm climatic conditions. When sweating appears on the forehead, it is considered that the body has adequately warmed up.

Taping and bracing

Taping and bracing are used to restrict undesired, potentially harmful motion and allow desired motion. There are two main indications for the use of braces and

tapes, (Fig. 2)

Prevention- taping is used as a preventive measure in high risk activities (e.g. football and basketball players’ ankles), while rehabilitation – taping is used as a protective mechanism during healing and rehabilitation phases. Although taping and bracing are used in injury management of numerous joints, there is evidence that only in ankle joints that taping and bracing prevent reinjuries of ankle joints.

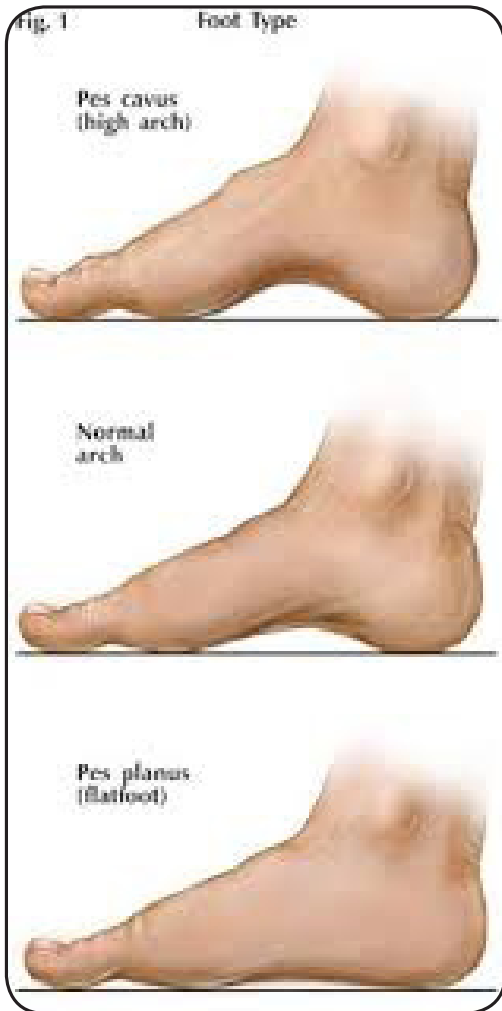
There are many different types of tape but if the purpose is to restrict movement it is appropriate to use non stretchable, rigid tape. If the purpose is to limit the movement of muscles and tendon it is appropriate to use kinesiio tapes, which are stretchable tapes. (Fig. 3)

Protective equipment

Protective equipment are being designed to cover certain parts of the body, which are vulnerable to injuries during playing, and to



Fig 3 : kinesiio tapes, which are stretchable tapes.



foot arch, some people have either a flat foot where foot arch is flatter, or a high arch foot, where foot arch curve is higher than normal. When selecting appropriate shoes, for a particular sport, it is advisable to select shoes according to the athletes foot type or arch. Sometimes it is necessary to wear sport insole fit in to the flat foot arch to make it comfortable and prevent excessive rotational movements of the foot and leg to avoid possible injuries. (Fig. 5)

It is also important to select shoes according to the playing surface. It is advisable to change sport shoes frequently before wearing off, since slightest rotational force or defect in shoes can give rise to lifelong injuries. Cotton socks are the recommended socks and cleanliness of socks and shoes are also very important since dirty socks will cause infections.

Any kind of sporting activity should take place in a safe environment and appropriate surface. Hard uneven, slippery surfaces can give rise to injuries and best avoided.

Appropriate training and preparation

An athlete is fit to play only when the athlete trains the body for the particular activity. Then the muscles and the systems of the body can tolerate the stresses of the sport. Otherwise they can get injured.

Sports recovery

In recent years, high priority is given to recovery following heavy bouts of exercises, training or competition. That is because when performing exercise, muscle energy gets depleted, muscles get micro injuries, and waste products accumulate in the muscles. Sometimes an activity has to be repeated on the same day. It is essential to get the muscle to recover fast, then only anyone can perform again and again. To perform better, it is necessary to do

Fig 5 : rotational movements of the foot

protect the injured parts temporally while returning to play from an injury.

For example helmets are mandatory in certain sports like motor racing, cricket and cycling. Some other equipment includes mouth guard in combat sports, rugby, shin guard in football, combat sport, gloves in cricket, hockey. (Fig. 4)

Other equipment and sport clothing

Sports shoes are very important gear to prevent injuries and for better performance. Different people have different foot arches. While most people have normal

Sport clothing is also very important to make athletes comfortable while playing and prevent them from environmental hazards. Some features of sport clothes include, sweat absorbability, minimum seam or seamless, ensure cooling effect, well-padded in certain places to prevent friction, and prevent environmental hazard like excessive heat and cold.

Appropriate surfaces



Fig 6 : cool down the body.

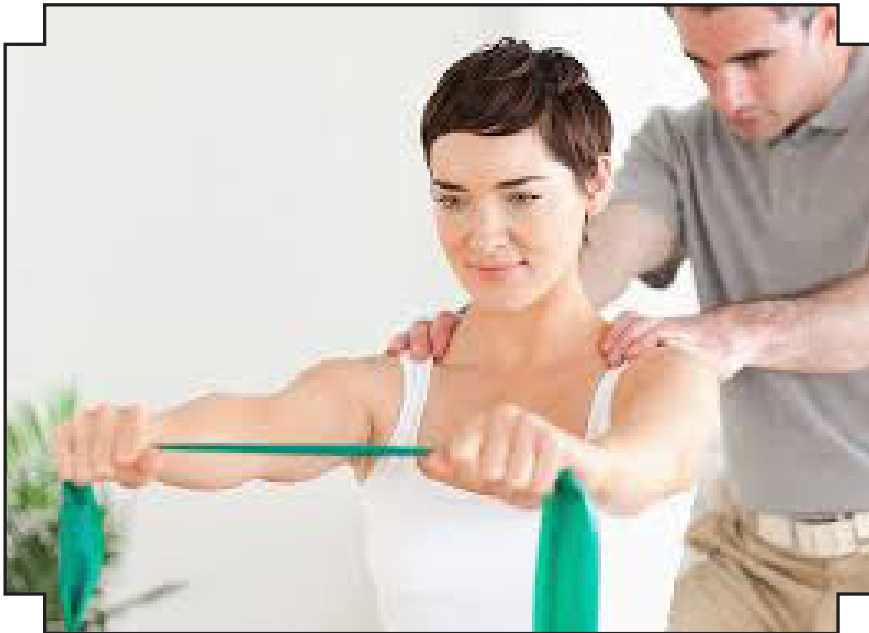


Fig 8 : treatment depends on suspected causes

hard training each and every day. To do hard training every day it is essential to recover your body as quickly as possible. There are several recovery methods available. A Carbohydrate rich diet just after the competition or training will replenish the energy stores. It gives nutrients to injured muscle to help recover and gives energy to build up new tissues, which is the expected outcome of the training.

Ice bath after the cooling down exercise further cools down the body. An Standing waist deep in 10-15°C cold water for five minutes will be sufficient to cool down the body. (Fig. 6)

Deep water running either in a swimming pool or any other place like a river after training will enhance recovery.

Sport massage

Regular massage helps to relax the sore muscles thereby increasing



Fig 7 : RICE treatment

circulation, which helps to give nutrients, oxygen, as well as removes waste product from the muscles.

Meditation and listening to music also helps to relieve mental fatigue.
Management of common sports injuries

Although we try to minimize sport injuries, it is a very common occurrence in sport. When it happens proper treatment is a must.

Initially first aid treatment and RICE treatment should be done (R- rest, I –ice, C- compression, E –elevation). (Fig. 7) Ice is the main component of RICE treatment. For the soft tissue injury it is advisable to keep ice at least for three days. After clinical examination, and investigations, a diagnosis can be made. Injury treatment includes proper rehabilitation exercises. If the player is physically fit only the player should be allowed to play. Muscle cramp is a very common condition in sport. It is caused by non-coordination between muscles and nerves. This condition also has so many causes like, lack

of minerals, lack of water, muscle fatigue, excess heat, and excess cold etc. If someone gets a cramp, water and minerals should be given irrespective of the cause and the rest of the treatment depends on suspected causes. (Fig. 8)

Any serious injury should be dealt with experience hands and properly rehabilitated. Serious injuries include muscle and ligament tear , cartilage and bone injuries, concussion and spinal injuries.

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