

Unit 7 | Physiology & Injuries in Sports

Physiology

The study of how our body responds to physical exertion is known as Physiology. When we talk about human physiology, we generally concentrate on the body's skeletal, muscular, nervous, endocrine, cardiovascular, metabolic, respiratory, digestive, urinary and reproductive systems, all of which are influenced by exercise in some way.

Skeletal muscles factor

Type I fibres/Slow Twitch Fibers

Type I fibres, also known as slow twitch fibres or slow oxidative fibres, have more capillaries, more myoglobin and more mitochondrial enzymes than rapid twitch fibres, which improves aerobic activity and fatigue tolerance. The fibres turn red and there is a bigger flow of blood since there are more capillaries present. These fibres contract slowly and stay constricted for longer periods of time, releasing considerable amounts of energy without tiring. Slow-twitch fibres are beneficial in long-distance sports such as cycling, swimming and running.

Type II fibres/Fast Twitch Fibers

Type II fibres, also known as a rapid twitch or fast glycolytic fibres, have a low aerobic capacity and fatigue tolerance due to fewer mitochondria, despite having a high concentration of glycolytic enzymes that promote anaerobic activity. They may produce energy without a blood supply, fast twitch fibres are lighter in colour than slow twitch fibres. Such fibres can generate little amount of energy quickly, contract quickly, tear easily and use a lot of energy. It is useful for anaerobic exercises such as sprinting, throwing and jumping.

Endurance

1. Aerobic capacity
2. Lactic acid tolerance
3. Movement economy
4. Muscle composition



Strength

1. Size of muscles
2. Body weight
3. Muscle composition
4. Intensity of nervous impulse



Flexibility

1. Muscle strength
2. Age and gender
3. Stretchability of muscle
4. Internal environment
5. Previous injury



**Physiological factors
determining the
components of physical
fitness**

Speed

1. Mobility of nervous system
2. Muscle composition
3. Explosive strength
4. Flexibility



Unit 7 | Physiology & Injuries in Sports

Effects of Exercises on Cardiorespiratory System

1. Increase the size of heart
2. Decrease in resting heart rate
3. Increases blood flow
4. Decrease in blood pressure
5. Increase in blood volume
6. Decrease in rate of respiration
7. Increase in endurance
8. Increase lungs efficiency



Effects of Exercises on Muscular System

1. Change in shape and size of muscles
2. Formation of more capillaries
3. Control extra fat
4. Increases food storage
5. Exercise and its health benefits
6. Non functioning fibre become actives
7. Efficiency and movement of muscles
8. Body posture remain correct



Physiological changes due to Aging

Ageing is characterized by the progressive degeneration of organ systems and tissues. It is largely determined by genetics and influenced by a wide range of environmental factors, such as diet, exercise, exposure to micro-organisms and pollutants.

1. Muscular Strength: It is defined as the maximal force that a muscle or muscle group can generate.
2. Neural Function: A nearly 40% decline in the number of spinal cord axons and a 10% decline in nerve conduction velocity reflects the cumulative effects of ageing on central nervous system functioning.
3. Pulmonary Function: Mechanical constraints on the pulmonary system progress with age to cause deterioration
4. Cardiovascular Function: Cardiovascular function and aerobic capacity do not escape age-related effects.

Sports Injuries

Sports injuries are caused during sports activities. These can also occur by recent trauma of a certain body location. Athletes' commitment to active participation in sports and fitness has always been disrupted or has resulted in traumatic experiences due to various forms of injuries. Injuries can occur as a result of incorrect movement, hitting or colliding with equipment, violent sporting manoeuvres such as diving and sliding, overtraining, or a lack of conditioning.

Types of Injuries

Soft Tissue Injuries

1. Abrasion
2. Contusion
3. Laceration
4. Incision
5. Sprain
6. Strain

Bone Fracture

1. Green-Stick
2. Comminuted
3. Transverse
4. Oblique
5. Impacted

Dislocation of Joint

1. Shoulder
2. Wrist
3. Ankle
4. Finger
5. Hip

Unit 7 | Physiology & Injuries in Sports



Contusion: Direct head or without any sports equipment can main cause of it. It is due to the minor accident



Strain: It can be mild as vessels severe. It can be occur at any time during the practice or competition it is caused by twisting or pulling of muscles



Sprain: It is the alignment injury. It may occur due to overstretching or tearing of ligament



Abrasions are injuries to the most superficial layers of the skin due to friction.



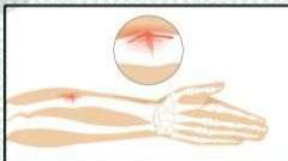
Laceration: Deep cuts may reveal underlying tissues such as fat, muscle, bone, or tendons.



Incision: An incision in cut made into the tissues of the body to expose the underlying tissue, bone or organ.

Soft Tissue Injuries

Types of Fracture Injuries



Greenstick: A greenstick fracture occurs when a bone fractures and bends rather than totally fracturing into fragments.



Comminuted: A fracture in which a bone is broken, splintered or crushed into a number of pieces is said to be a comminuted fracture.



Transverse: This can be found among broken bones. They are parallel to your bone and horizontal (opposite the direction of your bone).



Oblique: This fractures can occur in broken bones. They occur when one of your bones is shattered at an angle.



Impacted: This occurs when the force of the injury drives the fractured ends of the bone into one another.