Physical and Psychological Factors Affecting Sport Performance

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Sport psychology is the study of the psychological factors that affect participation and performance in sports.

Some of the most important skills taught from sports are

-goal setting
- relaxation
-visualization
- self-talk awareness and control,
- concentration,
-confidence,
- Sport in childhood. Association football, shown above, is a team sport which also provides opportunities to improve social interaction skills

- Sports are most often played just for fun or for the simple fact that people need exercise to stay in good physical condition.
- professional sport is a major source of entertainment.

Muscle Strength

- Muscle strength has mechanical & neural components :
- **(1) Mechanical strength :** the maximum force a muscle can exert.
- This depends upon the muscle cross-sectional area .
- So if after a period of training, an athlete increases his muscle size by 50 % , he will also increase the force the muscle can develop by 50% .
- **(2) Neurological strength :** meaning how many of the AHC motor neurons supplying that muscle are recruited + frequency of action potentials in them.
- In diseases involving the AHCs (e.g., poliomyelitis) the number of active AHCs may be considerably reduced → decreased performance.
- A severely depressed person (or athlete) , who lost his motivation , may , unconsciously , recruit less AHCs than normal → decreased performance

Muscle Power

When muscles contract or stretch in moving a load they do **work** , and energy is transferred from one form to another.

The " **power** " of muscles refers to how quickly the muscles can do this work and transfer the energy.

Work = Force X Distance

Power = Work/Time

The shorter the time used to perform a piece of work , the more power is needed
Hence , if a weightlifter lifts a given weight explosively over a short time (say 0.5 seconds) he needs his muscles to produce much more power than if he did that while taking more time (say 3 sec).

Energy Availability

When humans utilize energy to perform muscular exercise , the energy is expended to :

(1) doing work & (2) generating heat .

For short-term , intense exercise e.g., when the person is jumping up from a squatting position , energy expenditure can be much more than for long-term exercise .

Energy Sources

(1) Energy needed to perform **short-lasting, high-intensity bursts** of activity is derived from **anaerobic sources** within the cell , whereas

(2) mild-moderate intensity Long term(Longer –lasting), less intense exercise (Aerobic Exercise) utilizes **oxygen & depends on aerobic respiration** .

the fast sources of energy in high-intensity short-term bursts of activity (The quick energy sources) consist of the →

(1**) Phosphocreatine system .**

(2) Glycolysis , &

(3) Adenylate Kinase

The most rapid source, but the most readily depleted of the above sources is **the Phosphocreatine** .

Glucose Availability

* Plasma glucose is maintained by an equal rate of glucose appearance (entry into the blood) and glucose disposal (removal from the blood).

* In the healthy individual, rate of appearance and disposal are essentially **equal** during exercise of moderate intensity and duration;

* However, prolonged , intense exercise can result in **a fall in blood glucose level and the onset of fatigue .**

* During exercise , rate of glucose appearance depends mainly on the liver (**glycogenloysis & gluconeogenesis**) , and to a lesser extent , on absorption from the gut .

Oxygen Availability

Which depends upon →
(1) cardiac output (the quantity of blood distributed by the heart) ,
(2) the ability of the lung to oxygenate the blood ,
(3) arterio-venous (a-v) oxygen difference (i.e., the ability of the exercising muscle to take up oxygen from blood).

Degree of Hydration

Intense prolonged exercise produces metabolic waste heat .
The heat is removed by sweating which , if intense , may cause **dehydration** .

* A male marathon runner loses each hour around 0.8 L in cool weather and 1.2 L in warm weather.
A female marathon runner loses about 70% of what the male loses .

* However , in hot weather , heavy exercise can cause much more losses of fluid from the body → dehydration .

•Dehydration leads to:
- **1- constant rise in body temperature**
- **2- increase in heart-rate**
- **3- decreased stroke volume and cardiac output** .

Blood Catecholamines & Ammonia

Plasma catecholamine concentrations can increase by 10 times .
Ammonia , which is produced by the exercising muscles from ADP is released into the bloodstream , leading to increased circulating levels

Age

Youth are better in sport performance than elderly e.g., a footballer getting old may retire or be a coach

Gender

(i) Because of difference between genders of in body build and physical ability , men can perform better than women in contact sports such as boxing , rugby and wrestling .

(ii) Menstruation : women may perform differently at different times during their monthly menstrual cycle

Drugs

(1) Anabolic steroids (e.g., Testosterone) :

These are used by some athletes (of both sexes) to increase their muscle mass, allow the athlete to train harder and thereby enhance their physical performance . They have harmful side-effects such as raised blood pressure and increased facial hair in female athletes . Their use in sport competitions is illegal .

(2) Stimulants

Stimulants increase reaction speed (i.e., decrease reaction-time) , reduce perception of pain and raise aggression

They are highly addictive and have side-effects including high blood pressure, cardiac problems , strokes, and liver disease .

(3) Narcotic analgesics

These are pain killers which athletes use to mask pain from an injury or overtraining

They are also highly addictive and cause withdrawal symptoms when the athlete stops using them.

• Sleep

- Sufficient , restful sleep is important for physical and mental health .
- Lack of sleep makes the athlete nervous and irritable , & deteriorates the physical performance

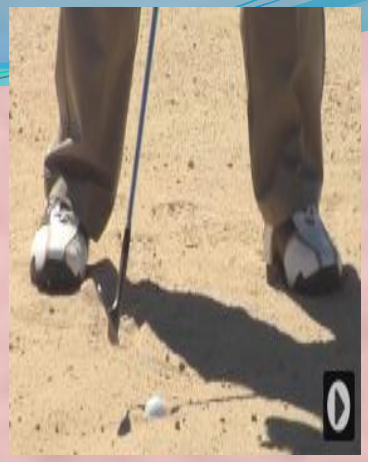
• Disease

- Musculoskeletal disease e.g., sprain , disk etc , or
- General disease e.g., bronchial asthma , colds , flu , etc

All may affect muscular exercise performance .

*A sprain is an injury to a ligament by stretching or a tearing

*A strain is an injury to either a muscle or a tendon



- **(6) Personality type**
- **(i) Introverts** tend to like sports which
- require:, precision , self-motivation ,
- need low arousal levels & individual
- performances e.g., archery رمى السهام, golf and snooker

(ii) Extroverts prefer sports which are: exciting, team sports, & need high arousal level , need large, simple motor skills e.g. rugby and boxing

(7) Other psychological factors

(i) Aggression can sometimes be useful and sometimes harmful

(ii) Depression and lack of motivation are harmful

THE OVERTRAINING SYNDROME

- **Overtraining Syndrome**
- **With increasing competitiveness in sport throughout the world , overtraining has become common among athletes .**
- **Overtraining occurs when the athlete, while stale مجهد(with impaired vigor نشاط and effectiveness) is pushed/forced (e.g. by a coach) to continue training at high intensity**
- **This frequently results in development of "Overtraining Syndrome " ,**
- **Overtraining syndrome is a chronic , debilitating موهن (body-weakening) condition .**
- **It may impair an athlete during training or daily work, with signs of -:**
- **(1) decreased concentration,**
- **(2) irritability and increased anger,**
- **(3) slowed mental function, and**
- **(4) diminished self-esteem.الحافز الذاتى**

- Symptoms of overtraining include fatigue (feeling of tiredness) , inability to exceed former الفائز levels of performance, and a decreased ability to perform &recover
- Disadvantageous مضر stages of overtraining include
- (a) overreaching بلوغ الهدف →(b) overtraining, → (c) staleness جفاء , اجهاد → (d) burnout, and → (e) injury/withdrawal
- These conditions are not limited to mature adult athletes.
- Young athletes are continuously confronted with increasing expectations, often resulting in unrealistic demands on time and physical performance
- This may lead to early withdrawal from the sport environment.