

FATIGUE AND ITS EFFECT ON HUMAN BODY: A PHYSIOLOGY STUDY

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ABSTRACT

Fatigue is a very common phenomena in today's era in humans and it's resulting in decreased efficiency and inability to continue work for a longer time. Overtraining or overwork results in reduction of energy sources in the muscle and accumulation of waste products. This leads to decreased contraction and results in fatigue.

Keywords:

Fatigue, Physiological, Fatigue and the effects

INTRODUCTION

These days fatigue is very common in every age and sex group. It may be the result of physiological, sociological, psychological or environmental factors. Intense physical activity and competitive sports require a high level of cardiorespiratory and muscular efficiency.

Overtraining or overwork results in reduction of energy sources in the muscle and accumulation of waste products. This leads to decreased contraction and results in fatigue.

Site of muscular fatigue:

Muscle for its normal function requires a continuous stimulus from the central nervous system (CNS) via motor nerves to the muscle. Nerve ending at the muscle forms neuromuscular junction. Site of fatigue may be :

- I) At the central nervous system
- II) At the neuromuscular junction
- III) In the muscle

1. Fatigue at the CNS may be due to psychological reason.
2. Neuromuscular junction: At this junction there is a decrease in the secretion of neurohormonal transmitter, acetylcholine, Hence, the transmission of the impulses to the muscle fiber is affected. Fast twitch fibers are more susceptible to the junctional fatigue.

MUSCLE

Depletion of energy reserve:

There is a depletion of energy reserves i.e. Adenosine triphosphate (ATP), Cerebral palsy (CP) and Glycogen. In short duration activity the ATP and CP are depleted and in long duration glycogen is depleted.

Lactic Acid Accumulation:

Lactic acid accumulation occurs during physical activity. It may increase up to 20 times from the basal level. This causes an increase in the H⁺. pH of the blood is 7.4 and it is lowered down to even 6.4 in severe exercise. This causes the dysfunction of the enzyme.

Increase in H⁺ increases the permeability of the cell membrane thereby, disbalancing the Na-K Permeability in the muscular membrane which is of importance in the excitation and recovery process of the muscle

Other factors of Fatigue:

Ischemia:

Blood supply to the muscle in heavy exercise is decreased. The muscular contraction exerts pressure several times that of maximal systolic pressure (200 mm Hg.). Thus, the blood flow is blocked. This condition will also result in hypoxic conditions in the muscle. Supply of oxygen to the muscle is cut off, thereby the aerobic energy release is affected. The accumulation of metabolites and lactic acid in the muscle increases.

Hyperthermia:

During intensive physical activity body temperature increases, blood from the muscle to the skin is diverted to facilitate the sweat mechanism as it helps in the thermoregulatory process. Blood flow to the muscle is reduced. Lactic acid and metabolite removal from muscle is decreased. This results in fatigue.

Symptoms of Fatigue:

1. Swearing: Sweating in various parts of the body is increased.
2. Breathing Difficulty: Sometimes due to fatigue there is difficulty in breathing.
3. Skin Colour: Skin colour becomes red.
4. Recovery Pulse: Recovery takes a longer time and pulse rate remains elevated.
5. Feeling Of weakness: Muscular weakness in strength is felt by the individuals.
6. Tiredness and pain in joints.
7. Psychological symptoms include-
 - a. Decreased concentration
 - b. Decreased perception
 - c. Increase in reaction time
 - d. Fall in flicker fusion frequency

These symptoms lead to poor coordination and error in movement execution and physical performance.

Causes of Fatigue

1. Overloading: Overtraining or overloading the athletes causes fatigue.
2. Insufficient recovery: If the time of recovery is not sufficient in between the training, fatigue persists and staleness may result.
3. Improper warm up: If the warm up is not properly done, fatigue sets early.
4. Psychological and Sociological Factors: Some social problems, which cause anxiety and tension may cause fatigue like economic problems, family problems, relations with coaches and other colleagues.
5. Competitions: Too many competitions without rest in between may be responsible for fatigue.

Treatment of Fatigue:

- a. Appropriate work and rest cycle: Training sessions should be planned in such a manner that appropriate rest pause is given. This facilitates blood flow to the muscles and metabolite removals are facilitated.
- b. Active recovery process: Jogging, walking, swimming after exhaustive training help in quick removal of metabolites from the muscle, thereby the recovery process is hastened. It is suggested that if exercise is given at 30-40% of maximum aerobic capacity, the recovery process is fast.
- c. Diet: Post exercise diet containing sufficient water, electrolytes, carbohydrates and vitamins will enhance the recovery process. Nowadays recovery drinks are available, which may be taken after the exercise to ensure quick recovery.
- d. Cold Bath: Cold showers after the exercise relieves fatigue. Cold bath contracts the blood vessels of the skin and induces dilatation of the blood vessels of the muscle.
- e. Physiotherapy: Physiotherapeutic means (massage, hydrotherapy, electrotherapy, waterjet) can increase the blood supply to the muscle and it helps in metabolic removal of waste products. A 5-minute massage during rest is found to hasten the recovery process. A drop in body temperature is also noticed.
- f. Rest: Rest or a good sleep in the horizontal position of the athlete hastens the recovery as in this position, heart, blood vessels and respiratory system have to do a minimum of work.

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REFERENCE

- 1) Pearce Evelyn (1997) "Anatomy and Physiology for Nurses" Jaycee brothers, New Delhi
- 2) Giam, C.K &The, K.C. (1994). Sport medicine exercise and fitness.
- 3) Nemir, A. (N.D.). The school health education New York:Harber and Brothers Odum, E.P. (1971).
- 4) Singh, S. (1979). Anatomy of physiology and health education. Ropar: Jeet Publication
- 5) Singapore: P.G. Medical Book. Meglynn, G., (1993). Dynamics of fitness.Madison: W.C.B Brown.
- 6) Related Sports Journals International & National Journals Exercise and Sport Sciences.
- 7) Sharkey, B. J. (1990). Physiology of fitness, Human Kinetics Book.
- 8) Journal of SportsScience.