Physiology of work

This article has been translated from WikiSkripta; ready for the **editor's review**.

Physiology of work is part of applied physiology. Its subject is a comprehensive physiological view of the mutual relations between a person and the external environment surrounding his workplace and influencing his work performance. Special attention is required for work activities carried out in extreme climatic conditions and in various occupations (e.g. work in mines, air transport, space research, work on the seabed, in deserts and arctic regions).

Evaluation of the body's physical load

The term physical load represents predetermined requirements, determined by external conditions independent of the individual under load. The response refers to the body's reaction to physical stress. The size of the response is individual different and depends on a large number of factors, for example a physical load of 100 W may lead to exhaustion in a sick person, while it may not cause any symptoms of fatigue in a healthy athlete. The size of the organism's response depends on its properties, expressed in terms of efficiency and performance, which need to be considered when assessing individual differences in response to a certain physical load.

Effectiveness

It is the ratio of external (physical) work to the value of the total energy exchange required for its realization. With less efficiency, the observed response of the organism to the given physical load will be greater.

Performance

Performance is the ability of an individual to perform in a certain activity. It depends on the state of health, training, endurance, talent and also on the conditions of the external environment (noise, climate, time). The overall psychological state of a person also has a significant influence on performance.

Reaction of the organism to non-physical forms of stress

Non-physical forms of stress usually accompany workloads. We include mental and emotional stress among them. Their intensity is difficult to physically quantify, and the manifestations of their effects often interfere with the effects of the body's physical load, which is why the body's reactions to these loads are important from the point of view of work physiology.

Mental Load

It is, for example, the scheduled completion of demanding tasks. Increases muscle tone, as a result of which the energy exchange of muscle increases. Mental stress often causes vegetative reactions, the course of which is similar to that of physical stress. These include, for example, an increase in heart rate, increased pulmonary ventilation, blood flow to the skin, increased sweat secretion, and the secretion of adrenaline into the blood.

Emotional burden

For example, it is fear or anger. It causes similar reactions as mental stress. These include, for example, tachycardia, hyperventilation, sweating, accompanied by feelings of fear or excitement with simultaneous significant stimulation of the sympathoadrenal system. Emotional stress causing a threat to life triggers a strong alarm (ergotropic) reaction within a few seconds and also has a strong stimulating effect on the parasympathetic nervous system. In states of extreme fear or terror, strong stimulation of the parasympathetic leads to involuntary defecation and incontinence of urine or even cardiac arrest.

Fatigue and Recovery

Fatigue is a process triggered by the body's response to stress that causes a reduction in performance. We distinguish between physical (muscular) and psychological (central) fatigue. Both forms of fatigue are combined during most physical and mental loads, only their mutual ratio changes, but their exact distinction is very difficult. After the fatigue-inducing exercise is over, recovery begins. During recovery, the ability to perform work increases again. The recovery process is finished when the original state is reached. Muscle fatigue predominates after heavy physical work, mental fatigue predominates after mental work.

Overload Syndrome

When fatigue and recovery are insufficiently balanced or when the limit of maximum performance is exceeded more often, functional disorders occur, which are summarized under the symptom complex - "overload syndrome". The typical cause of this syndrome is exceeding the limit of the mechanical load of the supporting and locomotor apparatus or the elimination of performance regulation by stimulating substances (doping).

Links

References

- TROJAN, Stanislav, et al. Fyziologie: Učebnice pro lékařské fakulty. 1. vydání. Praha : Avicenum, 1987.