

Strength, Fast - Strength and Anaerobic Capabilities of the Female Body

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ABSTRACT

Experts in the field of theory and methodology of physical training and sports training have conducted scientific research on strengthening the health of middle-aged women, improving their functional and physical condition. Acceleration of the pace of life, change of simple stereotypes, increase of psycho-emotional loads in the process of human activity - all this is caused by the lack of movement activity, so it is necessary to find new approaches to optimize training loads and improve methods of training process management.

The total muscle strength in women is about 2/3 of this figure in men. However, there are significant differences in the strength of different muscle groups. Compared to men, women have relatively weaker arm, upper back and trunk muscles. Their maximum free force (MEF) is 40-70% of the maximum free force of these muscles in men. At the same time, the maximum free force of the lower body, including the leg muscles, is approximately 30% lower in women than in men.

Perhaps this condition is caused by the effect of lower body muscle training in daily life through walking, running, etc.

Differences in the strength potential of women and men are mainly due to differences in body size, more precisely, it is manifested in the volume of muscle tissue. In fact, the relative differences between women's and men's muscles are very small compared to the absolute differences.

The relative strength of the muscles of the lower body is on average 8% less in women than in men. The difference in strength indicators is even less, when absolute indicators maximal free strength are related to the weight of the muscle and fat-free part of the body, it depends on the amount of muscle weight. In this case, the average strength of the muscles of the lower body of women is 6% less than that of men, and the flexor and straightening strength of the hips is not different from that of men. The maximum free force of the shoulder flexor muscles corresponds to 1 cm² of cross-sectional area, approximately equal in women and men.

The percentage ratio of fast and slow-moving tendons in muscles is the same in non-exercising women and men, as well as in athletes (women and men) who play the same type of sport. The thickness of all types of muscle tendons is on average less in women than in men.

The results of jumping and short-distance running depend to a certain extent on muscle strength. Women significantly lag behind men in these exercises. Dynamic strength during high-speed movement is obviously lower in women than in men, even though the relative isometric and dynamic strength of the body without muscle and fat is the same in women and men during low-speed movement. If the results in jumping are compared to the center of body weight, women are not inferior to men in this indicator: the high jump record is 3.2 cm/kg, and the long jump record is 12.5 and 12.3 cm/kg. 100 m. The average speed of the male record holder in running is 8.4 m/min/kg, and the female record holder is 9.5 m/min/kg. Thus, women are slightly faster than men when their running speed is adjusted for body weight.

The level of muscle strength training corresponds to the increase in muscle strength under the influence of directed strength training, and this indicator is lower in women than in men. This difference is more pronounced between the ages of 16 and 30, and is less pronounced before puberty (12-14 years) and during the period of gender involution (after the age of 40), which indicates that the relevant male sex hormones, that is, androgens, play an important role in the development of muscle strength.

In women, strength training has a greater effect on reducing fat tissue and increasing body weight and muscle mass than men. Even when there is an increase in muscle strength and weight in women as a result of strength training, it is less than in men. This situation is explained by the fact that the level of muscle hypertrophy is controlled to a certain extent by male sex hormones, which indicates that the blood concentration (thickness, saturation, enrichment level) is 10 times higher in men than in women.

Anaerobic (capable of living in the absence of free oxygen) energy systems in women, known as anaerobic energy systems, include phosphagen (ATF + KF) and lactacid (glycolytic) systems. Their capacity is less in women compared to men, and this situation is related to the lower muscle mass in women. Low anaerobic energy production system capacity indicates low anaerobic efficiency.

In women, the concentration of ATF and KF in muscles is approximately the same as in men (up to 4 mm/kg of muscle weight for ATF and up to 16 mm/kg of muscle weight for KF), due to the small volume of muscle tissue, the total amount of muscle phosphagens in women is less than in men. The small capacity of the phosphagen system in women depends on the speed of the phase of oxygen deficiency (lactate). Even in high-level rowing female athletes, the maximum capacity of the phosphagen system (up to 100 cal/kg body weight) is on average equal to that of young non-exercising men. In young women who do not work, this indicator is very low (up to 60 cal/kg of body weight). According to this indicator, the difference between sportsmen and women is even higher. If the capacity of the phosphagen system is compared to the minimum body mass (muscle weight), the difference between women and men is less.

Differences in aerobic capacity (endurance), maximal oxygen consumption, body size, and composition are not known between boys and girls until puberty, and maximal oxygen consumption (MAQ) is similar. In young men, it is on average 20-30%, more than in women aged 35-45. The difference between women and men in maximal oxygen consumption (MAO) decreases with age. The difference in maximal oxygen consumption (MAO) between women and men is reduced to about 15-20% when compared by body weight. By the age of 20-30, the maximum consumption of oxygen per 1 kg of body weight is on average 35-40 ml/kg*min in women, and 45-50 ml/kg*min in men. constitutes When maximal oxygen consumption (BMI) is measured against muscle-free body weight, the difference is even less because adipose tissue is metabolically inactive and does not consume oxygen. The difference in maximal oxygen consumption (MAO) between men and women practically disappears when the ratio of maximal oxygen consumption (MAO) to active muscle weight is measured.

There may be some individual variation in the amount of maximal oxygen consumption (MAO) between men and women of the same age. Maximal oxygen consumption in physically fit women is similar to that of physically fit men. In the non-exercising group, maximal oxygen consumption was approximately 75% consistent with women's maximal oxygen consumption and 50% of men's. Female endurance athletes have naturally higher maximal oxygen consumption (MAOIC) than women who participate in other sports. Also, the maximum oxygen consumption (BMI) in non-athletes is equal to the ratio of 1 kg of body weight (on average, 55-60 ml/kg*min in female athletes of medium level, and 70-75 ml/kg*min in high-level athletes). However, the average maximum oxygen consumption (BMI) is greater than the difference between female and male athletes, and the maximum oxygen consumption (BMI) in relation to body weight is 20-25% lower in female athletes than in male athletes (this difference is 15-20% in non-athletes). Even maximal oxygen consumption relative to lean body weight (MBO) was 8.6% lower in elite female marathon runners than in men (76.5 vs. 96.6 mL/kg*min, respectively). The data presented show that the difference between women and men is lower in women when maximal aerobic work is compared. This determines the success of women in endurance sports.

This situation, in particular, leads to a decrease in the record results achieved by women compared to men, and the lengthening of the distances in sports competitions also creates difficulties for women to win prizes in the world sports fields.

Very low maximum oxygen consumption (MOC) in women is caused by a decrease in the oxygen carrying capacity of the female body.

The maximum amount of oxygen that can move through arterial blood vessels is lower in women than in men. These differences are associated with lower circulating blood volume, blood hemoglobin concentration, AVR-O₂ heart volume, and maximum heart rate in women.

According to difference equalization problems, the maximum oxygen consumption (MOC) is determined by multiplying the maximum heart rate by the maximum heart rate AVR-O₂:MRK=S M max*(AVR-O₂). Both of these multiples are less common in women than in men. This situation is explained by the following: the concentration of hemoglobin in the blood is almost the same in girls and boys until puberty. In women, this indicator is on average 10-15%, less than in men. Therefore, the oxygen content in women's blood is low and, accordingly, the supply of O₂ in the arterial blood is high. During maximal aerobic exercise, the supply of O₂ in the venous vasculature from working muscles is approximately the same in women and men as in the mixed venous vasculature. Thus, the maximum systemic AVR-O₂ is lower in women than in men, which is associated with a much lower hemoglobin concentration in the blood.

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