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ASSESSMENT OF PHYSICAL (SOMATIC) HEALTH OF YOUNG MEN IN THE CONSTRUCTION OF HEALTH IMPROVING STRENGHT

Abstract. The systematic review aimed to determine the effect of strength training (ST) on physiological and morphological adaptive capacities in healthy young men. A search was conducted for randomised clinical trials containing information on the effect of resistance exercise on physical and functional changes in young men aged 18-45 years. As a result, 13 publications that met the search criteria were found. Long-term strength training has been shown to significantly improve strength, muscle volume and explosive abilities in trained individuals. Strength training 3 times a week can increase lean body mass and left ventricular mass index, with a decrease in body fat. The duration of weightlifting training has a positive effect on anthropometric and physiological parameters, but not on biochemical parameters.

Results and discussion.The studies evaluated the effect of ST on the physiological parameters of men of different ages and fitness levels. Participants underwent various ST programmes that included exercises for the upper and lower extremities with varying intensity and volume. Muscle strength, endurance, muscle hypertrophy, changes in cardiac and vascular function, as well as cellular respiration and levels of inflammatory biomarkers were assessed. The pre-and post-intervention scores were compared to determine physiological changes, such as increased muscle mass, strength, improved cardiac function and endurance.

The ST program led to improvements in muscle strength, and body composition, and contributed to morphological remodelling of the heart (enlargement of the LV, RV) in a study by A. Grandperrin et al. [1].

B. J. Schoenfeld et al. [2] demonstrated that a significant increase in muscle strength can be achieved in individuals who engage in ST with only three 13-minute sessions per week. The results of such training are similar to those achieved with significantly more time spent on medium-load training (8-12 repetitions per set). This is relevant for those with time constraints, allowing for efficient strength gains that can contribute to a greater commitment to physical activity among the population. The increase in muscle hypertrophy is dose-dependent, with greater gains being achieved with higher training volumes. To maximise muscle growth, it is recommended to spend more time training every week. However, the amount of training does not affect the endurance of the upper body muscles.

T. G. Belshaw et al. [3] also confirmed that prolonged maximal ST significantly improves strength, muscle volume and explosive muscle capacity in trained individuals compared to untrained individuals. B. J. Schoenfeld et al. [4] determined that a light training programme induced greater hypertrophy of the gastrocnemius muscle compared to a heavy training programme, while heavy

training promoted greater hypertrophy of the middle and lateral heads of the gastrocnemius muscle.

ST and END have a positive effect on men's physiological parameters. E. A. Dawson et al. [5] determined that peak VO2 increased significantly after endurance training, and brachial artery vascular function increased after both types of training. Both training plans led to a significant improvement in endothelium-dependent vasodilation of the brachial artery, but the overall adaptation to peak VO2 was more significant after END. Eccentric exercises without concentric exercises have a significant impact on PBMC respiration. Combined eccentric-concentric exercise caused the greatest muscle fatigue, reducing PBMC respiration and lactate levels, while eccentric exercise alone had the least effect. The effect of anaerobic metabolism did not change PBMC respiration in the study by E. I. Lähteenmäki et al. [6].

The sequence of exercises does not affect the increase in 1-RM in bench press and bench triceps extension. L. Brandão et al. [7] argued that performing these exercises in any sequence is effective for achieving maximum strength. There was a moderate decrease in CSA increase in the pectoralis major when an isolated triceps exercise was performed before a multi-joint exercise. It may be worth performing exercises where the pectoral muscles are the main agonist muscles first in the sequence if the goal is to maximise hypertrophy of this muscle complex. Performing a combination of exercises that vary in length-tension ratio is preferable for maximising the development of all three triceps heads.

A systematic review by B. S. Currier et al. [11] included 192 studies evaluating the effects of various resistance training protocols on muscle strength and hypertrophy. The highest effects for both indicators were observed in protocols with high load and training frequency. The overall risk of bias in the studies was moderate, suggesting that the results should be interpreted with caution. The main conclusion is that high load and frequency of training provide the greatest gains in strength and hypertrophy, highlighting the importance of intensity in ST programmes.

In this review, most studies used different levels of volume and intensity in the number of sets (1, 3, 5) and repetitions (10-30). After analysing 2083 articles comparing the responses to training with different volumes to induce muscle hypertrophy, E. Baz-Valle et al. [12] determined that for the quadriceps and biceps brachii there were no significant differences between moderate and high-volume training, but high volume training was better at stimulating muscle mass gain in the triceps brachii. The optimal volume for muscle hypertrophy in young, trained men was 12-20 sets per week.

Conclusions. The effect of ST on physiological parameters such as muscle thickness, hypertrophy and cardiovascular function was positive, with an increase in lean body mass and a decrease in fat mass. Training also improved biochemical

parameters such as leukocyte activity and levels of key metabolic markers. Combination training, which includes both concentric and eccentric exercises, has shown significant potential for improving muscle performance and functional performance. High-intensity training with a variety of exercise types can provide more pronounced results than traditional approaches.

Given the results, it is recommended that a comprehensive approach to strength training, including a high volume of exercises and different types of loads, be applied to achieve maximum physiological benefits. Further research, development and testing of individually adapted training programmes based on the physiological and metabolic characteristics of the participants and their long-term health effects is also recommended.

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