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STUDY OF FACTORS DETERMINING THE LEVEL OF ACTIVE-DYNAMIC FLEXIBILITY

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Abstract

Flexibility is one of the key physical qualities that determines a person's functional capabilities, quality of movement, and level of physical fitness. In today's lifestyle, characterized by high levels of stress, sedentary lifestyles, and prolonged periods of static posture, the ability to maintain sufficient flexibility is especially important. Insufficient flexibility leads to poor posture, chronic back and joint pain, decreased performance, and an increased risk of injury.

Research into the factors influencing flexibility development allows for more effective training, the development of musculoskeletal disease prevention programs, and the improvement of overall public health. This makes flexibility a relevant topic not only in sports practice but also in medicine, physical therapy, and healthy lifestyles.

Flexibility as a physical quality plays a key role in ensuring optimal joint mobility, maintaining proper biomechanics, and maintaining a high level of physical and mental well-being. In recent years, there has been a significant increase in interest in flexibility development methods due to the increasing prevalence of physical inactivity, occupational deformities of the musculoskeletal system, and stressful conditions associated with muscle tension.

The modern pace of life, prolonged computer work, and lack of regular physical activity lead to decreased muscle and ligament elasticity, limited range of motion, and the development of functional impairments. This impacts not only physical fitness but also quality of life, a person's ability to perform every day and professional tasks, and their resilience.

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Flexibility is a crucial component of physical fitness, essential in most sports, dance disciplines, rehabilitation programs, and preventative health practices. Research into the factors that influence flexibility development allows for the development of personalized training methods, increased effectiveness of rehabilitation interventions, and a reduced risk of overuse injuries.

Thus, the study of flexibility and the conditions for its development is becoming highly relevant in the context of strengthening public health, increasing physical performance, preventing diseases of the musculoskeletal system, and developing a culture of conscious physical activity.

The Purpose of the Study

To comprehensively investigate the influence of anatomical, physiological, age-related, genetic, and behavioral factors on flexibility development in order to optimize training and improve the body's functional capabilities.

Research Objectives

1. To study the theoretical foundations of flexibility as a physical quality.
2. Consider the types of flexibility and their characteristics.
3. Analyze the main factors influencing the development of flexibility.
4. Determine the importance of flexibility for health, physical fitness and injury prevention.
5. Explore existing methods and means for developing flexibility.
6. Conduct an analysis of the effectiveness of various approaches to developing flexibility (based on literature or observations).
7. Formulate conclusions about the most significant factors influencing the development of flexibility, and practical recommendations.

Research Methods

Analysis and synthesis of scientific and methodological literature. Study of works on anatomy, physiology, sports pedagogy, and physical training methods to determine current views on flexibility development. Comparative analysis. Comparison of various factors influencing flexibility, as well as a comparison of

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development methods. Observation. Recording the characteristics of flexibility exercise performance, changes in range of motion, and the general condition of the musculoskeletal system. Methods of mathematical and statistical data processing. Analysis of the obtained results to identify patterns, reliability, and effectiveness of influencing factors.

Study Results

The high frequency of exercises involving dynamic elements of large amplitude places increased demands on targeted improvement of flexibility. It is advisable to distinguish between active and passive flexibility, and within these, static and dynamic flexibility. Clearly, the structure of active and passive actions, both dynamic and static, differs, and varies in muscle activity, duration, magnitude, and location of muscle effort. All this requires significant differences in the methods for improving various types of flexibility.

This study provides a theoretical and experimental justification for one approach to targeted flexibility improvement. Given the development trends of modern rhythmic gymnastics, it has become necessary to develop not only flexibility in general, but also its varieties, in particular, active-dynamic flexibility. The latter is manifested in movements where a large amplitude is achieved through the action of internal forces and the inertial forces arising from rapid movements. Such exercises include large-amplitude swinging movements performed without fixing the final position.

Unlike the scientific and methodological literature on the issue under study, where authors primarily examined the quality of flexibility in static exercises, our dissertation examines issues related to improving active flexibility in dynamic exercises with a wide range of motion. The study identified the kinematic structure of large-amplitude swinging movements: the leading factors determining the amplitude of such movements were determined; A method of isometric tension of pre-stretched muscles for developing active flexibility in wide-amplitude swinging movements was developed and experimentally validated.

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In studies by other authors, isometric tension was used either for targeted strength development or for the simultaneous development of strength and speed, flexibility and strength, and strength and improved movement technique. This dissertation substantiates the comprehensive value of isometric tension of pre-stretched muscles as a method for simultaneously developing strength, extensibility, and the ability to relax muscle groups, and, as a result, improving active-dynamic flexibility.

Currently, training focuses primarily on developing passive flexibility. This issue is also the focus of most scientific and methodological studies related to improving flexibility.

As a result of the analysis of scientific and methodological literature, comparison of various approaches and study of influencing factors, the following results were obtained:

It has been established that flexibility is a complex physical quality that depends not only on the elasticity of muscles and ligaments, but also on the condition of the joints, neuromuscular regulation and the general functional state of the body.

It has been found that flexibility development is influenced by a number of factors, including age, gender, genetics, physical activity level, muscle temperature, musculoskeletal system health, and psycho-emotional state. Regularity of training has been identified as the most significant factor.

Flexibility has been shown to be important for preventing musculoskeletal disorders, improving posture, reducing the risk of injury and increasing the efficiency of motor activity.

The analyzed methods for developing flexibility showed varying effectiveness: the most effective is a combination of static and dynamic stretching, including a warm-up, breathing exercises, and a gradual increase in range of motion.

It has been found that systematic training for 4-6 weeks leads to a significant improvement in the range of motion, especially if stretching exercises are performed daily.

The influence of psycho-emotional state on flexibility has been noted: stress and muscle tension reduce mobility, while relaxing breathing techniques help increase the range of motion.

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Based on the analysis, it can be concluded that the optimal flexibility development program should be individualized, taking into account the age, health status, level of physical fitness and goals of the participant.

Conclusions

Flexibility is a vital physical quality, ensuring full motor activity, proper biomechanics, and a reduced risk of injury. Its development positively impacts overall health and physical performance. Flexibility is determined by a combination of factors, including age, gender, heredity, physical activity level, muscle temperature, nervous system, psycho-emotional state, and overall health. The most significant factor determining flexibility development is the regularity of training. Regular exercise helps compensate for age-related changes and individual anatomical differences.

An analysis of flexibility development methods revealed that a comprehensive approach, including a warm-up, static and dynamic stretching, breathing exercises, and a gradual, pain-free increase in range of motion, is most effective. The study's results confirm that regular exercise over several weeks leads to a significant increase in range of motion and improved joint mobility. Achieving optimal results requires an individualized approach that takes into account the individual's health, fitness level, and goals. Therefore, flexibility development is an accessible and effective means of promoting health, preventing musculoskeletal disorders, and improving quality of life, confirming the relevance of further research on this topic.

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