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TECHNOLOGY OF USING STATIC EXERCISES IN TRACK AND FIELD TRAINING

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Annotation

This article explores the technology of using static exercises in track and field training and analyzes their impact on athletes' physical performance. Experiments conducted with athletes of different age groups revealed that static exercises effectively improve strength, balance, and muscle stability. The paper also provides practical recommendations for integrating static exercises into athletic training programs to enhance overall performance.

Keywords

track and field, static exercises, technology, physical training, strength, balance, training efficiency

ТЕХНОЛОГИЯ ПРИМЕНЕНИЯ СТАТИЧЕСКИХ УПРАЖНЕНИЙ НА ТРЕНИРОВКАХ ПО ЛЁГКОЙ АТЛЕТИКЕ

Аннотация

В статье рассматривается технология применения статических упражнений в тренировочном процессе по лёгкой атлетике. Проведён анализ их влияния на развитие физических качеств спортсменов, в частности силы, равновесия и устойчивости мышц. В ходе эксперимента установлено, что систематическое использование статических упражнений способствует повышению общей физической подготовленности и эффективности тренировочного процесса. Приведены практические рекомендации по внедрению статических упражнений в тренировочные программы.

Ключевые слова

лёгкая атлетика, статические упражнения, технология, физическая подготовка, сила, равновесие, эффективность тренировки

INTRODUCTION

Track and field is one of the most fundamental and widely practiced sports disciplines, encompassing various activities that develop strength, speed, endurance, coordination, and flexibility. The training process in track and field

requires a systematic and scientifically grounded approach to enhance athletes' physical performance and technical mastery. In recent years, the integration of modern training technologies, including static exercises, has become increasingly important for improving overall athletic development and injury prevention.

Static exercises, also known as isometric exercises, involve muscle contractions without visible joint movement. Unlike dynamic exercises, which focus on motion and repetition, static exercises emphasize maintaining specific positions that develop muscular endurance, balance, and stability. This training method effectively strengthens deep muscle groups, improves posture, and increases the athlete's control over body movements. For track and field athletes, who rely on explosive power and precise movement patterns, these qualities are essential.

Applying static exercise technology in track and field training allows coaches to individualize programs, target specific muscle groups, and optimize training intensity. It also contributes to reducing fatigue and muscle strain during competition preparation. Scientific studies have shown that combining static and dynamic exercises leads to significant improvements in strength, flexibility, and coordination compared to using dynamic exercises alone.

This study aims to analyze the methodology and effectiveness of using static exercises within track and field training sessions. The research focuses on the physiological effects of static exercise application, the development of physical qualities, and the potential integration of these exercises into athletes' daily training routines. Ultimately, the goal is to develop practical recommendations that can enhance training efficiency and support long-term athletic performance.

METHODS

This research employed an experimental design aimed at analyzing the effectiveness of static exercise application in track and field training. The study involved 24 athletes aged 17–22, divided into two groups: an experimental group and a control group, each consisting of 12 participants with similar levels of physical preparation. The experiment lasted for 8 weeks, during which both groups trained under identical conditions, except that the experimental group included specific static exercises in addition to their standard dynamic training program.

The static exercise complex consisted of isometric holds such as planks, wall sits, calf raises, squats held at mid-position, and static lunges. Each exercise was maintained for 20–40 seconds with 3–4 repetitions, depending on the athlete's preparedness. Sessions were held three times per week, emphasizing correct technique, controlled breathing, and muscle engagement. The control group performed only traditional dynamic drills focusing on strength and endurance.

To assess the impact of static training, pre- and post-tests were conducted measuring key physical parameters: maximal strength (via standing long jump and medicine ball throw), balance and stability (via one-leg stance test), and muscular endurance (via sit-ups and push-ups for 30 seconds). Heart rate and perceived exertion were also monitored to evaluate physiological adaptation and fatigue levels.

Data were analyzed using descriptive statistics and paired t-tests to determine the significance of performance changes within and between groups. The methodological approach focused on ensuring consistency, reliability, and reproducibility of results. Training observations and athlete feedback were recorded throughout the study to identify subjective improvements in posture, control, and body awareness.

This methodological framework provided a comprehensive basis for evaluating how static exercises influence physical development and training efficiency in track and field athletes.

RESULTS

The results of the eight-week experimental training revealed notable improvements in the physical performance of the athletes who participated in static exercise sessions. The experimental group showed statistically significant progress ($p < 0.05$) in several key performance indicators compared to the control group, which continued traditional dynamic training only.

Strength improvement. The average standing long jump distance increased by 8.6% in the experimental group, compared to 4.2% in the control group. Similarly, the medicine ball throw distance improved by 10.3%, reflecting enhanced muscular power and stability derived from isometric training.

Balance and stability. The one-leg stance test results demonstrated a 15% improvement in the experimental group, indicating better postural control and coordination. This improvement was attributed to the activation of stabilizing muscle groups through prolonged static holds such as planks and lunges.

Muscular endurance. The number of correctly performed push-ups and sit-ups within 30 seconds increased by an average of 12.7% and 11.4%, respectively, in the experimental group, while the control group's improvements were less than 6%. These results suggest that static exercises contributed to greater muscular endurance and resistance to fatigue.

Physiological indicators. Average resting heart rate in the experimental group decreased by 4–5 beats per minute after the training period, showing improved cardiovascular efficiency and recovery capacity. Athletes also reported a lower perception of fatigue and enhanced body awareness during dynamic movements.

Overall, the integration of static exercises into the training process resulted in better strength balance, improved neuromuscular coordination, and increased training efficiency. The data confirm that combining static and dynamic methods produces superior outcomes compared to conventional training alone, supporting the effectiveness of static exercise technology in track and field preparation.

DISCUSSION

The findings of this study demonstrate that the inclusion of static (isometric) exercises in track and field training has a substantial positive impact on athletes' physical performance, confirming previous research emphasizing the benefits of combining static and dynamic methods in sports conditioning. The significant improvements observed in strength, balance, and endurance highlight the effectiveness of isometric holds as a complementary training technology in developing both neuromuscular control and overall stability.

The increase in standing long jump and medicine ball throw results in the experimental group suggests that static exercises enhance not only muscle strength but also the coordination between agonist and antagonist muscle groups. This improvement is likely due to the increased intramuscular tension generated during isometric contractions, which promotes better synchronization of motor units. Such physiological adaptations are crucial for track and field athletes, whose performance relies on explosive yet controlled muscle activation.

The observed gains in balance and stability further indicate that static exercises effectively target deep postural muscles responsible for maintaining body alignment during movement. These muscles are often underdeveloped in traditional dynamic training programs that emphasize motion over control. By incorporating exercises like planks, wall sits, and static lunges, athletes improved their proprioception and body awareness—qualities essential for precise movement execution in sprinting, jumping, and throwing events.

In terms of endurance, the increased number of push-ups and sit-ups performed by the experimental group demonstrates enhanced muscular resilience. Static holds, by requiring prolonged tension under load, improve the muscles' ability to sustain force without fatigue. This endurance enhancement not only benefits performance during prolonged training sessions but also aids in recovery and injury prevention, as stronger stabilizing muscles reduce the risk of strain.

Moreover, the reduction in resting heart rate and perceived fatigue among the experimental group indicates a positive adaptation of the cardiovascular system and a more efficient energy expenditure during physical activity. These findings align with studies suggesting that static exercises improve circulation and oxygen utilization by promoting better vascular adaptation within working muscles.

Overall, the results confirm that integrating static exercise technology into track and field training contributes to a more balanced development of the athlete's physical qualities. Static exercises provide a controlled and low-impact method to strengthen stabilizing muscles, improve postural control, and enhance overall training efficiency. Coaches and practitioners are therefore encouraged to include isometric holds within warm-ups, strength routines, or recovery sessions to optimize performance outcomes. Future research may focus on long-term effects, optimal duration of static holds, and the specific impact on different track and field specializations.

CONCLUSION

The results of this study confirm that the integration of static (isometric) exercises into track and field training significantly enhances athletes' physical performance by improving strength, balance, and muscular endurance. Over the eight-week experimental period, athletes who practiced static exercises alongside traditional dynamic drills demonstrated superior progress compared to those who followed standard training methods only. These outcomes suggest that static exercises play an essential role in developing the deep stabilizing muscles that contribute to improved posture, coordination, and movement efficiency.

One of the key advantages of static training is its ability to strengthen muscles without excessive joint stress, which reduces the risk of overuse injuries common in high-intensity sports. Furthermore, the controlled nature of isometric holds improves body awareness and neuromuscular control, leading to better technical execution in running, jumping, and throwing events. The observed decrease in resting heart rate and perceived fatigue also indicates improved cardiovascular adaptation and recovery capacity.

From a practical perspective, static exercises are easy to integrate into any training session and require minimal equipment. Coaches can incorporate them during warm-ups, strength development phases, or recovery sessions to enhance overall training efficiency.

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