

THE EFFECT OF THE COMBINED TRAINING METHOD ON THE TECHNICAL AND PHYSICAL FITNESS OF SHOT PUTTERS

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Abstract

The present study lends support to the hypothesis that the development of a scientifically grounded training methodology for the rotational shot put technique, combined with improvements in technical and physical fitness and the implementation of a paired training method, contributes to improved athletic performance among shot putters. The experimental programme comprised a two-phase, six-week cycle. The first phase involved the progressive increase in difficulty of 28 test exercises. The second phase involved the performance of these exercises at maximum intensity. The training sessions were methodically structured, encompassing a general and specific warm-up, a primary segment focusing on the execution of throws and pushes of a 6–10 kg projectile, and the implementation of simulation exercises. The outcomes of these exercises were systematically documented. The technique was monitored using high-speed video recording (210 fps) and an accelerometer to assess the acceleration of the pushing limb. The strategic alternation of regional speed-strength exercises, with the emphasis shifting between the initiation of the turn and the final effort, ensured a targeted impact on the key elements of specialised training. The data obtained indicate an increase in the stability of technical parameters and an improvement in performance indicators when applying the proposed methodology.

Keywords

rotational method, core thrust, technical and physical fitness, paired training method, high-speed video recording, accelerometer, simulation exercises, speed-strength training.

The marked improvement in performance across all athletics disciplines, including the men's shot put, poses a significant challenge in identifying the most effective approaches and methods for managing the training process of Uzbek athletes.

The targeted training of top-level athletes is a long-term process that commences with the establishment of fundamental foundations. These include the formation of the correct dynamic pattern of the overall structure of the competitive movement and the assurance of the necessary level of general and specific physical fitness.

It is evident that an increasing number of the world's leading athletes are now utilising the rotational method of shot put. Nevertheless, this technique has not yet become widespread among shot putters, primarily due to the insufficient scientific development of training methods for the rotational throw, both in the UK and abroad. In consideration of the historical origins of the circular swing, it is evident that a complete absence of methodology is not applicable; however, contemporary requirements are not fulfilled by extant approaches. The rotational technique has undergone significant changes, resulting in increased demands on the physical fitness of modern shot putters.

The research hypothesis is predicated on the assumption that the development of a scientifically sound training methodology for the rotational shot put technique, the improvement of technical and physical fitness, and the introduction of a combined training method will lead to an improvement in the sporting results of shot putters.

The technical and physical training programme was centred on exercises designed to target the primary muscle groups involved in the rotational throw of the shot put. Over a six-week period, the athletes performed 28 test exercises, with the load being increased on a weekly basis. Thereafter, over the following six weeks, these exercises were performed at maximum intensity. Each training session in the experiment commenced with a general warm-up, followed by a specific warm-up comprising a developed set of exercises to prepare for the main part of the session and strengthen the core muscles, combined with static and statodynamic strength exercises of a general nature. The sequence of exercises comprised alternating regional speed-strength exercises for the muscles of the upper and lower limbs. In one training session, the emphasis was placed primarily on coordination with the entry phase into a turn, whilst in the next session, the focus was on the final effort. Consequently, a targeted focus was placed on key elements of the athletes' specialised preparation prior to the main part of the training session.

The primary focus of the training programme was on the development of technical skills. Equipment of varying weights (6–10 kg) was utilised in the execution of the throws, which were executed from a variety of starting positions. The throws were also performed from a stationary position, with a turn. The

programme's primary component entailed the execution of simulation exercises, meticulously designed to hone the finer aspects of the rotational technique employed in the shot put. In the course of the programme, the results for each exercise were systematically recorded.

The technique of the spin-out push was analysed using high-speed video recording (210 frames per second) and an accelerometer that measured the acceleration of the pushing limb and, consequently, the shot put.

The two-point stance is achieved more expeditiously prior to the final push, and the projectile's velocity demonstrates reduced variability, which indicates an enhancement in the athlete's technical skill and, consequently, contributes to superior sporting performance.

Conclusion: The hypothesis developed in the study is confirmed by the data obtained: the introduction of a scientifically grounded training method for the rotational shot put technique, combined with targeted improvements in technical and physical fitness and the use of a cross-training approach, contributes to an improvement in the athletes' performance.

The efficacy of the method was demonstrated by the gradual increase in the complexity of the exercises and the subsequent transition to the development of maximal power. This ensured the systematic development of the major muscle groups and the establishment of stable dynamic patterns of competitive movement.

The objective evaluation of technique was facilitated by the implementation of high-speed video recording and an accelerometer, enabling the objective measurement of alterations in the kinematics and dynamics of the shot put. This methodology enabled the documentation of a diminution in the variability of the projectile's velocity and the attainment of a two-point stance with greater alacrity prior to the exertion's culmination. The indicators demonstrate an improvement in the athletes' technical proficiency.

The practical significance of the study lies in the fact that the proposed training programme and exercise system can be incorporated into the preparation of shot putters to enhance the stability and effectiveness of their performances at a competitive level.

In order to further refine the methodology, it is recommended that the sample of participants be expanded, that long-term monitoring of adaptive changes be conducted, and that additional methods for assessing athletes' functional status be integrated with a view to personalising the training process.

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