



IMPROVING START AND INITIAL ACCELERATION TECHNIQUE IN SPRINTING

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ARTICLE INFO:

Received:09.10.2026

Revised: 10.10.2026

Accepted:11.10.2026

KEY WORDS:

track and field, sprinting, low start, starting blocks, initial acceleration, speed-strength training, speed, running technique, false start.

ABSTRACT

This article examines the technical training specifics for athletes specializing in short-distance running. Primary attention is focused on the efficient execution of the low start, the use of starting blocks, and the technique of the initial acceleration phase. The importance of speed-strength training and movement coordination during the first few seconds following the starting signal is highlighted. Common errors occurring during the start are analyzed, including the causes of false starts, inefficient push-off, and excessive muscle tension.

The article emphasizes the need for an individualized approach to training, as starting position parameters, initial stride length, and acceleration patterns must align with the athlete's physical and technical capabilities. The rationale for using specialized exercises aimed at developing explosive power, reaction speed, and rapid acceleration is established.

An effective combination of technical and physical training enables the refinement of starting actions and creates the conditions for improved athletic performance.

Introduction. Sprinting is a track-and-field discipline in which athletic performance is largely determined by an athlete's ability to execute movements at high speed over a short period [5, 6, 8]. Despite the apparent simplicity of running movements, achieving high speed requires the precise coordination of various muscle groups, efficient arm and leg action, the



maintenance of proper torso posture, and the effective utilization of ground reaction forces [4, 7].

Technical training is a key component of an athlete's long-term preparation [2, 9]. Inefficient movement patterns can lead to a loss of speed and increased energy expenditure. Consequently, the coach's task involves not only developing the athlete's physical attributes but also establishing a movement structure in which every action serves a specific functional purpose.

The initial phase of the race holds particular importance in sprinting. The start and subsequent acceleration lay the foundation for the athlete to reach high speeds. Even minor technical errors during the first few seconds of the race can disrupt movement rhythm and hinder performance over the remainder of the distance.

Effective sprinter training entails the comprehensive development of strength, speed, coordination, speed endurance, and technical proficiency. Furthermore, the content of training sessions must be tailored to the athlete's individual characteristics and level of preparedness [1, 3, 10].

Research methods and organization. This study employs methods involving the analysis and synthesis of scientific and methodological literature regarding sprinter training, the examination of low-start and initial acceleration techniques, and the analysis of practical experience from track-and-field coaches [13, 14]. When examining the training process, the key physical attributes determining sprinting efficiency were taken into account. One of the most significant factors is the speed-strength capability of the lower limbs. Leg strength enables the athlete to generate the necessary force during ground contact, particularly when pushing off from the starting blocks.

However, increasing strength capabilities does not in itself guarantee higher speed. Crucial to performance is the athlete's ability to rapidly apply existing strength to a specific movement. Therefore, sprinter training should combine strength-building exercises with those focusing on speed and coordination [11, 12].

A sprint race is conventionally divided into several interconnected phases: the start, initial acceleration, the main running phase, and the finish. Transitions between these phases occur gradually; thus, the quality of execution in one element directly impacts the next.

This study focuses primarily on the first two phases-the start and initial acceleration-as it is during this period that the athlete must effectively utilize initial force and progressively increase speed.

Research results and discussion. Characteristics of the low start. The start in sprint running is a crucial element of competitive performance. Its primary objective is to create the conditions necessary for a rapid initiation of movement and efficient acceleration. To achieve this, a low start using starting blocks is employed. These provide the athlete with a stable base of support



and allow force to be directed in the optimal direction. Consistent and individually tailored block placement facilitates the development of a stable motor skill.

When determining block placement, factors such as the athlete's height, leg length, physique, level of physical fitness, and individual technique must be considered. There is no universal placement that is equally effective for all athletes. Placing the blocks too far apart can hinder the effective use of leg power, whereas placing them too close together may restrict freedom of movement and compromise the optimal structure of the starting position. Therefore, the final block configuration should be determined during practical training and adjusted by the coach.

Execution of starting commands. When preparing for the start, the athlete must assume a position that is both stable and functionally advantageous. Upon the command "On your marks," the feet are placed against the starting blocks, the hands are positioned near the starting line, and body weight is distributed to allow for an immediate transition to movement following the signal. After the "Set" command, the hips are raised, the knees lift off the track surface, and the body's center of mass shifts forward. In this position, the athlete must maintain stability and remain ready to initiate movement instantly.

The ability to maintain optimal muscle tension is of great importance. Excessive relaxation reduces readiness for the start, while excessive tension restricts freedom of movement and can impair reaction speed. At the moment the starting signal is given, the athlete simultaneously begins pushing off with their legs and actively using their arms. The initial movements should be directed primarily forward, facilitating an efficient build-up of speed.

Causes of an ineffective start. When learning and refining starting technique, it is essential to consider common athlete errors. One such error is an insufficiently powerful push-off from the starting blocks. This may stem from a lack of speed-strength conditioning or an inability to effectively apply available force at the right moment. Another common issue is excessive muscle tension. This results in stiff movements, disrupts arm and leg coordination, and increases energy expenditure.

Particular attention must be paid to preventing false starts. Premature movement often arises from an athlete's intense desire to react as quickly as possible to the starting signal. Therefore, the reaction to the command should be developed through the repeated practice of starting drills.

For an effective start, the athlete must learn to maintain focus and control body position while simultaneously reacting quickly to an external signal.

Starting acceleration technique. The starting acceleration phase begins immediately after leaving the blocks. Its primary objective is to progressively increase speed to a level that allows for the transition to the main running phase.

The initial steps following the start are typically characterized by relatively short stride lengths and a pronounced forward lean of the torso. As speed increases, stride length gradually lengthens, and the torso assumes a more upright position. Coordinated arm and leg action is



crucial during this phase. Effective arm movement helps maintain the necessary tempo and rhythm, while a powerful push-off propels the body forward.

When executing starting acceleration, one should not attempt to artificially increase stride length at the expense of natural rhythm. The main goal is to gradually build speed while maintaining technical efficiency in movement.

Transitioning to the race phase. As the initial acceleration concludes, the athlete gradually shifts to a more relaxed and rhythmic running style. At this stage, it is essential to eliminate any excess muscle tension that arose during the intense build-up of speed. Excessive stiffness can negatively affect technique and reduce the efficiency of subsequent movement. Therefore, the athlete must learn to combine high speed with relative freedom of movement.

The transition from the start acceleration to the race phase should be smooth. It is important to avoid abrupt changes in rhythm, stride length, or torso position.

Developing this skill requires systematic practice. The training process may incorporate short accelerations, repeated starts from the blocks, running from various starting positions, and specialized exercises to develop speed-strength capabilities. A comprehensive set of specialized exercises should be employed, with their specific content determined by the objectives of the particular training session.

The importance of specialized exercises. Improving the start and initial acceleration requires the use of a set of specialized exercises. The content of these exercises should be determined by the objectives of the specific training phase and the athlete's individual characteristics.

Key areas of training include:

- 1) developing explosive lower-body muscle power;
 - 2) improving movement reaction speed;
 - 3) enhancing the ability to execute a powerful push-off;
 - 4) developing movement coordination;
 - 5) refining the technique of the initial steps;
 - 6) establishing efficient arm action;
 - 7) learning to maintain optimal torso positioning;
- reducing excessive muscle tension while maintaining high speed.

Exercises that closely resemble competitive movements in terms of structure and execution speed are particularly beneficial. However, increasing the volume of specialized exercises must be done with due regard for the athlete's fitness level.

The coach must monitor not only the number of repetitions but also the quality of execution for each exercise. If the technical structure of the movement begins to break down due to fatigue, further increases in workload may reduce the training's effectiveness.



Conclusion. The analysis demonstrates that refining starting technique and initial acceleration is a crucial component of training for sprint athletes.

Start efficiency is determined by a combination of factors, notably speed-strength capabilities, reaction speed, movement coordination, optimal body positioning, and the technically correct use of starting blocks.

Initial acceleration requires a progressive increase in speed accompanied by a gradual shift in body position and stride length. The transition to the main phase of the race should be executed without disrupting the rhythm and while maintaining the speed already achieved.

It is advisable to systematically incorporate specific exercises into the training process that target the development of explosive power, reaction speed, coordination, and technical skills. At the same time, the content and volume of training should be tailored to the individual physical and technical capabilities of each athlete.

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