

Research on Core Strength Training Methods for Sprint Athletes

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Abstract: In sprint training, core strength exercises play a critical role. These training methods, encompassing both static and dynamic core exercises, enhance an athlete's control, coordination, and explosive power, thereby contributing to their success in sprint events. This paper delves into the essence and techniques of core strength training, discusses its practical value for sprinters, and proposes a practical model and approach for implementing core strength exercises in sprint training. The aim is to broaden the application of these methods in sprint training to optimize training outcomes.

Keywords: Sprinting; Athletes; Training Methods; Strength Training; Core Strength.

1. Introduction

Sprinting, as a competitive sport, encompasses various critical technical motions including the start, mid-race running, acceleration, and the final sprint. These interconnected phases place high demands on an athlete's core strength. Traditional sprint training often overly focuses on the limbs while neglecting core areas such as the torso, leading to imbalanced training. [1] This imbalance can result in insufficient control and stability as the athlete enters the final sprint phase, adversely affecting their overall performance and potentially the final outcomes of the race.

To address this issue, integrating core strength training into sprint routines is vital. [2] By enhancing the strength training of core body areas, not only can an athlete's control and stability be significantly improved, but it also equips them with superior physical qualities to compete more effectively in races. This comprehensive and holistic training approach injects new vigor into the athletic performance of sprinters.

2. The Essence and Methods of Core Strength Training

Core strength training extends and supplements traditional athletic training. Initially applied in fitness and rehabilitation, this method has been widely adopted in competitive athletic training, yielding effective results. [3] Core strength training focuses on specialized exercises for the athlete's core body areas, enhancing their strength, balance, and stability. This empowers athletes with exceptional control over their bodies, enabling them to leverage core strength during crucial moments to optimize their performance. Moreover, core strength training emphasizes large muscle group exercises. Scientific methods stimulate the athletes' deeper muscles, thus enhancing muscle strength, balance, and endurance.

The methods and means of core strength training are diverse. [4] In terms of intensity, the training can be categorized into weighted strength training, bodyweight training, and interactive strength training. From the nature of training, it includes speed strength training, general strength training, stability strength training, and maximal strength training. Regarding difficulty, it encompasses static bodyweight training, non-static bodyweight training,

dynamic strength training, and dynamic bodyweight training. These core strength training modalities effectively boost sprinters' core strength, meet their specific training goals, and enhance their sprinting speed and overall competitive performance, laying a solid foundation for their success in races. [5]

3. The Role of Core Strength Training Methods for Sprint Athletes

3.1. Enhancing Athletes' Body Stability

In sprinting, a lack of core strength inevitably impacts critical phases such as starting and accelerating, adversely affecting overall performance. Issues like body swaying stem from insufficient body stability and inadequate core strength. [6] To improve this, it is crucial to focus on core strength training in a sprinter's daily routine, strengthening the torso and major muscle groups. Core strength training not only unlocks athletes' potential but also lays a solid foundation for their physical enhancement. As core strength increases, so does an athlete's body stability, allowing them to execute sprints with more scientifically precise movements and postures, thereby achieving optimal training and competitive levels.

3.2. Enhancing Athletes' Control Ability

In the training regimen of sprint athletes, core strength training is key to enhancing body self-control. Through training, athletes can more effectively use their major muscle groups to optimize body functions, allowing precise energy transfer to various body parts, ensuring each functions powerfully, and laying the groundwork for success in sprint competitions. Body control is crucial during the sprint, as it determines the efficient distribution and output of strength. For instance, athletes should harness core strength properly, understanding the power needed for each sprint phase, and adjust their body strength usage accordingly to ensure a flawless race. Thus, sprint athletes should adopt targeted core strength training methods, stimulating muscle groups to continually power body functions and control energy precisely during power transfer, ensuring balanced and efficient power use throughout the sprint.

3.3. Enhancing Athletes' Body Coordination

Sprint training involves various elements including strength, endurance, and limb training. Excellent limb coordination is crucial for maximizing limb strength and achieving high-quality sprint performance. Conversely, inadequate limb coordination can limit sprint speed and hinder performance improvement. The coordination of an athlete's limbs relies on the support of body strength, especially the ability of major muscle groups to transfer power to the limbs. By ensuring continuous and coordinated limb power, athletes can display good body posture and standard sprint patterns, enhancing the aesthetic value of sprinting. For example, in core strength training, targeted muscle impacts can significantly improve athletes' control over curve-running techniques, allowing them to achieve more stable and faster sprint performances under coordinated limb action.

3.4. Preventing Training Injuries

Sports injuries are a common dilemma during training and competitions, which can temporarily affect training schedules or performance, or in severe cases, cause long-term damage to athletes' physical functions, threatening their careers and daily lives. Exploring the causes of sports injuries reveals they often relate to insufficient muscle layer training during the training process. Especially in the sprint final, insufficient mental and physical coordination can lead to exhaustion, increasing injury risk. This often stems from traditional sprint training neglecting core strength development. Thus, incorporating core strength training into sprint athletes' routines is crucial. Targeted training effectively stimulates athletes' muscle layers, generating more power and teaching them to distribute it wisely during competitions to ensure efficient motion execution while reducing injury risk. Additionally, core strength training enhances overall athletic ability, making their sprint training and competitions more aesthetically appealing and competitive.

4. Specific Practical Methods of Core Strength Training for Sprint Athletes

4.1. Core Strength Training in a Stable State

Stable state core strength training activates athletes' muscle groups to enhance power transmission across various body parts. It includes:

(1) Static core strength training in a stable state: This is a foundational training form used early in an athlete's core strength regimen. Exercises such as plank supports, supine bridges, and glute bridges help sprinters initiate core strength training, stimulating their muscles to distribute power across multiple body parts.

(2) Explosive core strength training in a stable state: Essential for overall athletic performance, this method utilizes equipment to enhance power explosiveness. By training with equipment to a certain extent and then releasing, it stimulates the athletes' muscle groups for power acceleration, particularly useful in sprinting phases like the start and final sprint.

(3) Unloaded core strength training in a stable state: This method is crucial for enhancing the overall physical quality of sprint athletes. It involves progressively difficult training routines tailored to the individual's physical fitness, gradually

increasing in intensity to boost core strength.

4.2. Core Strength Training in an Unstable State

Unstable state core strength training continuously enhances a sprinter's adaptability and overall physical quality, proving to be an effective training approach. Typically, training begins in a stable state and progressively moves to more challenging unstable conditions to intensify the core strength training:

(1) Static core strength training in an unstable state: Compared to its stable counterpart, this method adds complexity. It often employs equipment like dumbbells and suspension straps to deepen the activation of muscle groups, distributing power throughout the body.

(2) Explosive core strength training in an unstable state: More challenging than stable state explosive training, it uses equipment like slide discs to help athletes perform core strength exercises. This powerful training mode stimulates the athletes' potential and boosts their explosive power, enhancing their overall physical capabilities and sprinting skills.

(3) Autonomous core strength training in an unstable state: This method aims to improve athletes' self-training effectiveness. Using equipment such as dumbbells and resistance bands, athletes engage in independent core strength exercises, continuously increasing the difficulty based on their physical capabilities to further develop their core strength.

5. Practical Pathways for Core Strength Training Methods in Sprinting

5.1. Promoting Core Strength Training Methods

In the training system for sprint athletes, actively promoting core strength training methods is crucial. This can be achieved through various means such as organizing lectures and workshops to deepen athletes' understanding of the importance of core strength training, thereby stimulating their enthusiasm to actively engage in this training mode. Core strength training is not only the foundation for enhancing athletes' physical stability but is also key to boosting their core competitiveness. To further drive the digitalization of sprint training, leveraging new media platforms and utilizing advanced technology and equipment to visually demonstrate core strength training methods and techniques can be highly effective. Both coaches and athletes can gain a clearer understanding and mastery of these methods through such promotion, aiming to broadly disseminate core strength training practices and enhance their role in sprinting.

5.2. Instructing Core Strength Training Methods

During the training of sprint athletes, coaches should comprehensively convey information related to core strength training, including its skills, methods, and core principles. Initially, coaches need to ensure athletes fully appreciate the positive impact of core strength training on their performance and then appropriately transmit the essence of core strength training. For example, coaches can use multimedia tools to integrate core strength training methods with information

technology, demonstrating them through short videos to help athletes understand and master the core elements of core strength training. By utilizing multimedia teaching tools effectively, coaches can promote the integration of training methods and technology, making the methods more vivid and straightforward, facilitating easy practice and implementation by athletes. This educational approach not only enhances the intensity of core strength training among athletes but also encourages them to independently apply core strength training methods in their daily routines, forming effective self-training patterns that further improve their overall competitive levels.

5.3. Facilitating the Practice of Core Strength Training Methods

In sprint training, the practical application of core strength training is essential for effectively enhancing athletes' core strength. First, to ensure the effective integration of core strength training into sprint routines, it is necessary to manage training equipment rigorously. Based on the specific needs of core strength training, ensuring an adequate supply of necessary equipment allows athletes to use them readily during training, whether in stable or unstable conditions. This not only promotes comprehensive development of the athletes but also significantly enhances the effectiveness of sprint training. Secondly, guided by core strength training methods, the athletes' roles should be fully utilized. Through systematic training plans, continually enhance sprint athletes' core competitiveness, laying a solid foundation for their outstanding performance in competitions.

6. Conclusion

In the training of sprint athletes, the practice of core strength training methods holds a pivotal role. It not only compensates for the deficiencies in traditional sprint training approaches and models but also underscores the central importance of core strength in the athletic capabilities of sprinters. Therefore, it is crucial to actively promote the deep integration of core strength training methods to ensure they become an indispensable part of sprinters' training regimes. By enhancing core strength training, athletes can improve their body control and stability, allowing them to perform more effortlessly in competitions and achieve better results. The implementation of core strength training not only aids in

the effectiveness of sprinters' training but also leads the optimization and upgrading of sprint training modalities.

During this process, core strength training methods should guide the continuous review and improvement of traditional sprint training methods. Introducing new training concepts and methods can better unleash athletes' potential and enhance their overall competitive capabilities. This holistic development is reflected not only in athletes' physical qualities but also in their psychological attributes and tactical applications. Thus, emphasizing the practice of core strength training methods is of paramount importance for promoting the comprehensive development of sprint athletes and highlighting the training value. This focus will also drive continuous progress and innovation in the field of sprint training, laying a solid foundation for cultivating more outstanding sprint athletes.

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