



Modern training methods and techniques used to develop the quality of speed

أساليب وطرائق التدريب الحديثة المستخدمة في تنمية صفة السرعة

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Abstract:

By analyzing this topic, the researchers goal to recognise the maximum critical techniques and methods of modern sports training to increase the characteristic of speed, as sports training is considered the main means of reaching the ideal performance for the athlete. Speed is taken into consideration a completely critical phisical feature in maximum sporting activities, particularly in speed races that require the runner to cowl a certain distance withinside the shortest feasible time at the same time as running, so developing it well will inevitably lead to achieving good result in sporting competitions. Accordingly, we can discuss all forms of speed and their importance, main to the modern methods and techniques utilized in growing every form of speed feature.

Key words: sports training methods, sports training techniques, speed.

المخلص:

يهدف الباحثين من دراسة هذا إلى الموضوع إلى معرفة أهم الأساليب وطرق التدريب الرياضي الحديث لتنمية صفة السرعة، فالتدريب الرياضي أهم وسيلة لتحقيق الأداء الأمثل للرياضي، وتعتبر السرعة من القدرات البدنية المهمة جداً في معظم المنافسات الرياضية، خاصة في سباقات السرعة إذ يتوجب على العداء قطع مسافة معينة في أقصر وقت ممكن أثناء الجري. وبالتالي فإن التطوير الجيد لهذه الصفة يؤدي حتماً إلى أداء جيد. وعليه سوف نطرق إلى كل أنواع السرعة وأهميتها وصولاً إلى الأساليب والطرق الحديثة المستخدمة في تطوير كل نوع من أنواع صفة السرعة.

الكلمات المفتاحية: أساليب التدريب الرياضي، طرق التدريب الرياضي، السرعة.

Introduction:

Speed is considered one of the fundamental components of physical performance, playing a crucial role in various sports activities. It varies from one individual to another based on specific factors and is closely related to other physical components such as agility, flexibility, strength, and endurance. Consequently, speed is an essential element of overall physical fitness, extending beyond mere running distances, as some may believe. It serves as a significant foundation for achieving a high level of athleticism in various sports. Its importance is evident in the fact that almost every fitness test includes assessments of different types of speed.

Speed also plays a crucial role in activities involving covering specific distances in the shortest possible time, such as in track and field events (e.g., 100m and 200m sprints). Additionally, it is essential for executing movements that require both speed and strength, such as contracting a specific muscle to achieve a movement goal, for instance, jumping to hit a ball or pushing off walls or starting blocks during fast running. Several variables contribute significantly to increasing running speed, including step length and frequency. Therefore, speed is one of the most important physical attributes leading to enhanced motor performance and athletic achievement, prompting us to explore the presentation of modern training methods and approaches used in its development.

1. Definition of Speed:

- The individual's ability to move from one place to another in the shortest time possible.
- "The ability of a person to perform individual and consecutive movements in a very short period."
- "The ability of a person to perform repeated movements of the same type in the shortest possible time, accompanied or unaccompanied by body movements, and thus the number of movements in a unit of time."

- "Muscle reactions resulting from the exchange between the state of muscle contraction and the state of relaxation." (Cloude, 1993)
- "The ability to perform a series of consecutive movements of the same type in the shortest possible time." (Eric, 1991)

2. Types of Speed:

2.1. Compound Speed:

- **Speed-Strength:** The athlete's ability to resist resistance at maximum speed and in the shortest time possible, such as vertical jumping and kicking in football (for the highest number of repetitions). (Weineck, 1997)
- **Speed Endurance:** The ability to resist speed loss at the moment of fatigue during maximum contraction or below it, to perform periodic movements with possible resistance, as in running for medium distances.
- **Maximum Speed Endurance:** The ability to resist the loss or reduction of fatigue to achieve maximum speed of contraction when performing periodic movements, such as running for short distances. (Weineck, 1997)

2.2. Pure Speed:

- **Single Movement Speed:** The ability to perform a single movement at maximum speed and low resistance, including throwing the javelin, shot put, swimming, and jumping.
- **Compound Movement Speed:** The ability to perform more than one skill with a single motion in the shortest possible time, such as jumping, hitting in volleyball, receiving and passing in football, handball, and basketball. (Mufti, 2001)
- **Reaction Speed:**
 - **Definition of Reaction Speed:** "The response to external influences in the shortest possible time," such as quickly reacting to the ball's movement after its trajectory changes. (Weineck, 1992, p. 337) It also refers to the speed of movement in response to a specific situation or stimulus, such as the speed of initiating a movement to meet the ball after a

teammate's pass or changing direction quickly due to an unexpected change in position during a game.

- It also refers to the speed at which a person moves to perform a movement after a specific situation or stimulus, such as the initial movement speed to receive the ball from a teammate or the speed of changing direction after a sudden change in position during a match.

▪ ***Types of Reaction Speed:***

- Through these multiple concepts of reaction speed, we identify three types of it. (Mufti, 2001, pp. 203-204)

✓ ***Simple Reaction Speed:***

- It is expressed in the time between the appearance of a known stimulus and the response to it. An example is the starting signal in running or swimming. (Occurs when the stimulus is known to the athlete, and they are aware of how to respond to it).

✓ ***Compound Reaction Speed:***

- It refers to the time between the appearance of two distinguishable stimuli and the response to one of them after distinguishing between them, as seen in boxing. (Occurs when the athlete does not know in advance the type of stimulus or the timing of its occurrence).

- **There are two types of compound reaction speed:**

✓ ***Single-response compound reaction:*** The athlete responds to a specific situation in a specific way, such as a boxer reacting to the opponent's performance, whether by retreating, advancing, or blocking. Similarly, in football, when a player decides whether to shoot at the goal or pass to a teammate. In this case, the athlete can only perform one action or one response, such as retreating or advancing, but cannot perform both actions simultaneously.

✓ ***Multiple-response compound reaction:*** This type is considered more challenging due to its need for a high level of attention to quickly make the correct and successful decision. It sometimes requires early

preparation for anticipating the opponent's performance. For example, a fencer who initiates an attack while being ready to respond to the opponent's counter-defense, a basketball player aiming at the basket while being prepared to respond to the failure of the shot or the opponent's defense, or a boxer who throws a punch and simultaneously can respond to the opponent's counter-defense after overcoming it. (Abu Al-Alaa, 2012, p. 202)

▪ ***Anticipatory Reaction Speed:***

It is the time interval between the appearance of the stimulus and the response to it, involving isolating thought and making the decision for the required action. This is particularly relevant, for example, in the context of goalkeepers in football (Mufti, 2001, pp. 203-204).

▪ ***Importance of Reaction Speed:***

- Assists in focusing non-aerobic enzymes.
- Aids in neuromuscular coordination.
- Reaction speed helps in the completion of sensory devices and their transmission to the central nervous system.
- Facilitates the utilization of non-aerobic resources without the presence of lactic acid.
- Contributes to athletes acquiring specialization-related excellence (Mufti, 2001, p. 208).
- Supports the development of psychological and cognitive abilities as a psychomotor attribute.
- Aids in adapting to various sensory responses.
- Facilitates motor learning due to its connection with the sensory and cognitive domains.
- Contributes to the functional integration of various other coordinative physical traits such as strength, flexibility, and agility.
- Facilitates the sensory devices' response to stimuli, transmitting them to the central nervous system, and subsequently, the motor response (Weineck, 1992, pp. 325-326).

▪ ***Transitional speed:***

- ***Definition of Transition Speed:*** Definitions of transition speed revolve around distance and time, characterizing it as the movement from one place to another at the maximum possible speed within the shortest time period.
- Harra defines it as moving forward as quickly as possible, involving covering a limited distance in the shortest possible time, such as sprinting in track and field or short-distance swimming (Kasim, 1998, p. 183).
- It also refers to the ability to move from one place to another in the shortest possible time, divided into two categories: speed for short distances and maximum running speed (Allaoui & Radwan, 1994, p. 233).

▪ ***Importance of Transitional speed:***

- Increasing speed is crucial in various sports activities, determining the physical qualification for specialized activities.
- Transition speed contributes to neuromuscular coordination.
- Speed, through muscle contractions and extensions, aids in increasing the muscles' ability to stretch and contract a maximum number of muscles.
- Helps increase muscle power and improve specific strength.
- Facilitates the athlete's adaptation to non-aerobic energy production (lactic acid).
- Speed contributes to the integration of functional analysis and the regulation of muscle tension under specific time and spatial requirements.
- Transition speed enhances performance in competitive tasks (Thil, 1977, p. 251).
- Contributes to increasing the energy stores of creatine phosphate and adenosine triphosphate (ATP) (Weineck, 1997).

- Plays a crucial role in various aspects of physical performance in different sports.
- Aids in the success of many motor skills (Mufti, 2001, p. 203).
- ***The theory and methodology of developing transitional speed:***
 - Precise awareness exercises should be employed to generate speed proportional to the load intensity.
 - Exercise intensity should not decrease until the end despite the fatigue accumulated due to the load.
 - When defining the overall speed development goal, one can rely on sports with smaller playing areas, especially for multi-disciplinary sports.
 - Speed exercises should include extremely fast movements in the form of high-speed actions.
 - To develop speed, specific exercises for the specialized activity that closely resembles actual competitive positions should be adopted.
 - Exercises from other collective and individual disciplines, as well as speed and endurance races, can be utilized.
 - From a practical standpoint, the repetitive method with maximum intensity specified at 90-100%, and a repetition range of 1-6, is considered one of the best approaches for overall speed development (Weineck, 1997).

3. Factors Influencing Speed:

- ***Structural Characteristics of Muscle Fibers:*** The composition of human muscles includes both red and white muscle fibers. Red muscle fibers are known for slow contractions, while white muscle fibers exhibit rapid contractions compared to red fibers. It becomes challenging to develop the speed level of individuals with a higher percentage of red fibers in most muscles, limiting their performance in activities that primarily require speed, such as short-distance running and swimming competitions. The genetic makeup of muscle composition sets certain limits on an individual's speed development.

- **Neural Patterns of the Individual:** The development of speed is linked to the neural pattern characteristic of an individual. The central nervous system's control and guidance are crucial for an individual's ability to perform various movements at maximum speed. The perfect coordination between the multiple functions of different neural centers significantly contributes to the development of speed.

- **Power Specific to Speed:** Power specific to speed is a fundamental factor for the development of speed, especially when overcoming resistances that require high muscle contractions. Research has demonstrated the development of transition speed in short-distance athletes in track and field as a result of enhancing their muscular strength. The speed of start and turns in swimming is significantly influenced by the strength of leg muscles.

- **Muscular Relaxation Ability:** The ability to achieve muscular relaxation plays a crucial role in speed development. Muscle tension, especially in antagonist muscles, hinders motor performance speed, often attributed to an individual's lack of mastery of proper motor performance or elevated emotional arousal in competitive sports.

Training in muscular relaxation can be achieved through exercises where muscles contract intensely, coupled with voluntary control of the breathing process (breath-holding), followed by complete muscle relaxation attempts. Such exercises help individuals acquire voluntary muscular relaxation after intense muscle tension.

- **Muscle Stretchability (Elasticity):** Muscle stretchability, resulting from the elongation of muscle fibers and characterized by muscle flexibility, is a factor that contributes to increased motor performance speed. Stretched or elongated muscles can contract with force and speed, similar to the behavior of a rubber band. This aspect includes not only muscles involved in motor performance but also resistance or inhibitory muscles to prevent hindrance and slow movements.

- **Willpower:** Willpower is a crucial factor for the development of an individual's strength and speed. The athlete's ability to overcome internal and external resistances to engage in activities aimed at

achieving their goals is essential for speed development. Coaches should work on strengthening the willpower of athletes, setting clear goals that require individuals to use their willpower to the fullest extent.

These factors collectively contribute to the complex nature of speed development, requiring a comprehensive approach in training programs. (Allaoui, 1990, pp. 153-156)

4. Considerations when working on speed development:

- Ensure proper warm-up and stretching of muscles, especially before starting speed exercises.
- Pay attention to the technical performance of the exercise, allowing the player to achieve maximum speed.
- The player should master the motor performance mechanically, so as not to divert attention trying to reach maximum performance speed.
- The distance or time taken for the exercise should not involve a slowdown in speed at any point.
- Focus on the principle that improving speed starts from slower to faster and from easier to more complex.
- The best time to perform speed exercises in a training session is immediately after warming up, before players become fatigued.
- Ensure that players are not fatigued before performing speed exercises.
- Rest periods should involve muscle relaxation and light movements such as jogging, leg relaxation, arm swings, and walking.
- Vary and change exercises before players become bored with them. (Mufti, 2001, pp. 207-208)

Conclusion:

goal of our research is to explore modern training methods used in developing the various forms of speed, whether as a compound attribute or as a pure characteristic. Speed is considered one of the most essential physical attributes needed in all sports activities, particularly

in speed-related disciplines. The aim is to achieve athletic performance, reach high levels, and compete with opponents, especially given the tremendous advancements witnessed in speed races recently, reaching the level of scientific marvels. Therefore, effective planning of training loads and understanding modern training methods targeting the development of this attribute will undoubtedly lead to its enhancement without the occurrence of negative effects that may result from planning not based on modern scientific foundations.

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