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The top speed phase in the 100-meter dash (m/p)
La fase de máxima velocidad en la carrera de 100 metros planos (m/p)

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ABSTRACT

To study the possible causes that negatively affect the national results of our runners in the Reyna Athletics test, brought with it the application of this research. The results obtained in the applied diagnosis allowed the authors to determine that the investigated athletes fail to maintain maximum speed after passing the first 50 meters of distance in the 100 m / p race. Taking into account the above, this work pursues the objective of developing a methodological alternative that contributes to enhance the maximum speed phase in the 100-meter flat runners of the School category of the EIDE of Guantánamo.

Keywords

Phase; Maximum speed; Enhance; Results.Fase.

RESUMEN

Estudiar las posibles causas que inciden de manera negativa en los resultados nacionales de nuestros corredores en la prueba Reyna del Atletismo, trajeron consigo la aplicación de la presente investigación. Los resultados obtenidos en el diagnóstico aplicado permitieron determinar que los atletas investigados no logran mantener la máxima velocidad luego de transcurrir los primeros 50 metros de distancia en la carrera de 100 m/p. Teniendo en cuenta lo anterior, este trabajo persigue el objetivo de elaborar una alternativa metodológica que contribuya a potenciar la fase de máxima velocidad en los corredores de 100 metros planos de la categoría Escolar de la EIDE de Guantánamo.

Palabras clave

Máxima velocidad; Potenciar; Resultados.

INTRODUCTION

Cuba was for many years a power in the 100m/p. The first great result at the international level was carried out by José Barrientos, equaling the world record of 10.2 seconds in 1928. He was followed by others who shone on the stages of the American continent and also throughout the world; among them: Rafael Fortín, Pan American champion in 1951 and triple Central American champion, (1946, 1950, 1954); Enrique Figuerola, fourth place in the Tokyo 1960 Olympic Games, champion at the World University in Sofia in 1961, Pan-American champion in 1963 and Olympic runner-up in 1964.

Other relevant results were Pablo Montes, fourth place in the 1968 Mexico Olympic Games, Central American champion in 1970, second in the 1971 world list with 10.0 seconds; Hermes Ramírez, leader of the 1969 world annual list with 10.0 seconds and second in the 1970 season with a time of 10.1. The female presence during the first half century was almost nil. Already in 1933 the First Women's National Championship was held and in 1935 the Cuban Women's Athletic Association was created. Berta Díaz became Pan American champion in 60-meter dash in Mexico 55.

However, in the second half of the 1980s, the level of Cuban specialists began to decline. In the 1987 Pan American Games held in Indianapolis, United States, the two best Cuban representatives at that time, Leandro Peñalver and Andrés Simón, only reached the finish line in fourth and fifth place respectively. That was also the last year in which a Cuban runner from the queen test was located in the annual list of the ten fastest on the planet.

In the other world championships held, the final race has not been accessible to the Cuban exponents either, nor have they been those of the Olympic Games of Barcelona 1992, Atlanta 1996, Sydney 2000, Athens 2004 and those carried out up to the present. In the ten world youth championships held since 1986, it has not even been possible to count on even a specialist in the final phase of the event.

This unfortunate decline in the Cuban 100m/p sector has generated the following question among specialists and fans in the country: Why has the training of world-class 100m sprinters been made impossible in Cuban Athletics?

Runners of this distance in our province are not excluded from this. The truth is that the results support the need to seek methodological solutions that allow obtaining better results in this test. Taking into account the need to counteract or limit the causes that lead to such results, this research pursues the objective of developing a methodological alternative that contributes to enhancing the maximum speed phase in 100m/p runners in the EIDE School category. of Guantanamo, based on the individual characteristics of the athletes and the competitive activity.

METHODS

Among the scientific methods used were:

Theoretical:

The inductive-deductive allowed starting from general theories to explain particular facts about the characteristics of the phases of the 100-meter dash.

The analytical-synthetic was used in the decomposition of the phases of the 100 m/p race into the main elements that make it up to determine its particularities and through synthesis, integrate them to discover their relationships and general characteristics.

The documentary review was applied with the objective of assessing the current state of the kinematic characteristics of the technique and the phase of maximum speed in the 100-meter dash.

Empirical:

Observation was used, obtaining the information from previously established criteria on the phase of maximum speed in the studied race, which allowed an assessment of its improvement.

The survey was applied to Athletics coaches. A questionnaire was elaborated with the objective of exploring the knowledge of the teachers about the knowledge of the phases of the 100-meter race, its importance in the school category, the existing insufficiencies in the phase of maximum speed in the investigated athletes and the need to have a methodological alternative that corresponds to the characteristics of these athletes in order to improve sports results.

RESULTS

The objective of this study was to find out in which stretches the athletes reach their maximum speed and for what distance they are able to maintain it in the 100 m/p test. To achieve this, a kinematic analysis was carried out by sections of 10m in said test. For the filming, the video cameras were located perpendicular to the athletics track in order to record the passing time of each one of the athletes by some references located every 10 m. Before the tests, the reference system was filmed in the center of each street and in each of the 10m sections of the athletics track; Subsequently, the 3 athletes participating in the test were filmed without moving the cameras. In order to obtain the passage time of each athlete, the instant of contact of the anatomical point "chest" of each athlete as they pass through the reference system of their lane corresponding to each of the sections of the race was digitized.

The data was entered into the BioCar calculation routine to obtain the following kinematic variables: Partial time in each section: Time interval used to cover each 10 m section (T0-10; T10-20; T20-30; T30-40; T40-50; T50-60; T60-70; T70-80; T80-90; T90-100).

The official race time was significantly lower in athlete #1 than in athletes #2 and 3 (11.44 ± 0.13s vs 11.57 ± 0.09s vs 11.66s respectively). However, in the partial times by sections no significant differences were found in all. The times of the 0-10, 20-30, 60-70 and 80-90m sections were significantly lower in athlete # 1 than in athletes # 2 and 3. While in the 10-20m section the time spent by the less fast athletes was less than that of the fastest. Regarding the acceleration and deceleration sections, only T80-100m was significantly lower in the fastest athletes. And in the T60-70m and T70-80m the athletes began to considerably decrease the speed of the race manifesting premature fatigue.

DISCUSSION

Athletic speed tests are complex disciplines that depend on multiple factors of a conditional type, decision making and movement control, the importance of which will vary depending on the duration of the event. The race is a particular type of locomotion that man performs to move quickly, but in the speed race it is not just about moving quickly, but coordinating all aspects of said locomotion in such a way that it is possible to travel a distance as quickly as possible.

The shorter the distance to be covered, the greater the contribution of each phase to the final result of the test, serve as an example that, in the men's 100m final of the 2016 Olympic Games, the difference between winning or not winning a medal was separated by 0.02 s., or that, in the final of the World Championships in Beijing 2015, the bronze medalist was classified by photo finish with a thousandth of a second (0.001s.) apart.

The 100-meter dash is one of the athletic events that arouses the greatest interest in the field of Athletics due to the high maximum speeds reached by the athletes.

In certain studies, this race has been divided into three large phases: Acceleration Phase, Maximum Speed Phase and Deceleration Phase (Mero, Komi, & Gregor, 1992). Once the athlete has taken off from the starting blocks, the Acceleration Phase begins, where the runner intensely increases their speed by increasing stride frequency and length.

The Full Speed Phase begins, in which the running speed continues to increase but at a slower rate of increase compared to the previous phase. And finally the Deceleration Phase occurs, in which a loss of speed is caused with respect to the maximum reached in the previous phase. Although this three-phase structure is accepted by several authors (Gajer, Thepaut-Mathieu, & Lehenaff, 1999; Mero et al., 1992; Moravec & cols., 1988).

Prieto, 2013 distinguishes 5 phases: reaction time, action, acceleration, maximum speed and resistance to speed. recently (Maćkala, 2007) have proposed a more complex structure that divides the event into seven phases: Phase I: Initial Acceleration (0-20 m); Phase II: Second Acceleration (20-40 m); Phase

III: Initial Peak Speed (40-50 m); Phase IV: 1st Speed Regulation (50-60 m); Phase V: 2nd Speed Regulation (60-70 m); Phase VI: Maximum Speed (70-80 m); Phase VII: Deceleration (80-100 m). Other authors such as (Brüggemann and Glad, 1990) and (Ferro et al., 2001) in their competition analyzes for 10m stretches valued the 30 - 50m stretch as the Acceleration Phase and the 80 - 100m stretch as the Deceleration Phase, respectively.

The phases of a 100-meter athletics race are the different stages through which the performance of the runners passes throughout this speed test. In this distance, runners will always strive to reach and maintain their maximum speed, because it is a very short distance that does not give rise to the dosage of effort. Each of these phases mark the differences that occur in the runner's running technique throughout the race, which evolves from the start crouching, to the finish, going through the periods in which the runner successively tries to, speed up and get up, as well as display his maximum level of speed.

In each phase of the race you work in a different way, these technical differences are supported by certain variations regarding the work done by the muscles when running. It is curious that when it comes to running at all times, it is possible to run in such a different way in the space of 100 meters. Likewise, the ability to run at maximum speed in each of the sections of this distance is subordinated to the different energy production mechanisms that intervene in this time frame (around 10-12 seconds).

Once the first 6 or 8 seconds of work have elapsed, the muscle must necessarily resort to other energy resources that will not allow it to reach the same level of intensity as in the first meters.

Mackala (2013), analyzed the different phases of the race (acceleration, maximum speed and deceleration), the speed, amplitude and frequency of a group of eight high-level sprinters throughout a 100-meter flat test to verify the influence of these variables on the phases of the race and technical efficiency, which reinforces the idea of the importance of this phase.

The specialized studies, for the most part, have taken into account for the biomechanical analysis of the technical execution, both the dynamic characteristics and the kinematics of the movements studied. However, there is a poor treatment of the phase of maximum speed, since most of the studies have been directed to the postural characterization of the snatch and the transitory steps to which the snatch is given greater importance, such as Baumann (1976); Mero, Komi and Gregor (1992), who study reaction time.

To delve into the subject investigated, authors are consulted who define the phase of maximum speed as: that phase in which the parameters of stride amplitude and frequency have reached their optimal values. It occurs when the athlete is capable of reaching the best records in speed races.

Maintaining maximum speed is one of the main objectives of a sprinter's specific training, ensuring that this speed is as high as possible. Novice athletes can barely maintain this level of performance above 1.0" - 1.5" of stroke. With training, the increase in speed in lower level athletes is mainly due to stride width, while in skilled athletes the determining factor is frequency (Tabasnik, 1991).

As its name indicates, the phase of maximum speed would be the one in which the runner moves at maximum speed. This section of the race begins when the runner has already reached verticality and the maximum amplitude of his stride, and continues for the meters that he is able to maintain it, depending on the technique, muscular strength, and especially the runner's speed resistance.

For a 100-meter sprint, this phase takes place approximately between 60 and 80 meters. The position of the body and the inertia achieved with its acceleration, will allow the runner to exploit the amplitude of the steps a little more, and to increase the frequency of his steps a little more if he manages to reduce the contact time of the foot in the ground at the supports. In this phase, said contact time can be reduced because the center of gravity is at its highest point; so the knee and ankle have to flex very little to prepare the leg for the drive of the next step.

In Cuba, there has been a decline in the quality of the 100 m/p sector, since Cuban athletes have not appeared in the finals of this athletic discipline in games at the Pan American and Olympic levels since 1987.

There are many causes that justify the lack of elite sprinters at the present time, but taking into account the importance given to the first phase of maximum speed in the 100 m/p race, this study is carried out, especially, in school athletes, since most of the specialized literature has been made on the basis of international elite athletes.

However, despite the obvious importance of this aspect, there are few studies found in the literature that address this issue.

Taking into account the lack of a bibliographical reference that addresses the phase of maximum speed as the central axis of an investigation and after analyzing the literature previously exposed and to try to solve this limitation from the theoretical-practical point of view, the group of authors of The objective of this work is to develop a methodological alternative that contributes to promoting the maximum speed phase in the 100-meter runners of the School category of the EIDE of Guantánamo, which will allow coaches to have a reference adjusted to the characteristics of its athletes, which serves as a guide

for the improvement of this phase, contributing in turn to the athletes investigated being able to resist high speeds after the first 50 meters of the race have elapsed, in correspondence with the objectives conceived in the athletic training process. , that is, in the short, medium and long terms.

CONCLUSIONS

The speeds reached in the first 10 meters of acceleration as well as in the intervals of 20-30, 60-70 and 80-90m seem to be the decisive ones in the race. The results of this study corroborate the hypothesis that to win a 100m/p race, one must accelerate quickly and maintain maximum speed for as long as possible, as well as minimize loss of speed at the end of the race. Being demonstrated that the maximum speed is reached approximately between 50 and 60 m in the masculine branch and in the feminine between 40 and 50 m and that it lasts approximately 10 to 20 m.

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