SPEED DYNAMICS IN 60 M HURDLES EVENT

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Introduction: In this paper, we analized, using the video recordings, both the analytical analysis and the integral analysis of the 60 meters hurdles event.
Subjects. The experiment was carried out on a group of 10 performance athletes of different sports clubs, at the Indoor National Championship. The athletes are between 18 and 25 years old and they are professional athletes for several years. They are also in the competition phase.
Materials and methods. The study took place at the Indoor National Championship. The recordings of the reaction time, and the overall racing time were performed with the electronic timing system from the athletics hall. The running time between the hurdles and the time from the last hurdle to the finish line, were timed manually. The recording of the times were made in the two heats of seven, respectively eight competitors, as well as in the final.
Results and discutions. After analyzing the intermediate times and the overall times of the heats and the final, the general chart records a continuous increase of the speed, reaching the maximum speed at the hurdle number 5.
Conclusions. It has been demonstrated that the reaction time does not influence the overall time of the race nor its result. The data obtained becomes a basis for assessing the positive or negative state of athletes, the level at which an athlete should behave, at maximum speed and at the specific strength to be competitive at the highest level.
Keywords: *speed, hurdles, performance athletes.*

Introduction

Speed is the ability to cover the distance between two points in the shortest possible time. It is the product of reaction velocity and the speed of execution (between the start of a movement and the moment when the movement is completed).

From a cinematic point of view, speed is a dimension of space-time relationships (V = S / T). Every movement takes place in space and time [1].

The term "speed" can have several meanings, depending on the sport and the circumstances in which it is used.

Sprint speed is defined as running at 95-100% of the maximum effort. This requires the participation of the alactacid anaerobic energy system, which is conditioned by the intensity of work performed without the excitement of muscle fatigue [2].

In athletics, the speed of movements is manifested in the following forms [3]:

Elementary forms
- a reaction rate
- execution speed
- repetition speed

Combined forms
- an acceleration speed
- speed

Schmolinsky states that "speed, according to the principle of systematization, can only develop if the exercise effort is done at maximum speed and in the conditions of a resting nervous system."

D. Harre mentions the following: "Because speed exercises are most effective when the nervous system is in the state of optimal excitability, speed training must not precede any tiring activity."

One can deduce from the previous statements two very important methodological guidelines:

1. The exercises are repeated at or near maximum speed, this being in relation to the athletic neuro-muscular coordination capacity [3]. There is also the idea [4] that athletes with a lower neuro-muscular coordination capacity should not abstain from exercises at maximum speed.

2. To ensure the condition of "optimal excitability, resting nervous system", work on speed development is done in the first part of the lesson, after sufficient heating but not exaggerated. As a rule, work is done in short series, 3-4 repetitions, the number of the series being also 3-4. In a series only a part of the repetitions will be carried out at maximum speed, with the aim of improving coordination. This indication concludes if we

show that, on average, for an exercise, no more than 5-6 repetitions of maximum intensity are recommended [5]. At the first signs of fatigue, the speed is interrupted. From this point of view, there are individual differences, the optimal number of repeats being established on a case-by-case basis. In a system of lessons, speed is planned after rest days or after light workouts.

The purpose of the paper

We have watched through this paper, using video recordings, both the analytical analysis and the integral analysis of the 60 m hurdles. We were able to visualize the start time, the travel time to the first fence, the travel time between the fences, the time of the last fence on arrival and the overall time of the race in the series and the final.

Motivating the choice of theme

The motivation of the option is based on the need to identify the speed dynamics in the 60 meter hurdles test, due to the importance of this aspect alongside the technique, in order to obtain superior results in competitions.

We chose this theme from the desire to deepen the complexity of theoretical knowledge specific to the 60 m hurdles, both technically and methodically, but also to know the means by which the results in this test can be improved.

The desire and the interest to know the novels that emerged related to the athletic practice practiced constituted another argument in the choice of the topic approached.

The importance and timeliness of the topic

Athletics, through its two forms of practice, as a mass and performance sport occupy an important place in the overall concerns of the movement of physical education and sport, which is highlighted in all the guidance documents elaborated lately.

In the athletic tests, the sprint - the speeding - is marked by a wide spread, and its repercussion, directly or indirectly, on other athletics is obvious. It is not exaggerated to say that the stage reached by sprint development is a true barometer for a multitude of other athletic probes, namely for those in which the speed of travel is a main parameter.

In the sprint hurdles tests, the final result is greatly influenced by a good start. In this sense, the speed of reaction, materialized in the time elapsing from the appearance of the starting signal - the pistol's stroke - to the departure of the starting blocks is of great importance.

Immediately, moving as quickly as possible after leaving home blocks is the first goal pursued by the athlete, a goal achieved by a relaxed, rhythmic running and a great amplitude of the movements from the very first steps, which will allow the athlete to get a increasing speed.

Running near the first hurdle is the capital for the entire race. The acceleration limit distance remains valid for the entire stroke. Because of this, in order to attack all fences with the highest possible speed, the running of the fences must be carried out with similar precision.

The main difficulty for all athletes is that the step model should always be aimed at reaching the optimal point of attack on all hurdles. This principle must be respected, regardless of the speed of the athlete.

In this sense, the athlete must also take into account the possible variations in the daily form, changing the atmospheric conditions (the presence or absence of wind, for example), acceleration rates (up to the first fence, and the following rhythmic intervals between hurdles).

The actuality of the topic under discussion is imposed by the very high level of performance at international level, at EC, CM and JO.

Materials and methods

Experimental was conducted on a group of 10 performance athletes from various sports clubs in the country, at the National Championship on Seniors and Youth field covered - 03 - 04 February 2018, Bucharest. Athletes are between the ages of 18 and 25 and have been practicing performance athletics for many years. At the time of the experiment, subjects were in competition.

Results and discutions
Identifying speed dynamics
<u>Series I</u>

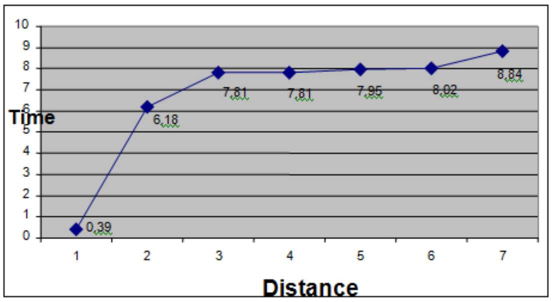

Fig. 1

Subject 1 records an increase in speed, reaching the maximum speed at hurdle number 5.

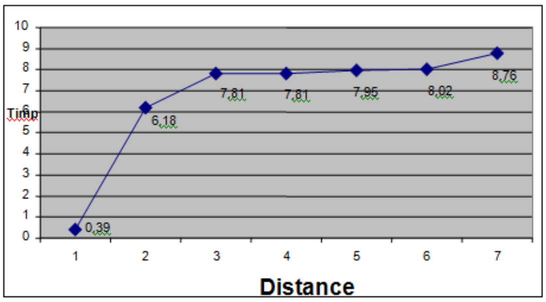

Fig. 2

Subject 2 records an increase in speed, reaching the maximum speed at hurdle number 5.

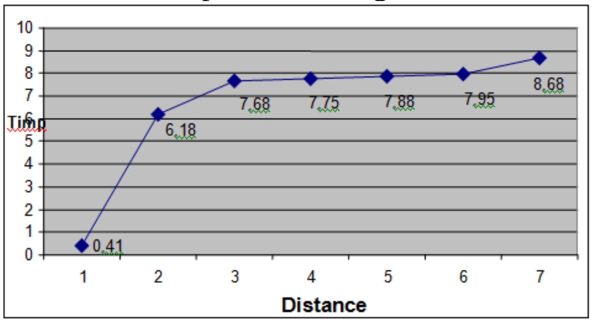

Fig. 3

Subject 3 records a continuous increase in the speed of movement, reaching maximum speed at hurdle number 5.

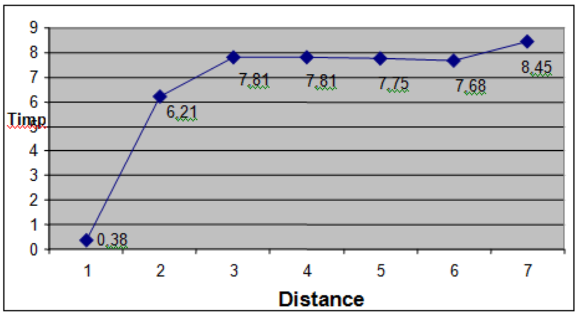

Fig. 4

Subject 4 records the maximum speed to the hurdle 2, speed maintained until the hurdle 3. Then follows a decrease in speed.

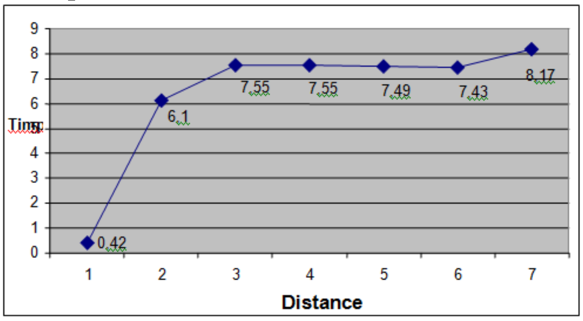

Fig. 5

Subject 5 maximum speed recorded in the hurdle 2, speed maintained until the hurdle 3. Then follows a decrease in speed.

<u>Series II</u>

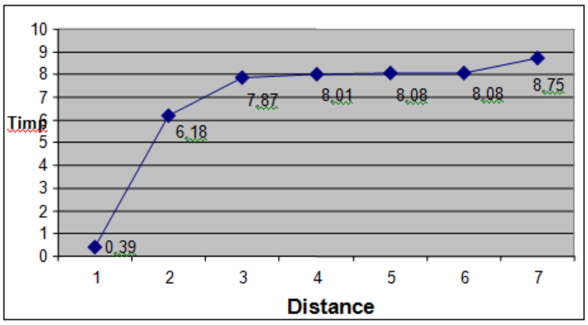

Fig. 6

Subject 1 reaches the maximum speed to hurdle 4 and maintains it up to hurdle 5.

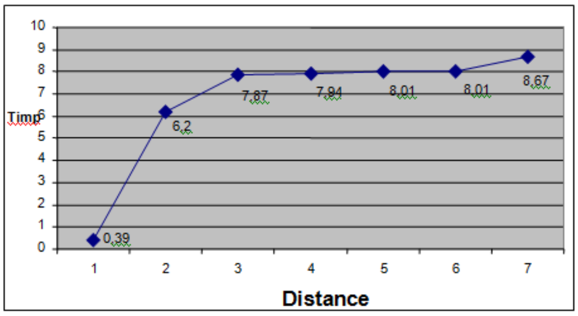

Fig. 7

Subject 2 reaches the maximum speed to hurdle 4 and maintains it up to hurdle 5.

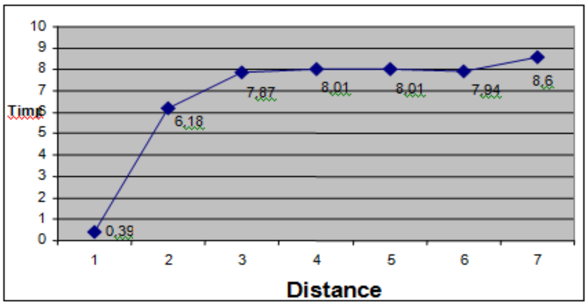

Fig. 8

Subject 3 reaches the maximum speed to hurdle 3, speed up to hurdle 4, then decreases to hurdle 5.

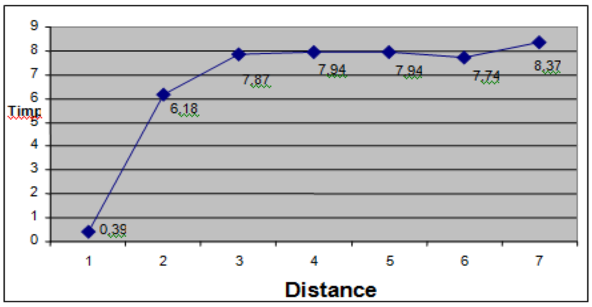

Fig. 9

Subject 4 reaches the maximum speed to hurdles 3, speeds up to hurdle 4, then decreases to hurdle 5.

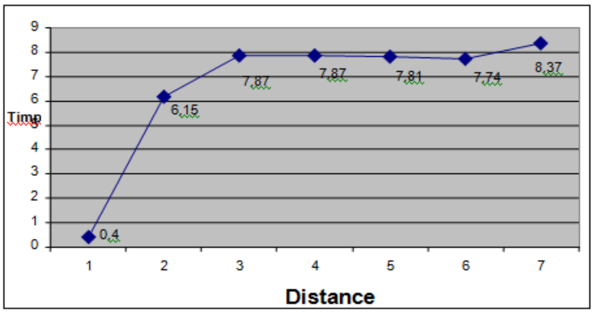

Fig.10

Subject 5 reaches the maximum speed to hurdle 2, speeds up to hurdle 3, then decreases continuously to hurdle 5.

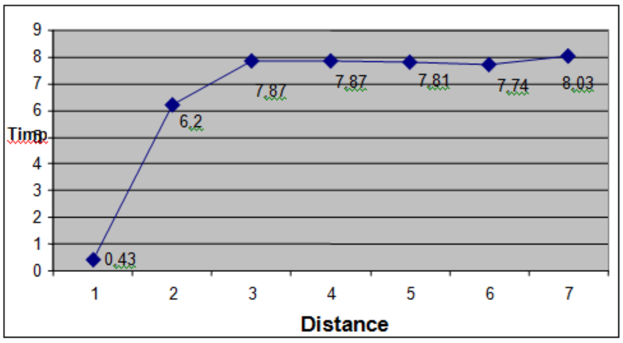

Fig. 11

Subject 6 reaches the maximum speed to hurdle 2, speed maintained up to hurdle 3, then records a continuous decrease to hurdle 5.

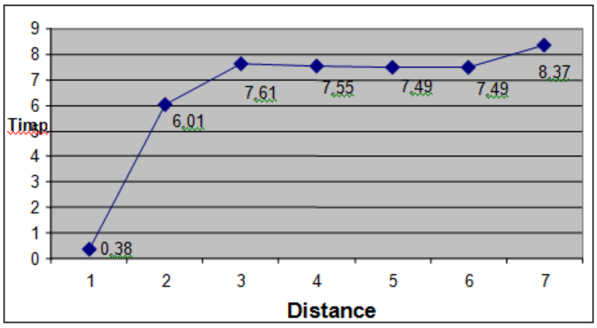

Fig. 12

Subject 7 reaches the maximum speed to hurdle 2, then decreases continuously to hurdle 5.

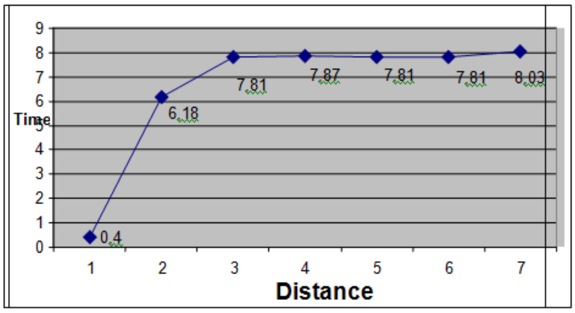

Fig. 13

Subject 8 reaches the maximum speed to hurdle 3, and then records a decrease in speed to hurdle 5.

The final

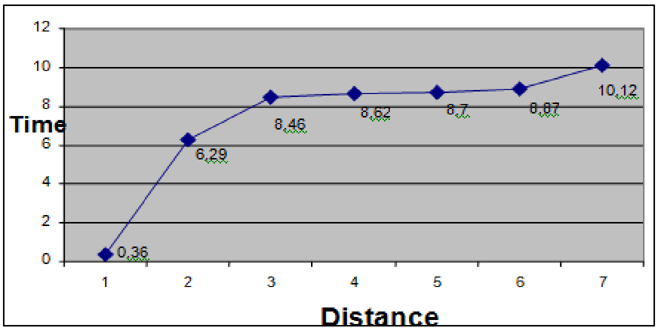

Fig. 14

Subject 1 records a steady increase in speed, reaching the maximum speed at hurdle 5.

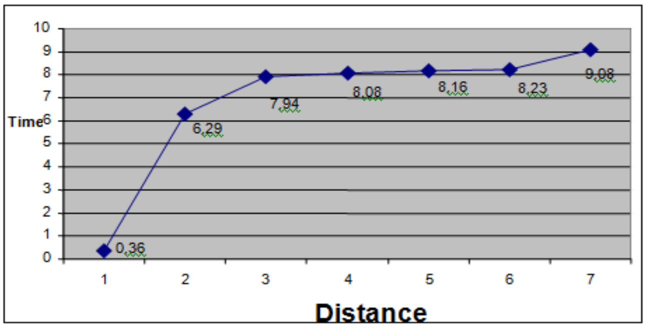

Fig. 15

Subjection 2 records a steady increase in speed, reaching the maximum speed at hurdle 5.

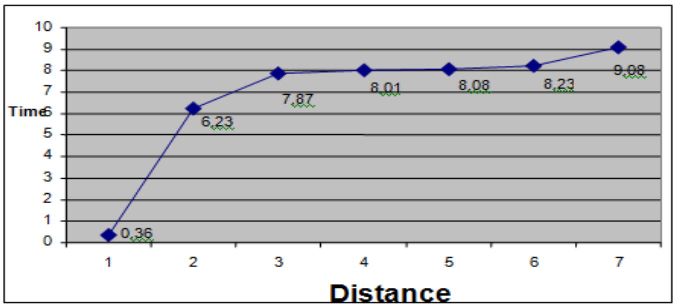

Fig. 16

Subject 3 records a continuous increase in the speed of movement, reaching maximum speed at hurdle 5.

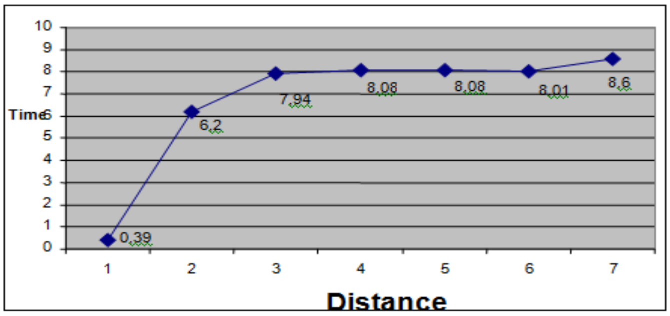

Fig. 17

Subject 4 records the maximum speed hurdle 3; speed maintained until the hurdle 4 and then experiences a drop in speed to the hurdle 5.

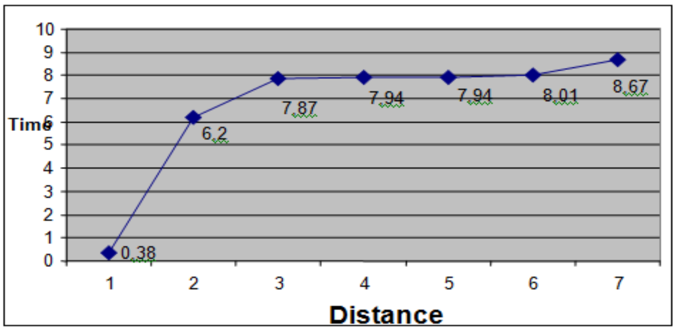

Fig. 18

Subject 5 an increase in the speed of travel, reaching maximum speed at hurdle 5.

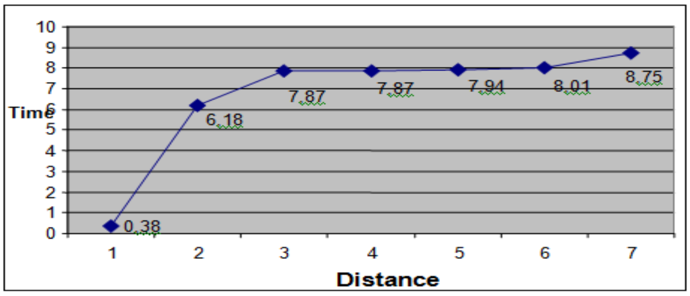

Fig. 19

Subject 6 is an increase of the speed, reaching maximum speed at hurdle 5.

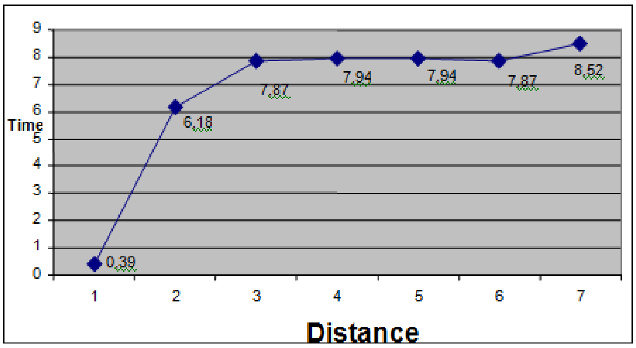

Fig. 20

Subject 7 reaches maximum speed of hurdle 3, speed maintained until the hurdle 4, and then a drop of the speed of the hurdle 5.

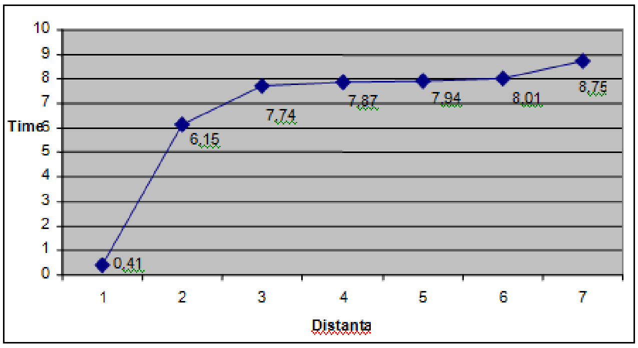

Fig. 21
Subject 8 records a continuous increase in the speed of movement, reaching maximum speed at hurdle 5.

Distance traveled in m / s

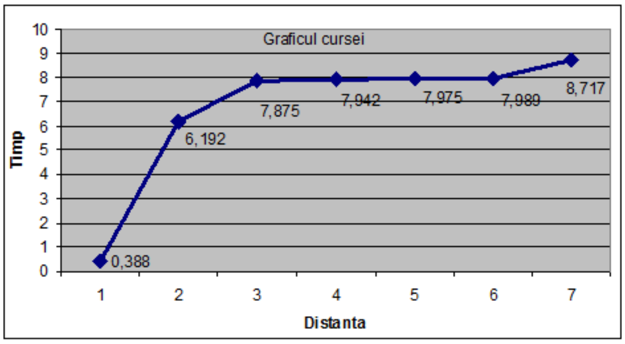

Fig. 22
The graph generally an increase of the speed of travel continuously, reaching maximum speed at hurdle 5.

Conclusions

This study was conducted to help specialists appreciate intermediate times in setting athletes' level of training for the 60 m hurdles test. To evaluate the whole run and to serve for the appreciation of some moments (acceleration phase and maximum speed phase).

This paper may suggest ways to use modern technology to simplify the work of coaches.

The data obtained becomes a basis for the appreciation of the positive or negative state of the athletes. The level at which an accelerated hurdles runner should behave at maximum speed and specific strength to be competitive at the highest competition.

The hypothesis put in question is confirmed. It can be noticed that in the samples of 60 m hurdles, the maximum speed is reached at the hurdle 5.

References

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