



THE IMPORTANCE OF PHYSIOLOGICAL TRAITS IN ASSOCIATION WITH METABOLISM IN THE DEVELOPMENT OF SPEED ENDURANCE AMONG MIDDLE DISTANCE RUNNERS

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Abstract:

This study sets up to investigate the importance of physiological traits in relation to metabolism in the development of speed endurance among runners at middle-distances. It aims at determining the level of physiological traits which are associated with metabolism among runners; in addition of developing the required physical attributes especially speed endurance. Accordingly, the researchers have administered two main physiological tests: The River index test and the Shannon flash back heart curve test to a sample of 15 runners from the athletics games club of Blida (Algeria). Their age range varies between 17 and 18 years.

Keywords: physiological traits, metabolism, speed endurance, middle distances

1. Introduction

Athletic games are regarded as an ancient sport in the ancient Olympic Games and the bride of the modern Olympic Games. It is also considered one of the first Olympic sports. It is divided into several competitions, among them (running, throwing, walking and the common competitions); furthermore, it has many benefits as it creates in the individual moral, skillful and physiological harmony which can be realized through the continuity in regular and coordinated drills for different events that are related to this

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sport activity. Digital achievement for all athletic games competitions and particularly running at middle distances lead us to the discussion about the factors which contribute to the achievement of good results.

Hence, we have focused on the role of physical traits that are associated with metabolism in the development of speed endurance as it has many benefits in preparing runners for the races.

Furthermore, sport training is considered one of the most important applied sciences and organized orientations for middle distances as compared to other diverse athletic games events in terms of the embodiment of fixed objectives and the runner body adaptation to effort (training program).

The majority of instructors in this specialty are facing the phenomenon of lack in sport realizations for their runners, in spite of daily intensive sessions of training. This is nowadays, the case in the fields of training in diverse sport teams especially among athletic games clubs at Blida's union which represents the sample of this current study.

It is important to underline the low level in achievement in the field of the runner's sport for improving training programs and therefore increase the level of achievements for the runners sport (Hara, Duae, 1982).

From this point, we ask the following question: Are physiological traits associated to metabolism important in developing speed endurance?

2. Research methodology

2.1 Research method

The researchers have relied upon the experimental method in administering two physiological tests: the River index test and Shannon flash back heart curve.

2.2 Research population

Our population consists of a group of runners at middle distances who activate at Blida's club. Their age is within the range 17-18. They belong to the regional association of Algiers town which include some of the mentioned teams: Blida's club, Mouloudia of Algiers, Fouka's club of athletic games, Staouali hopes.

2.3 Research sample

The research sample consists of 15 middle-distance runners who belong to Blida's team of athletic games at the city of Blida (their age is 17-18)

2.4 Research tools: Physiological test + River index test

- **The Aim:** this test is one of the sport medicine which allows the assessment of the athlete sport state as a result of training; in other words, it is used for measuring cardiac and vessel compatibility with effort and level of fitness as well as to disengage the extent of adaptation with the applied training program
- **Sport material:** Metric tape to adjust the distances within the area of 400 meters- timers- speedometer.

2.5 Method of administering the test

We ask the runner to make 30 movements of the legs bend during 45 seconds. We measure his heart beat at rest before work (N1) then we measure his heart beat straight away after the test (N2); after that, he rests for 1 minute, then we take his heart beat after this operation (N3).

We calculate the result by applying the following equation:

$$\text{River index (1)} = (N1+N2+N3) - 200: 10$$

Index result	Fitness level	Heart adjustment with effort
0	Excellent	Sporting heart
From 1 to 5	Very good	Trained strong heart
From 5-1 to 10	Good	Strong capable heart
From 10.1 to 15	Average	Heart of bad adjustment

Table 1: Then we use the following River table in assessing this test

2.6 Shannon flash back heart (1965)

The Aim: is to generally assess the runner's flash back heart and their level of physical fitness.

Research tools: Stop watch for measuring heart beat at a distance 1000 meters

Method of making the race: The runner runs a distance of 1000 meters with utmost effort and at just upon arrival we take his heart beat after every 30 seconds of the flash back period until reaching 5 minutes. At the end and according to these results, we establish a curve that shows us the retrospective sequences of

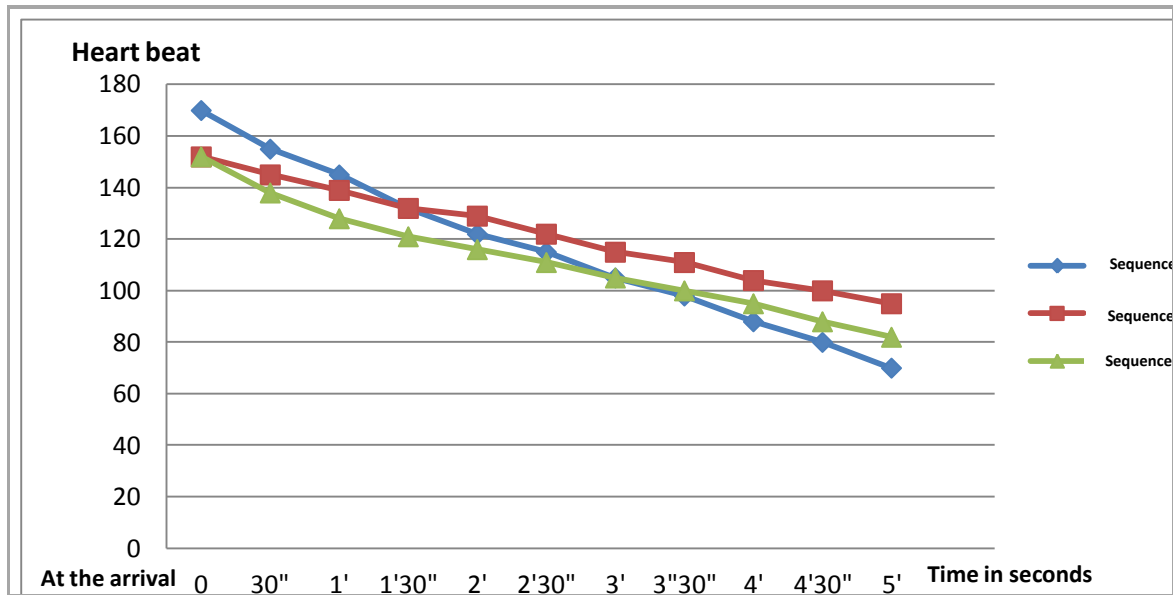


Chart 1: Shows the variations in the heart beat within a retrospective sequence (5 mn) after making utmost effort (1000 meters)

2.7 Statistical methods

Percentages: In our analysis, we used the percentages-the method of working it out is as follows:

% = number of frequencies x 100 / the total sample.

Percentage (%) = $A \cdot K / N$

Where:

A = number of frequencies K = Basis-100

N= sample

3. Presentation and analysis of River results

3.1 River test

It shows the level of physical fitness in the pre-test phase.

		Level of physical fitness					
Individual scores		Excellent	Very good	Good	Average	Weak	Total
Pre-test	Number of sample	0	0	5	8	2	15
	Percentage	0%	0%	33.33%	53.33%	13.34%	100%
Pro-test	Number of sample	1	5	7	0	0	13
	Percentage	07.69%	38.46%	53.85%	0%	0%	100%

Table 2: The evolution which occurs at the physical fitness level of the sample runners through the proposed training program

This table shows a significant improvement in the level of physical fitness as the pre-test results reveal a 07.69 % where two runners have obtained an excellent level of physical fitness; meanwhile 38.46% have attained a very good level whereas the other 7 runners who represent 53.85% have obtained a good level. However, it appears from the pre-test results that the highest level is good with 33.33% corresponding to a total of 5 runners. On the other hand, the level of physical fitness was average concerning 53.33% that is to say 8 runners. The result has also revealed that 13.34% 2 runners have obtained a weak level in their fitness.

This evolution in the level of physical fitness shows the runners considerable adaptation to the applied training program.

3.2 Shannon Flash back heart

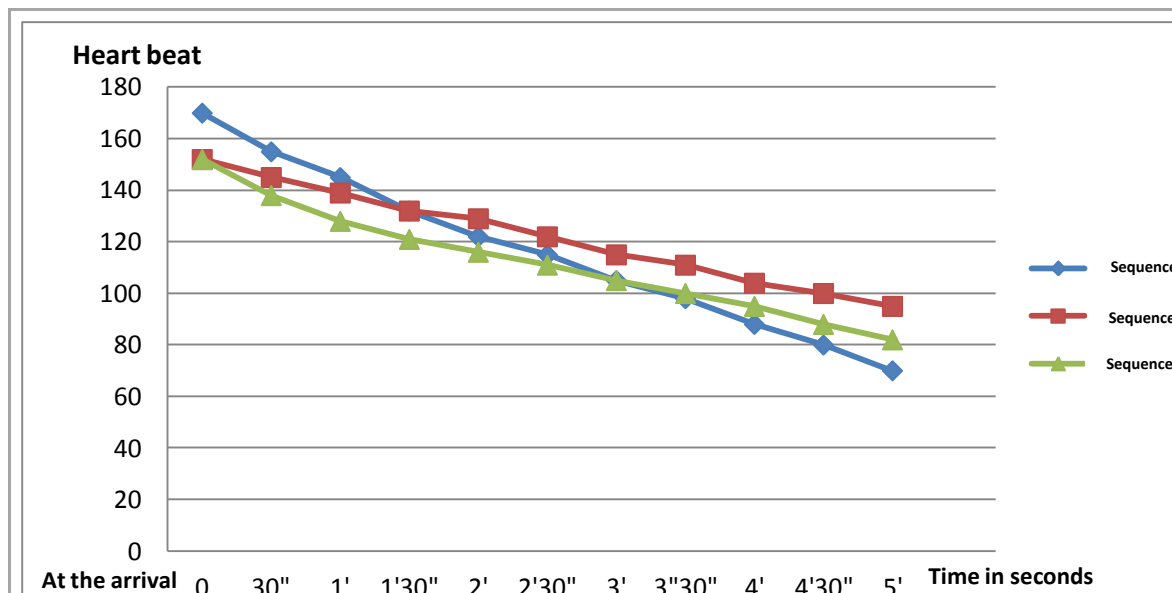


Chart 2: The variations which occur to the heart beat during the flash back phase (5 mn) after accomplishing an utmost effort (1000 meters)

3.2 Analysis of Shannon's flash back heart curve

This test was administered in three phases and a curve was established on the heart retrospective sequences for each stage. Hence, one can notice a gradual increase in the heart beat when ending utmost effort during each phase. As the curve chart indicates, an utmost beat was reached in the third phase 68.61H/B. This gradual increase in the beat has coincided with reducing in the record time for each runner at 1000 meters distance. The retrieval has evolved from one phase to another as the heart beat has, after 5 minutes of the retrieval in the first phase, reached 97.06 H/B.

As far as the second phase is concerned, it has attained 84.26 H/B minute da. However, the retrieval has appeared in the third phase in a more sophisticated way as it has attained 71.07 H/B. This rapid retrieval is generally due to the development in the level of physical fitness. But particularly, the physiological explanation of the change which occurred in the retrieval sequences in the third phase, as it is shown in the chart curve, demonstrates the increase in the heart size besides the amount of inflated high blood per minute, in addition to the reflection of the benefits in the evolution of endurance trait as a result of intensive training on the rapid slowing down of the heart beat after the execution of high intensity load.

The slowdown in cadence is due to the large quantity of blood for each heart beat and the stretching in the vascular system as well as the increase in diameter artery and the rest of the blood vessels.

4. Conclusion

The aim of this study is to highlight how important the development of physiological traits associated to metabolism through the application of a training program is in the development of speed endurance among runners at middle-distances, in other words, our research came as a treatment for continuous sport handicap which tends to prevail at the level of this category of runners.

Thus, we try to follow the evolutions which are inherent in metabolic traits since we noticed a weak level in kinetic achievements among the runners of this specialty: which are the lack of the trainers effectiveness; the lack of interest in training and retraining coaches in this specialty.

In administering the pre and pro-test to the sample of runners, it appeared that the development of technical level for all athletes is no longer limited to the development of physical fitness and technical skills but focus on research and recent physiological studies. The latter have clarified the positive relationship between each trait and another; furthermore, it does enable the adjustment of devices with the contents of the physical training in order to increase the functional and physiological capacity specific to each device.

Thus, the lack of coaches' interest in this scientific domain is the fundamental independent variable which explains the runner's underachievement at middle-distances.

It was also concluded from the experimental study that a considerable development in the level of traits associated with metabolism and in the level of physical fitness among the sample runners as it turned out how important the

development of traits in relation to metabolism is in breaking the barrier in front of the prevailing handicap at the runner's level.

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