



AGE DYNAMICS OF SPORTS ACHIEVEMENT IN HIGHLY QUALIFIED TRIPLE JUMP ATHLETES

T. Marinova*

Department Track and Field, Pedagogy Faculty, National Sports Academy “Vassil Levski”,
Sofia, Bulgaria

ABSTRACT

Commercialization of sport increasingly places elite athletes in a situation of choosing to participate in a greater number of competitions. On the other hand, sports specialists encourage young athletes in order to achieve a high sports result at an early age. This is one of the reasons that motivated us, based on an analysis of the dynamics of the sports result in the age aspect in elite triple jumpers, to propose a model of gradual increase of the result at different ages. The purpose of this study is to establish the optimal sports result for the individual ages in men's triple jump. Tasks of the study: 1) To establish the optimal age for achieving the personal best by analyzing the achievements of 50 highly qualified triple jumpers. 2) To analyze the dynamics of the sports result in the age aspect of the same athletes. 3) Based on the obtained data, to propose a model of gradual increase of the result at various ages. Methods: To fulfill these tasks, we conducted a study of the literary sources and statistical analyzes of the results of the study individuals. We took the data for the analyzes from the worldathletics website. Results: The data analysis showed that the optimal age for achieving a personal result in the triple jump discipline for men is 24-25 years. Conclusions: The average values of the sports achievement of the individuals we analyzed in terms of age were used to create a recommended model for a gradual increase in the sports achievement, which can help to objectively plan the age dynamics of the sports result.

Key words: model, planning

INTRODUCTION

The goal of the training and competition process in elite sport is to achieve high sports results. Sports achievement should be considered as a complex multifactorial phenomenon, the dynamics of which over time reveals the total influence of biological, social, economic, technological, sports-pedagogical and other factors. In modern sports theory and methodology, sports achievement is the subject of many analyses, especially in some quantifiable sports such as athletics. The chronological age at which the highest sports results are achieved is different in various sports, as well as in both

sexes. In the methodological literature, there are a number of studies related to that issue, some of which consider only the optimal age for achieving a personal best, and others, using mathematical statistical methods, serve as predictive models for achieving that result (1-5). Based on this, we believe that a more detailed analysis of the dynamics of the sports result in the triple jump discipline for men at different ages can provide important information about the long-term planning of the training process, as well as for making certain adjustments to the development of a given athlete.

METHODS

The purpose of this study is to establish the optimal result at different ages, and to propose a model of a regular increase in sports achievement in highly qualified triple jump athletes. For this purpose, we set ourselves the following tasks:

*Correspondence to: Tereza Marinova, Department Track & Field, Pedagogy Faculty, National Sports Academy “Vassil Levski”, Sofia, Studentski grad, 21st “Acad. Stefan Mladenov”, e-mail tereza.marinova@nsa.bg, authors phone +359895705050

1. To establish the optimal age for achieving a personal best by analyzing the achievements of 50 highly skilled triple jumpers with personal best over 17.30 m.
2. To analyze the development of the sports result in terms of the age of those jumpers.
3. Based on the obtained data, to propose a model for a regular increase of the result at different ages.

Research methods: a study of literary sources, as well as statistical processing of the results of the study persons. We took the data for the analyses from the world athletics website.

RESULTS

Table 1 presents the personal best of the study persons, as well as the age at which these were achieved. The performance of 50 highly qualified athletes in men's triple jump was analyzed.

Table 1. Performance of the study persons.

No.	Name	PB	No.	Name	PB
1	Christian TAYLOR	18.21	26	Bin DONG	17.58
2	Will CLAYE	18.14	27	Dimitrios TSIAMIS	17.55
3	Pedro PICHARDO	18.08	28	Lyukman ADAMS	17.53
4	Teddy TAMGHO	18.04	29	Osniel TOSCA	17.52
5	Khristo MARKOV	17.92	30	Marquis DENDY	17.50
6	Jadel GREGÓRIO	17.90	31	Rostislav DIMITROV	17.49
7	Yoelbi QUESADA	17.85	32	Randy LEWIS	17.49
8	Marian OPREA	17.81	33	Osviel HERNÁNDEZ	17.49
9	Phillips IDOWU	17.81	34	Benjamin COMPAORÉ	17.48
10	Christian OLSSON	17.79	35	Daniele GRECO	17.47
11	Nelson ÉVORA	17.74	36	Paolo CAMOSSO	17.45
12	Seref OSMANOGLU	17.72	37	Yoann RAPINIER	17.45
13	Walter DAVIS	17.71	38	Igor SPASOVKHODSKIY	17.44
14	Alexis COPELLO	17.68	39	Konstantinos ZALAGITIS	17.44
15	Omar CRADDOCK	17.68	40	Donald SCOTT	17.43
16	Denis KAPUSTIN	17.65	41	Aleksandr PETRENKO	17.43
17	Yoandri BETANZOS	17.65	42	Alexey FYODOROV	17.42
18	Nathan DOUGLAS	17.64	43	Shujing ZHU	17.41
19	David GIRAT	17.62	44	Samyr LAINE	17.39
20	Fabrizio DONATO	17.60	45	Jonathan SILVA	17.39
21	Charles FRIEDEK	17.59	46	Colomba FOFANA	17.34
22	Leevan SANDS	17.59	47	Vyacheslav TARANOV	17.33
23	Yanxi LI	17.59	48	Andrew MURPHY	17.32
24	Aarik WILSON	17.58	49	Mykola SAVOLAINEN	17.30
25	Ernesto REVÉ	17.58	50	Lizhi ZENG	17.30

To determine the average age for achieving a personal best, these data were used in a variation analysis (**Table 2**). The age of achieving the maximum sports result of the study subjects varies in the range of 21-32 years, with the average age of achieving a personal best being 24.98. The minimum sports result is 17.30 m, and

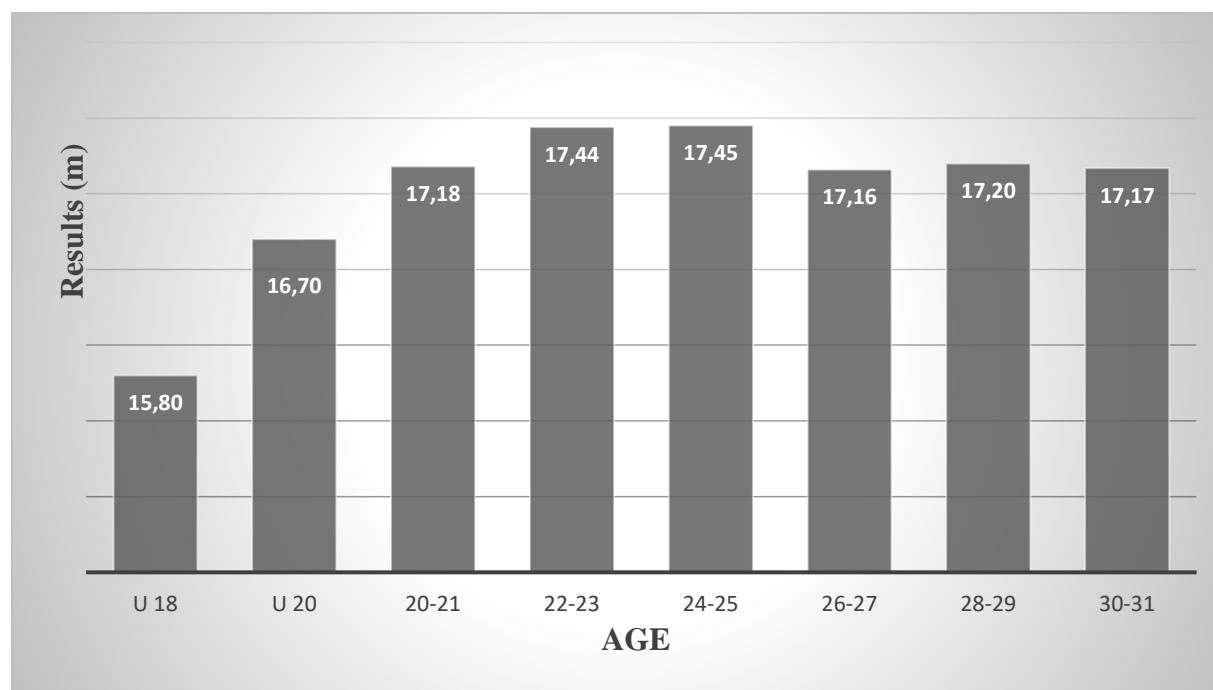
the maximum is 18.21 m. The coefficient of variation (V%) for both indicators studied is less than 12, which determined the sample as uniform. The obtained results give us the reason to determine 24-25 years of age as optimal for achieving the highest sports achievement in the men's triple jump discipline.

Table 2. Variation analysis of indicators.

Indicator	n	Xmin	Xmax	R	X	S	V%
PB	50	17.30	18.21	0.91	17.60	0.22	1.24
Age	50	21	32	11	24.98	2.58	10.34

It is known that sports specialization in athletic jumps begins at the age of 14-15. In order to establish optimal sports achievement at different ages, we analyzed the dynamics of the personal best of the study athletes, dividing them into two groups. In the first group were the athletes with official results in the U18 age group, and in the second group those who started to compete in the triple jump discipline in the U20 age group. The dynamics of the average values of the sports result of the athletes from the first group is presented in **Figure 1**. The average result for age U18 is 15.80 m, and we should note that the achievements of

the athletes in this age vary in the range of 15.00-16.68 m. The biggest difference between the minimum and maximum results is found at the age of 26-27 years, where the minimum achievement is 15.11 m and the maximum 18.11 m. In general, the increase in the average values of the results is gradual and reaches its maximum values in the range of 24-25 years of age, after which it slightly decreases, but the average value remains at approximately 17.20 m. Only six of the analyzed athletes in the 1st group have achieved their personal bests after the age of 26.

**Figure 1.** Dynamics of the average values of the sports result of the athletes from the 1st group.

When analyzing the dynamics of the average values of the sports result of the athletes from the 2nd group with the first official results in the triple jump discipline at the age of U20, we found a slower development of the average values of the sports achievement compared to the athletes from the 1st group (**Figure 2**). In the U20, 21-22 and 23-24 age groups, the differences in the minimum

and maximum results are over 2 m, after which they decrease. Twelve of the subjects in the second group achieved their personal bests at the age of 26. The high averages at the age of 32 can be explained by Phillips IDOWU and Colomba FOFANA's personal bests of 17.81m and 17.34m respectively, against the background of only 4 athletes still competing.

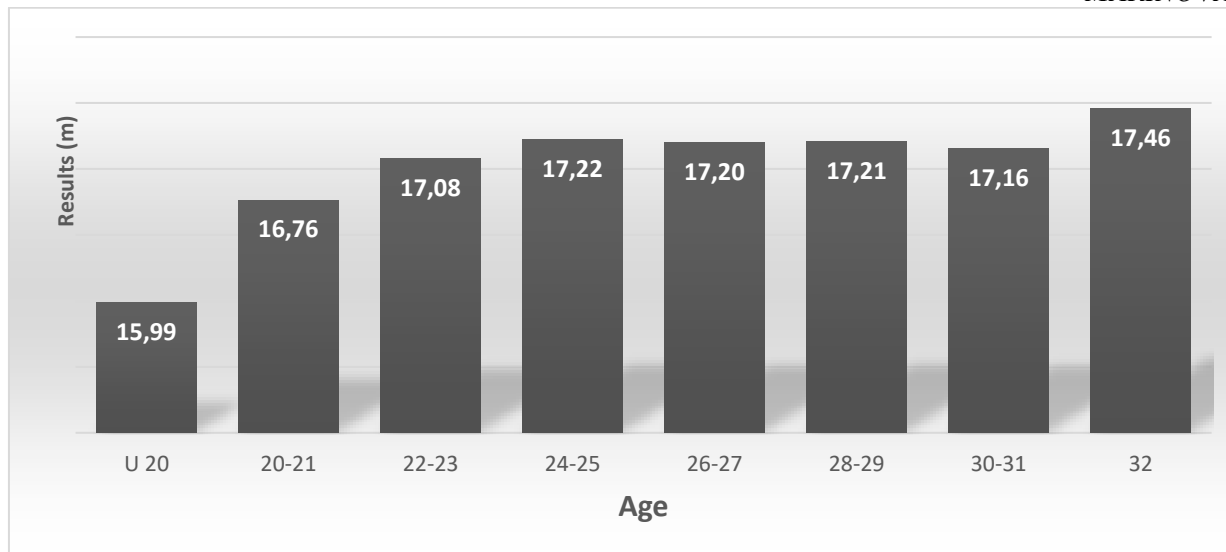


Figure 2. Dynamics of the average values of the sports result of the athletes from the 2nd group.

Based on the data, we can conclude that the athletes assigned to the 1st group have achieved their personal best earlier than those in the 2nd group. Of all the individuals analyzed, only 4

have crossed the 18.00 m line, and all of them have started their participation in competitions at the age of U18.

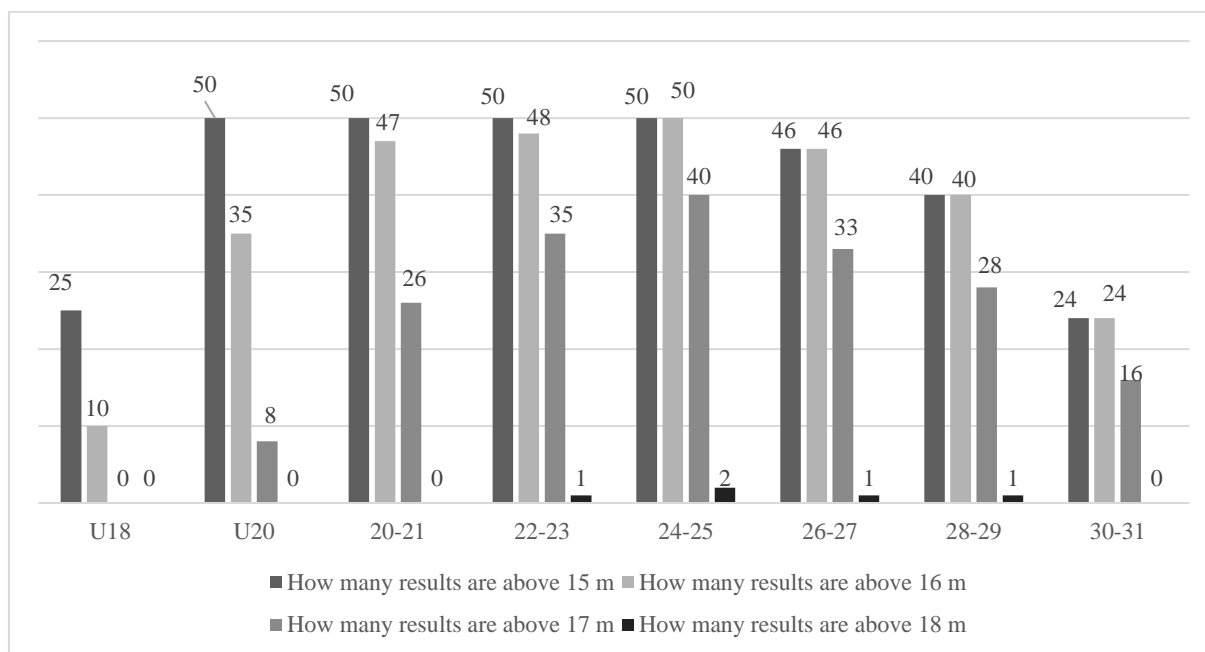


Figure 3. Frequency of achieving a specific result from the age aspect.

Figure 3 presents the frequency of achieving a specific result in terms of age. In the first analyzed age group, U18, ten of the twenty-five analyzed athletes achieved a result above 16.00 m. In U20, there were fifty study subjects and the sports result of eight of them was above 17.00 m. At the age of 22-23 years, Pedro PICHARDO achieved 18.08 m, which is his personal best. The age

defined by us as optimal for achieving the highest sports result in the triple jump discipline for men is 24-25 years, and here it is characterized by high values of achievements. Forty of the study subjects had achievements above 17.00 m, and two of them had results above 18.00 m. In the following ages, the results gradually decreased, and the number of the study subjects was reduced

accordingly due to the termination of their careers. At the age of 30-31, only 24 of the 50 athletes analyzed are still competing. Taking into account the average values of the sports result in

the age aspect for the study subjects, as well as the frequency of achieving certain results at different ages, we propose the following model of growth of the sports result at different ages (**Table 3**).

Table 3. Sports result growth model at different ages.

Age	U 18	U 20	20-21	22-23	24-25
Result	15.60-15.80 m	16.40-16.60 m	16.80-17.00 m	17.00-17.20 m	17.30-17.40 m

The optimal age for achieving the personal best in various sports has been the subject of numerous publications. In their study (3), determined the optimal age for achieving the maximum result in the triple jump for men as 25.7 ± 2.0 (n=32). On the other hand, analyzing the results of the participants in the London 2012 Summer Olympic Games, Longo et. al. 2016 (6), determined the optimal age for achieving the personal best in track and field jump for men as 25.3-26.7. The optimal age for achieving high sports results in the triple jump discipline for men, established by us as 24.98, largely confirms the statements of the authors cited above.

CONCLUSION

After analyzing the age dynamics of sports achievement, we found that, for the most part, athletes who started in the U18 age group achieved their personal records earlier than those who started at a later stage, but there is also a tendency to end their sports career earlier. We used the average values of the sports achievement for the analyzed subjects in terms of age to create a recommended model for gradual growth of sports achievement, which can help objectively plan the age dynamics of the sports result.

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