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Cuban triple jump. A procedure for determining the sports reserve

Abstract

The changes in the current competitive system of athletics with a tendency to increase competitive demands worldwide at younger ages, have caused the outdated of the most accepted theories on the conception of the long-term sports preparation system. This constitutes a limitation for the implementation of new methodological conceptions in said process, with its implications in the reduction of the effectiveness of the athletes' sporting life and the selection of the sports reserve to be inserted in the elite, for which it was necessary to resolve The scientific problem: How to determine the Cuban sports reserve in the athletic discipline of triple jump for both sexes? The stated objective was: To apply a methodological procedure for the determination of the Cuban sports reserve in the athletic discipline of triple jump for both sexes. Documentary analysis, systemic approach and statistical techniques for information processing such as mean, standard deviation, ranges, linear and polynomial regression equations were used as fundamental methods. The application of the procedure allowed to evidence modifications in the age zones with respect to the reference criterion, as well as the determination of the little existence of sports reserve cases in the triple jump discipline, for its insertion in the world elite in the 2020 Olympic cycles. -2024 and 2024-2028. Keywords: sports preparation, growth tempo, sports reserve, triple jump

Introduction

The most current studies on sports results zones by age, date from the 80s of the last century, in research carried out by Ozolin (1983), considered the father of sports results zones by age, three zones are proposed of sports results by age, which are nothing more than the age ranges in which the athletes obtained their first high results, their best marks and, finally, the maintenance of them. However, at present these results do not provide high levels of reliability, since the current competitive system is much more demanding at an early age, since the introduction of the Junior World Championships in 1986 (athletes between 17 and 19 years old), of the World Cadet Championships (athletes between 15 and 16 years old) in 1997 and of the First World Junior Olympiad for athletes from 14 to 19 years old, in 2010. This tendency to advance specialized and intensive training at earlier ages, constituted a threat to the further development of athletes and, therefore, decreases the reliability of the selection of the sports reserve to be inserted in the elite, by not being able to establish if it really the athlete will be able to successfully transition to the adult categories; due to the lack of a pattern of behavior of the elite itself at those ages. In the research carried out on the triple jump for both sexes, the theoretical foundations of the conception of long-term sports preparation were defined by Matveiev (1977); Ozolin (1983) and de la Paz (2021) based on the review of the research background on the evolutionary dynamics of sports results and the

areas of sports results by age in athletics. (Ozolin, 1983); (Siris, 1988) and (Forteza and Ramírez, 2017).

Within this global problem, it should be noted that Cuba has only achieved that three of its 33 medalist athletes in Cadet World Championships, later obtain Olympic medals or in Senior World Championships, which represents a 9.09% effectiveness in the transfer, a value that is below the world average in this indicator. This result shows that the Cuban athletics training system is inefficient compared to the rest of the countries that lead world athletics. (Mathews, 2019) It is interesting to know what general considerations exist in the world about what is the sports reserve for national athletics teams. But, except for the classified documents that existed in the former Union of Soviet Socialist Republics in the 1960s until the end of the 1980s, which included a whole series of methodological indications, based on physical and technical indicators, no other antecedents were located. In the empirical approach carried out through the study of documents, it was detected that, despite the fact that in the foundations of the conception of long-term preparation; it is specified that in order to include an athlete in the world elite, they need to have references of the level to which they want to reach, such as the progression of their results by age and the growth rate of their marks, in the current procedure for the determination and classification of the Cuban sports reserve, these indicators are not considered, since only physical aptitudes are taken into account, delimited in standardized tables and the average mark equivalent to the bronze medal of the last three world championships of the category, since sometimes it is required a young athlete to make a mark that his body does not have sufficient biological maturity to perform.

After this, the athletes who had made this mark or higher for possible new entry (PNI) to the national team or fully evaluated as excellent in the national validation were selected, to be selected athletes with immediate perspective (API), and they are the ones who they are sent to the discipline or are considered a reserve, depending on their age and existing enrollment capacities at the "Giraldo Córdova Cardín" Higher School of Training for Athletes (ESFA). This denotes the lack of scientificity in the current procedure for determining the sports reserve in Cuban athletics; for the establishment of long-term sustainable training strategies and a more precise sports selection of those who have the skills to project themselves at the world level, which constituted the problematic situation to be solved in this investigation, delimiting as a scientific problem: How to determine the reserve Cuban sport in the athletic discipline of triple jump in both sexes?; assuming as objective of the investigation: To apply a methodological procedure for the determination of the Cuban sports reserve in the athletic discipline of triple jump in both sexes.

Materials and methods

The methodological foundations for the treatment of the object of study were based on the conception of the study of growth tempos as a tool for determining the evolutionary dynamics of sports results (Zatsiorsky, 1989); (Maestre, 2021) the delimitation of the result areas by age. Ozolin (1983); cited by Siris (1988) and the most accepted procedures on the determination of the sports reserve by Utkin (1989), and Verjoshanski (2002). For the determination of the sports results zones of the world's elite athletes in the athletic discipline studied, the following was applied as a fundamental scientific method: \downarrow Systemic approach: In the elaboration of the procedure for updating the sports performance zones by age and the determination of the sports reserve. \downarrow Documentary analysis: It allowed the compilation of data generated per year (2005-2020) from the rankings and yearbooks of the International Federation of Amateur

Athletics, currently World Athletics (IAAF/WA) as official documents, and the basis for the preparation of the chronology of sports results by age of the athletic discipline studied. } Arithmetic Mean or Average: This measure of central tendency was used to determine the evaluation ranges by age from the world elite, and the percentage growth times of the sports results of the athletes by age. } Standard deviation: This dispersion measure was used to elaborate the evaluation ranges by age with the relationship between mean and standard deviation. } Range: Measure of dispersion that indicates the difference between the highest and lowest values of the distribution. } Statistical criterial: For the elaboration of the evaluation instrument (Range of behavior of the results) (Zatsiorsky, 1989). } Linear and polynomial regression equations: To determine the behavior of the evolutionary indicators of sports results and growth tempos.

The previous study carried out on the procedure for the selection and classification of the Cuban sports reserve in athletics was carried out by reviewing the normative documents of the Cuban Athletics Federation (FCA) and the National Athletics Commission (CNA) oriented to the determination of what are the steps that integrate it and the criteria for the selection of the immediate perspective athletes (API) and the possible athletes new entry to the national team (PNI). The graphic representation of the polynomial equations allowed the delimitation of the three areas of sports results by age for their subsequent contrast with the results of Ozolin's research (1983), and its corresponding update in the athletic discipline of triple jump. Once the characteristics of the acting procedure were determined and critically assessed, the new procedure was designed. This procedure was structured in 11 steps, which made it possible to determine the Cuban sports reserve in the triple jump athletic discipline for both sexes, to be inserted into the elite performance level in the 2020-2024 and 2024-2028 Olympic cycles. They are explained below: 1. Selection of the first 50 athletes by the international ranking from 2005 to 2020 of the WA triple jump. 2. Filter and remove duplicates. 3. Find the average of the mark corresponding to the 20th place in each of the years studied. 4. Intentional sampling, keeping the athletes who made the average mark 20 or better, at least once and who had a result in at least 3 years in their entire sports career. 5. Preparation of a table with the results of the athletes by age. 6. Determination of the average results by age of all athletes. 7. Determination of the variation of athletes' marks by age. 8. Determination of average growth tempos by age. 9. Preparation of an evaluative scale of the brands by age and their evolutionary dynamics. 10. Selection of the athletes of the discipline born from the year 2000 with the condition that they appear in the national ranking in the period 2016 – 2020 at least once. 11. Evaluation of said athletes according to the evaluative scale made in step 9.

As a result of the first two steps of the procedure designed to solve the previous insufficiencies, primary data of 1600 athletes, equivalent to the population, were collected and duplicates were filtered and eliminated in a Microsoft Excel-2013 Spreadsheet. (Matthews, 2019) From the application of the third and fourth steps of the procedure, the sample group, reference pattern of sports results, was made up of 140 athletes who met this condition in at least one of the years of the period for each of the sexes. in the discipline studied; and of which 116 were selected, whose individual chronology of results by age could be located, with at least three results by age in their entire sports career. The determination of the statisticians of the behavior of the sports result by age in the athletic discipline studied as part of the application of the fifth to the seventh step of the procedure, made it possible to determine their evolutionary dynamics by calculating the regression equation that best correspondence showed with the conduct of sports results. Subsequently, and as the eighth step, the

percentage growth times of the sports result were found. These allowed to calculate how much the sports result increases or not, from one age to another consecutively. In part of the ninth step, an evaluative scale was made, with respect to the marks by age and their evolutionary dynamics, in order to have a criterion of what a successful or desired performance is at each age. For the execution of the tenth step of the procedure, Cuban athletes born after 2000 (turning 16 years old in 2016 as the closing of the school category and the 2012-2016 Olympic cycle) were selected. In order to resolve the deficiencies detected in the current procedure For the determination of the Cuban sports reserve and as part of the last step of the proposed methodological procedure, two conditions were proposed for the classification of athletes as API or PNI as appropriate, taking into consideration the evaluation through the evaluative ranges of the sports result by age and through the times of growth of the sporting result.

Condition 1:

- If the sports result evaluated from high average upwards between 16 and 19 years old, then it can be considered API - If the sports result evaluated from a high average upwards from 20 years, then it can be considered PNI

Condition 2: – If the growth tempo is between +/- the deviation of the average annual growth between 16-17 years, up to and between 18-19 years, then it can be considered API. – If the growth tempo is between +/- the deviation of the average annual growth from 19-20 years, then it can be considered PNI. As a result of the application of the eleventh step of the procedure, the sports results were located in the national rankings from 2015 to 2020, of the athletes born from 2000 for each sex of the discipline studied, and each one of their results was evaluated from of its location within the sports result ranges elaborated from the criterial statistician, considering the six evaluative ranges proposed by Zatsiorsky (1989): Very high, high, high average, low average, low and very low. Results and Discussion Determination of their evolutionary dynamics by calculating the regression equation that showed the best correspondence with the behavior of sports results (a polynomial), which appears endorsed in Table 1.

Table 1. Polynomial regression equation that expresses the evolutionary dynamics of the sports results by age of the world elite in both sexes for the discipline studied.

Triple Jump	Evolutionary dynamics of sports results
Male and female sex.	$y = -0,0046x^2 + 0,2581x + 3,1864$

Fountain: Tamayo, A. y Martínez, D. (2021)

Table 2 shows the results of the delimitation of the three areas of sports results by updated ages in each of the sexes, of the athletic discipline studied and their contrast with the results of Ozolin's research (1983).

Table 2. Results of the update of sports results by age with respect to Ozolin's research (1983).

	First Greatest Hits Zone	Zone of optimal possibilities	High Results Zone
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Triple Jump	Ozolin	Actualiz.	Ozolin	Actualiz.	Ozolin	Actualiz.
male sex	19-21	20-22	22-24	23-26	25-27	28-31
female sex	18-21	19-22	21-24	23-26	23-25	27-31

The results obtained allow to determine the following regularities: ♣ The sports results zones by age were updated in the athletic discipline studied, showing changes in the ages included in each of them, with a tendency to increase the range of total amplitude. ♣ The results of the processing applied so far do not confirm the hypothesis that the increase in high-level skills at earlier ages causes an advancement of sports performance. ♣ Regarding the number of years to achieve the greatest result since the first great successes are achieved, it was detected that it increases in a range greater than that proposed by Ozolin (1983), approximately in two years. The results of the determination of the growth times of the sports result by age in the discipline studied are shown in Table 3, corresponding to the ninth step of the procedure.

Table 3. Linear regression equations that express the dynamics of the growth tempo of the sports results by age of the world elite in the discipline studied.

Triple Jump	Evolutionary dynamics of sports results
Male and female sex.	$y = 0,2037x + 5,7358$

Fountain: Tamayo, A. y Martínez, D. (2021)

The application of the tenth step of the procedure allowed the preparation of the sample group of Cuban athletes in both sexes who met the established conditions, equivalent to 36 athletes in the totality, of both sexes, of the discipline studied. As a result of the application of the eleventh step of the procedure, the sports results were located in the national rankings from 2015 to 2020, of the 36 athletes born since 2000 for each sex of the discipline studied, and each of their results was evaluated from of its location within the sports result ranges elaborated from the criterial statistician, considering the six evaluative ranges proposed by Zatsiorsky (1989). The result of this processing allowed conclusions to be reached for each sex studied. Subsequently, the growth times of the sports results of the 36 Cuban athletes of both sexes, in the discipline studied, were processed for the study of compliance with the second condition. As a discussion, the results allowed to determine the growth tempos between the ages: 16-17 years, 17-18 years, 18-19 years and 19-20 years, provided that they had support from the criterial statistician previously prepared with the data from the world elite. Table 4 shows the results of the analysis of both conditions of the discipline studied.

Table 4. Results of the determination of the sports reserve in the triple jump discipline in both sexes.

Discipline	Compliance with conditions
Triple Jump male sex	The application of the procedure made it possible to determine that Cuba currently has 2 male athletes, to be considered a sports reserve and inserted

	into the international competitive level for the 2020-2024 and 2024-2028 Olympic cycles.
Triple Jump female sex	The application of the procedure made it possible to determine that Cuba currently has 1 female athlete, to be considered a sports reserve and inserted into the international competitive level for the 2020-2024 and 2024-2028 Olympic cycles.

Fountain: Martínez y Tamayo (2021)

The study on the acting procedure allowed to determine that this is based on the sports result, which implies that coaches and athletes are going to go out to look for that result at all costs, without a regulation determined by the logic of individual biological growth and development. and on the other hand, it does not recognize to what extent changes in performance from one age to another should be promoted, as a guarantee of sustainability.

Conclusions

The study of the theoretical and methodological references that support the process of long-term sports preparation in athletics, allowed to determine references of successful behavior from the reference data provided by world elite athletes of both sexes and that require continuous updating. in accordance with the characteristics of the current competitive system. The procedure proposed for updating the sports results zones by age, in the studied discipline of the triple jump for both sexes, allowed the readjustment of the criteria established by Ozolin in 1983. The application of the procedure made it possible to determine that Cuba currently has three athletes in the triple jump discipline, both sexes, who can be considered a sports reserve to be inserted in the international competitive level in the 2020-2024 and 2024-2028 Olympic cycles.

References From

Peace Arencibia, L. (2021). A new dimension in the work Fundamentals of Sports Training, by Matveiev. Action Magazine, 17. Forteza, A. & Ramirez, E. (2017). Theory, methodology and training planning: From the orthodox to the contemporary. Seville: Wanceulen Editorial. Master Castilla, D. (2021). Approach to the biological objective of sports training. Olympia Scientific Journal, 18, 102-110. Martinez Fernandez, D. (2021). Methodological procedure for the determination of the Cuban sports reserve in the athletic discipline of triple jump, female. (Undergraduate thesis). UCCFD Manuel Fajardo, Havana, CU Matthews, P. (2019). The International Track and Field Annual – The Association of Track and Field Statisticians. Manchester: SportsBooks Publisher. Matveiev, L.P. (1977). Fundamentals of sports training.

Moscow: Publishing House Fizcultura and Sport. Ozolin, N. (1983). Selection and prognosis of faculties in athletics. Moscow: Vneshtorgizdat Publisher. Siris, P. Z.; Gaidarska, P. M. & Rachev, K. I. (1988). Selection and prognosis of faculties in athletics. Moscow: Editorial Vneshtorgizdat.

Tamayo Hechevarria, A. (2021). Methodological procedure for the determination of the Cuban sports reserve in the athletic discipline of triple jump, male. (Undergraduate thesis). UCCFD Manuel Fajardo, Havana, Cuba.

Utkin, V. (1989). Metrological fundamentals of the control of the technical and tactical preparation of athletes. In: Zatsiorski, V: Sports Metrology (pp.187). Moscow: Editorial Planeta.

Verjoshanski, I.V. (2002). Laws of the morphofunctional specialization of the organism during the long-term training process. In his: Theory and methodology of sports training. Barcelona: Editorial Paidotribo.

Zatsiorski, V.M. (1989). Forecast and selection in sport. In his: Sports Metrology (pp.278-287). Moscow: Editorial Planet.