

The selection of sporting talents for Athletics through physical condition tests and their percentiles
La selección de talentos deportivos para el Atletismo mediante pruebas de la condición física y sus percentiles

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ABSTRACT

The selection of sports talents is an area of knowledge that still needs to be deepened and investigated in the specific context of different sports. Hence, the research problem focuses on the following question: what is the current state of the selection of sports talents for Athletics through physical fitness tests and their percentiles? To provide a solution and develop the research, documentary analysis and analytical-synthetic methods were used. Scientific evidence demonstrated that the selection of sporting talents for Athletics through physical fitness tests and their percentiles is a viable option.

Keywords

Talent selection; Athletics; Physical condition; Percentiles.

RESUMEN

La selección de talentos deportivos es un área del conocimiento que aún requiere ser profundizada e investigada en el contexto específico de los diferentes deportes. De ahí que el problema de investigación se centre en la siguiente interrogante: ¿cuál es el estado actual de la selección de talentos deportivos para el Atletismo mediante pruebas de condición física y sus percentiles? Para darle solución y desarrollar la investigación se emplearon los métodos análisis documental y analítico-sintético. La evidencia científica demostró que la selección de talentos deportivos para el Atletismo mediante pruebas de condición física y sus percentiles es una opción viable.

Palabras clave

Selección de talentos; Atletismo; Condición física; Percentiles.

INTRODUCTION

The sports talent selection process is crucial for several fundamental reasons that include both the development of the athlete and the long-term success of the sport. Below are some of the most relevant aspects of the importance of developing a scientific selection process for possible sporting talents:

1. Identification of potential: allows you to identify individuals with the physical, technical, tactical and psychological skills necessary to excel in a specific sport. This ensures that resources are invested in those with the highest likelihood of success.

2. Personalized development: Once identified, talents can receive personalized training and development to maximize their potential. This includes adjustments to technique, tactics, physical and mental preparation, as well as monitoring your progress.

3. Resource optimization: The selection process helps sports organizations direct their resources more effectively, investing in athletes who show true potential for high performance, which is essential in an environment where resources may be limited.

4. Long-term planning: talent selection is essential for the long-term strategic planning of sports federations and teams. It allows the creation of a reserve of athletes who can be developed with a view to future competitions, ensuring the sustainability and continuity of sporting success.

5. Innovation and adaptation: The selection process also encourages innovation in training and development techniques. By identifying new desirable characteristics or abilities in athletes, coaches and sports scientists can adapt their methods to improve overall performance.

6. Motivation and commitment: For selected athletes, the process can increase their motivation and commitment to the sport. Knowing that they have been identified as promising talents can boost their dedication and effort in training and competition.

7. International competitiveness: at a macro level, effectiveness in the selection of sports talent contributes to the success of countries in international competitions. A robust and systematic selection process can lead to greater accumulation of medals and achievements at the global level, raising the profile of the sport and the country in the international arena. In summary, the sports talent selection process is not only important for the individual development of athletes, but also plays a crucial role in the success and sustainability of sports and teams at national and international levels.

In the context of Athletics sport, one of the key aspects of the scientific selection process of possible sporting talents is the determination and selection of physical tests applied by Physical Education teachers and Athletics specialist coaches.

These professionals, as Jova (2015), Molina (2020) and Doval 2022 agree, to develop the selection of talents, face a short time to assign a test to the students with the greatest qualities, in addition to the assignment of Testing and selection of talents is carried out under intuition, that is, empirically where in some cases the results are favorable, but there is no scientific method that supports this procedure. The events that are carried out on the track are: 100 m, 200 m, 400 m, 800 m, 1500 m, Hexathlon and combined relay. For field tests, the following are carried out: the discus throw, shot put, long jump and high jump.

Another way is physical efficiency tests based on percentiles to evaluate the physical condition of children, adolescents and young people as possible sporting talents. In this regard, the present investigative work of systematic review of the scientific literature focused on the following research problem: what is the current state of the selection of sporting talents for Athletics through physical fitness tests and their percentiles?

To answer the question of the research problem, the **general objective** of this work was to: develop a systematic review of the scientific literature that allows the determination of the current state of the selection of sporting talents for Athletics through physical fitness tests and their percentiles.

DEVELOPMENT

Regarding the projects that have been applied to the talent section in Athletics through physical fitness tests and their percentiles, despite there being works on the research topic, according to studies carried out by Ramos and Aguirre (2015), in Central America and the Caribbean, the detection and identification of talents has a great area of opportunity, realizing that there are insufficiencies in the talent selection process. For this reason, this bibliographic review becomes a tool so that new teachers, who have been appointed to this sport or teachers with a track record in this environment, can rely on their teaching work for the selection of talents in Athletics and that coaches can optimally take advantage of the physical capabilities of the selected sporting talents.

The research that was carried out is of a documentary type, for its development the qualitative approach was used under the design in the analysis and review of documents, the methodology called for this work "funnel" was used, which allowed reviewing the literature referring to the topic. research, under the key words: talent selection, Athletics, physical condition and percentiles.

As a first methodological procedure, the reviews were filtered in reliable databases such as Google Scholar, Dialnet, Science Direct, Scielo, on articles, books and authors that could address the topic of an international, national and local nature. The second methodological procedure consisted of the selection process under the inclusion and exclusion criteria of literatures. The third methodological

procedure consisted of evaluating the quality of the scientific information, limiting what was found with what is related to the topic, context, relevance, and year of publication preferential to the last 10 years and precursors. And in the fourth methodological procedure, the findings extracted from the data are shown, as a synthesis.

Below are the results obtained according to the keywords (talent selection, Athletics, physical condition, percentiles), as well as the talent selection projects of authors whose level of relevance and interest have been considered to add value to the research.

Firstly, percentiles have been considered, since they offer a key tool in statistics, which involves classifying data, in this case physical condition assessments, from lowest to highest, to determine where a particular percentage of observations is located. in the data set, for example, 80th, 90th or 95th percentile, with which a valuable classification reference framework is obtained for the selection of sports talents.

In the scientific article by Jaramillo (2021), published by the Colombian magazine “Ímpetus”, entitled “Detection and selection of talents and sports initiation”, the concepts of talent in the sports context have been concentrated and ordered chronologically.

Figure 1

Chronological order of the concept of talent in the sports context.

Autor	año	Concepto de talento
Niadori	1983	“El niño talento no sabe por sí mismo que lo es, por eso hay que buscarlo, identificarlo, y por ende, guiarlo, orientarlo”
Zatsiorsky	1985	“El talento deportivo debe entregar la combinación de diferentes capacidades motoras, psicológicas y aptitudes anatómicas y fisiológicas, que permiten potenciar el logro de los altos resultados deportivos en determinada disciplina deportiva”.
Hahn	1989	“Aquella persona con la disposición por encima de lo normal, de querer realizar rendimientos elevados en el campo del deporte”.
Borms	1994	“Alguien supra normal, no completamente desarrollado, dotado de condiciones especiales para desempeñarse con éxito en ciertas especialidades deportivas”.
Schuler	1994	“El talento depende tanto de la constitución de herencia (tipo de constitución corporal) y disposición motora, cognitiva y afectiva favorable, así como en relación al desarrollo de condiciones sociales y ambientales propicias”.
Blázquez	1995	“Una aptitud natural o adquirida para algo”.
Burlo, et al	1996	“Aquel individuo que posee un conjunto de aptitudes genéticas o adquiridas que permiten la obtención de resultados relevantes en una especialidad deportiva”.
Kozel	1997	“Un atributo extremadamente complejo, genéticamente determinado, complicado en su estructura y sujeto a las condiciones del medio ambiente”.
Moskotova	1998	“Las manifestaciones de las capacidades motoras son bastantes variables en función de las particularidades de la constitución genética, edad, sexo, maduración de las funciones psicomotoras, definiciones sociales, culturales y étnicas de los grupos y poblaciones demográficas”.
Matsudo	2000	“Es una colección de variables y que la más importante es la genética”.
Pila H.	2006	“Es toda manifestación sobresaliente del ser humano que se traduce potencialmente en altos índices de rendimiento motor y morfo funcional, que propician una adecuada iniciación y desarrollo en el proceso pedagógico complejo, denominado entrenamiento deportivo”.

On the other hand, in the book “Theory and Methodology of Sports Training”, its main author, Collazo (2006) states that: **“A sporting talent is an individual with physical abilities higher than the normal average for his or her age and who are not yet fully developed and perfected, many times with a superior somatotype for their age, with certain individual aptitudes to quickly learn complex motor actions that require great coordination.”**

Another important issue is the recognition of the school space as a favorable context that presents advantages of the sports talent selection process (PSTD). In this regard, Jaramillo (2021) explains the significance of having information about the family context, being in contact with the person responsible for your sports preparation.

In the work “Selection and development of sports talents: a proposal for the school environment” by Dorticós and León (2010), they mention the importance and need to establish a sports selection system, due to the great competition that exists at all sports levels. Therefore, they recommend integrating a system for the selection and monitoring of those who show aptitudes, capacities, values, abilities above the average of a sport or sports, towards high performance without affecting their stages of biological development. Based on the work of Dorticós and León (2010), Figure 2 contains a compendium of authors who are considered references and details conceptions and strategies regarding the process of selecting sports talents.

Figure 2

Conceptions and strategies about the selection process of sports talents, according to Dorticós and León (2010).

Selección del talento			Estrategias de selección de talentos deportivos (Pila 2003)	
Objetivo escoger mediante diferentes métodos, técnicas y test a los más capaces y dotados de aptitudes, que a corto o mediano plazo pueden obtener altos resultados en un deporte determinado			Tipo de estrategia	Valoración
Gutiérrez	1991	"Una operación reposando sobre una predicción a corto plazo en cuanto a las posibilidades de que un sujeto dado, en el seno de un grupo de atletas, posea atributos, el nivel de aprendizaje, el entrenamiento y la madurez necesaria para realizar una mejor performance que el resto de los miembros del grupo en un futuro inmediato".	1.-La que se produce cuando los entrenadores deportivos asisten a las competencias que se desarrollan en el ámbito escolar, en ellas observa los rendimientos o la participación destacada de los competidores y eligen de esta manera, los elementos que integraran la selección para sus grupos de trabajo.	Empírica
Nadori	2000	"La selección deportiva no es otra cosa que el proceso a través del cual, se individualizan personas dotadas de talentos y aptitudes favorables para el deporte, con la ayuda de métodos y test científicamente válidos"	2.-Esta forma tiene en cuenta la opinión del Profesor de Educación Física, cuando el entrenador de un deporte se acerca a preguntarle si posee algún alumno que reúna ciertas y determinadas características requeridas para su deporte en cuestión	Empírica
Romero	2005	"Es un sistema de medidas organizativo-metodológicas, que incluyen los métodos pedagógicos, psicológicos, sociológicos y médico-biológicos de investigación, a base de los cuales se detectan las capacidades de los niños, los adolescentes y los jóvenes para especializarse en una determinada modalidad deportiva o en un grupo de modalidades"	3.- Observación en un niño o adolescente alguna característica somato - tipológica, disposición o aptitud que le hace determinar un posible desarrollo en su deporte	Empírica
			4.- Sustentada sobre bases más científicas (aplicación de las técnicas estadísticas) y parte de un principio masivo en su aplicación, permite a través de sus normas de evaluación, establecer un sistema de clasificación de las potencialidades motrices y somato - tipológicas para una adecuada iniciación en la práctica de los deportes	Científica

From these conceptions and strategies that show that to select sports talents, coaches and researchers must develop a work system supported by applied sciences, which is why to develop this process it

must be conceived as a scientific selection of possible sports talents. According to Collazo (2006), this is defined as:

“Biopsychosocialpedagogical process, which implicitly involves the identification of possible sporting talent based on the assessment of a set of specific results that provide dissimilar tests that are applied with the purpose of comparing them with certain pre-established regulations, which are correlated with said results to detect those individuals who stand out from the study group, where it is necessary for the evaluation of dissimilar parameters from different dimensions to have a scientific nature, without discarding the always appropriate clinical eye of those who, with their professional experiences, often tend to notice some individuals. With certain aptitudes for a specific sport.”

In the literature review, authors have also been found who have classified the talent selection process by stages. The following images show the characteristics that an athlete must possess according to each level, or their location based on the results of the evaluations of the physical condition based on percentiles.

Figure 3

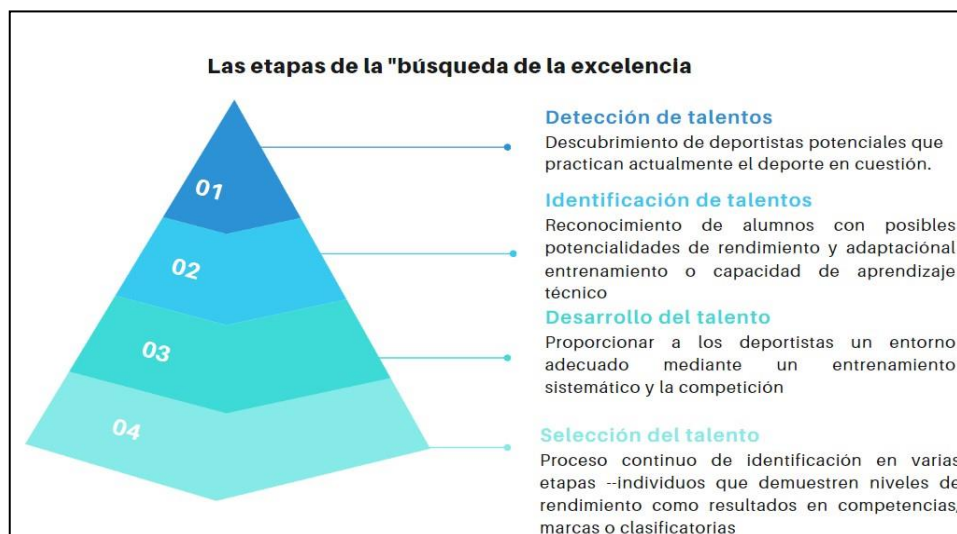
Levels in the selection process of sports talents (adapted from Pila, 2015).



In Figure 3, the five levels are established in Pila's (2015) sports talent selection process. We can find a proposal more in line with the reality with which the Physical Education teacher lives, since he can use this pyramid later. of applying physical condition assessments.

Figure 4

The stages of the "search for excellence" in the sports talent selection process.



Source: Williams and Reilly (2000).

Next, a systematized compilation of the trajectory and research experience of authors studying the aspects discussed is presented. After applying the funnel methodology, we discerned between works of significance and great scope at the international, national and local level, identifying mainly two works, which were selected for their impact, relevance, feasibility and applicability in the Mexican school context that favor the work of the Physical Education teacher.

The first work presented is that carried out by a research group from 34 countries of the European Community called "Promoting Fitness and Health Through Physical Activity" (PROFITH), which, although primarily, is oriented towards the evaluation of physical condition related to health in children and adolescents, also has percentiles based on the elements of physical condition that can be used, for the purposes discussed in this work, in addition to giving an interpretation both individually and to groups. with the platform called "FitBack" (see the electronic addresses <https://www.fitbackeurope.eu/es-es/> and <https://www.youtube.com/watch?v=QNIYgAGQ8do>).

The "Fit-back" platform, once the data of the evaluated subject(s) has been loaded, gives an instant interpretation of the measurements of the elements of physical condition, locating in a visual and understandable way coded by colors and icons that represent the different zones (green, yellow and red), which allows the teacher three very favorable contributions.

The first, save time, have personalized recommendations for all those evaluated regardless of their scores. The second, to have a procedure based on the scientific method, to select sporting talents in Athletics under the 90th percentile classification. The third, from the evaluations there is a diagnosis,

which can serve as a starting point so that, when By carrying out the tests again, the progress of both those who have been selected as talents and those who can be placed as reserves can be compared.

The tests it handles are the following:

Figure 4

Representation of the “Fit-back” platform tests.

Plataforma Fit back Europe		
Test		¿Qué evalúa?
1. Test de 20m ida y vuelta (Course Navette)		Capacidad cardiorrespiratoria
2. Prensión manual (dinamómetro digital)		Fuerza en brazo
3. Salto de longitud (sin carrera)		Fuerza en pierna
4. Estatura	IMC	Antropometría
5. Peso		
6. Perímetro de cintura		

The second work is related to the author Hermenegildo José Pila, Doctor in Pedagogical Sciences, who has been an international reference, and base point for America Latina by doing work in different countries, some to mention his native Cuba, Nicaragua, Argentina, Venezuela and Mexico.

It is convenient to highlight as a national study the project that Doctor Pila carried out in Mexico entitled “Soma Project”, in which specialists from Germany, Bulgaria, Cuba and Mexico participated, developing standards for the selection of talents in high performance, publishing a book in in 2000 entitled “Method and Standards for Evaluating Physical Preparation and Selecting Sports Talents”, his contributions have marked the main precedent on the continent and in Mexican territory, on talent selection until the year 2000, providing considerations towards various sports.

In this work, tables and tests are presented to evaluate the initiation and selection in each sport in particular, however, it guides students in a very general way towards the tests that take place in the Secondary School Sports Games. For example, the test was applied for long jump without impulse race, but there is a gap to use it in athletes who participate in high jump, as it has no correlation with their height, flexibility or speed, it is also necessary to emphasize that from that period To date, 23 years have passed.

In the publication by Pila (2005), titled “Selection of talents for sports, 27 years of experience in Cuba”, the SOMA project applied in Mexico in 1996 is shown, which is aimed at a sample of 160 students of the 32 Mexico states. The results could be evaluated, allowing the physical condition to be diagnosed and possible talents for sports initiation to be detected. Below, the evaluation tables and the tests carried out for this exercise are attached.

Figure 4

Tests to evaluate, evaluation table and sports.

Pruebas a valorar bajo el percentil 90 y 97 estatura		Tabla de evaluación general por puntos	
Estatura: cm	Peso: Kg	Muy bueno	330 o más
6. Velocidad (50m)		Bueno	240 a 320
7. Lagartijas		Regular	150 a 230
8. Abdominales		Deficiente	60 a 140
9. Salto de Longitud sin carrera de impulso		Mal	50 o menos
10. Resistencia (1000 m)		Total:	
Deportes a clasificar se distribuyen en cuatro grandes grupos según el percentil:			
° Deportes de resistencia y fuerza rápida			
° Deportes de juegos con pelota			
° Deportes de combate			
° Deportes de apreciación y arte competitivo.			

Source: Pila (2005).

Various criteria also emerged from the reviewed bibliography. For example, Lorenzo et al (2015), differ in their work from a PSTD by stating that: "And if we forget about talent detection...and if we individualize the process of developing their talent." Likewise, Ortega et al (2021), in the publication "Central aspects of research and development of sports talents: systematic review", disagree about PSTD for various reasons such as early specialization, sports burnout, lack of evidence between early detection and results. of athletes at the elite level, etc. But scientific evidence reveals the urgent need for a PSTD.

Scientific evidence reveals that physical condition tests continue to be very useful since they provide us with diagnostic evidence of their current state of physical condition which, although not conclusive, can apply suggestions such as those proposed by the authors. Till and Baker (2020) in Figure 4.

Figure 4

Possible solutions to the identification and development of talent.

Challenges	Possible solutions
(1) What are we looking for?	(A) Clarifying definitions – what is talent? • Understand 'what is talent' (it is not a fixed capacity and develops over time) • Talent ID vs. Performance ID – The Matrix • Develop evidence for talent indicators within sport specific systems, including... • Measures and criteria within specific sports that help identify talent • Employ retrospective research/tracking designs to monitor characteristics of young athletes aligned to future success (B). Understanding sport and predicting the future • Develop a performance/mental model for the sport • Design research studies to evaluate sport performance • Develop coaching vision - the ability to predict the future
(2) What are the most effective ways to identify, select, and develop talent?	(A) Identifying Talent • Consider the timing of talent identification • Allow flexibility to move across (or within a system) – be fluid • Monitor the efficacy of the TIDS decisions • Develop sport specific, multi-disciplinary tools that can monitor athletes reliably over time • Use the Coach as an applied scientist – they have data (although may not know it!). How can this be used and shared? (B) Understanding development (biological-psychological-social) • Coach education – Pediatric Science and Biological-Psychological-Social development • Delay identification or provide more opportunities • Assess maturity status and interpret data according to maturity alongside age • Consider grouping strategies (e.g., shirt ordering and bio-banding) to equalize competition and identification opportunities (C) Resourcing the System • Effective use of resource – creating more opportunities • Supporting coach education and training • Funding basic and applied research
(3) Health considerations for TIDS	(A) Are TIDS appropriate and healthy? • Awareness of TIDS impact on athlete health • Design appropriate learning and development environments with a balance of activities in and outside of sport • Align day-to-day practitioner behaviors to promote athlete health • Develop TID programs and practices that allow sampling of a range of sports and integrative neuromuscular training (B) Is early specialization necessary? • Clear message that sport sampling is a positive outcome with long-term benefits • Application and reinforcement of the message from key stakeholders, coaches, teachers and parents

Regarding what was published by Flores and Parra (2019), who assert that, “having subjects with superior sporting potential does not ensure obtaining results, but adequate performance”, however, contrary to what Lorenzo et al (2015) assure in their publication, this PSTD process, applied under scientific methods and statistical programs as was the case in their work, undoubtedly helps in decision-making for the selection of possible athletes, this is adds Pila's (2005) statement, which states that there is no perfect system to discover and float new sporting talents. Isidoria et al (2018), responds to the reply made by various authors who show antagonism towards early specialization in sport, where they express the possible negative impacts and consequences on the young athlete, adverse effects that Isidoria et al (2018) declare can be avoided or mitigated by designing an effective scientific strategy that assesses the real potential of the future athlete.

CONCLUSIONS

A systematic review of the scientific literature was developed that allowed the determination of the current state of the selection of sporting talents for Athletics through physical fitness tests and their percentiles.

The evidence shows that the selection of sporting talents for Athletics through physical fitness tests and their percentiles is viable, as has been demonstrated in the FitBack and SOMA projects by Pila (2005).

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