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*Translated from the original in Spanish*

**Original article**

## **Test to evaluate the specific speed in female handball goalkeepers of the Cuban national preselection**

## **Test para evaluar la rapidez específica en porteras de balonmano de la preselección nacional cubana**

## **Teste para avaliar a velocidade específica dos goleiros nacionais cubanos de pré-seleção de handebol**

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## ABSTRACT

**Introduction:** The handball goalkeeper must have an excellent physical condition to overcome the multiple current demands of the game. In the offensive game, there is an increase in the speed of the actions, strength and endurance of the players and a high technical-tactical background, among others, so the goalkeepers need to highlight the specific speed in their position in which are the defensive movements before the shots on goal.

**Objective:** The present study aimed to design a test for the evaluation and control of the specific speed of the goalkeepers of the Cuban national handball team. The three goalkeepers of the Cuban national handball team who were preparing for the 2012-2016 Olympic cycle, and who later attended the Pan American Championship in Havana, 2015, participated in the research.

**Materials and methods:** Theoretical and empirical methods were used, such as functional structural systemic, direct observation and measurement.

**Results:** The results of the analyses carried out in the study were presented. According to the observations made during the training sessions, it was found that there was no instrument to evaluate and control the specific speed of the goalkeepers' position, they were included in the control and evaluation of the field players; therefore, there was no assessment of the state of this essential capacity in this position in handball.

**Conclusions:** After the application of the test and the evaluation of the specialists and the members of the national handball commission, the Test was incorporated into the Comprehensive Preparation Program for the Athlete of the discipline due to the results achieved in an ascending manner by the goalkeepers during the preparation and competition.

**Keywords:** Handball; female goalkeepers; Speed; Test.

## RESUMEN

**Introducción:** El portero de balonmano debe poseer una excelente condición física para superar las múltiples exigencias actuales del juego. En el juego ofensivo, se constata un aumento en la velocidad de las acciones, fuerza y la resistencia de los jugadores y un elevado bagaje técnico-táctico, entre otros, por lo que los porteros necesitan destacar la rapidez específica en su posición en los que se encuentran los desplazamientos defensivos ante los lanzamientos a portería.

**Objetivo:** El estudio que se presenta tuvo por objetivo diseñar un test para la evaluación y control de la rapidez específica de las porteras de la preselección nacional cubana de balonmano. En la investigación, participaron las tres porteras de la selección nacional cubana de balonmano que se preparaban para el ciclo olímpico 2012-2016, y que posteriormente asistieron al Campeonato Panamericano La Habana, 2015.

**Materiales y métodos:** Se utilizaron métodos teóricos y empíricos como el sistémico estructural funcional, la observación directa y la medición.

**Resultados:** Se presentaron los resultados de los análisis llevados a cabo en el estudio. De acuerdo con las observaciones realizadas a los entrenamientos de la preparación, se constató que no se contaba con un instrumento para evaluar y controlar la rapidez específica de la posición de las porteras, se incluían en el control y evaluación de las jugadoras de campo; por lo que no se tenía una valoración del estado de esta capacidad



esencial en esta posición en el balonmano.

**Conclusiones:** Tras la aplicación del test y la valoración de los especialistas y los miembros de la comisión nacional de balonmano, se incorporó el Test en el Programa de Preparación Integral del Deportista de la disciplina por los resultados alcanzados de manera ascendente por las porterías durante la preparación y la competencia.

**Palabras clave:** Balonmano; Porterías; Rapidez; Test.

## SÍNTESE

**Introdução:** O goleiro de handebol deve possuir uma excelente condição física para superar as múltiplas exigências atuais do jogo. No jogo ofensivo, há um aumento na velocidade das ações, força e resistência dos jogadores e um alto background técnico-tático, entre outros, portanto os goleiros precisam destacar a velocidade específica em sua posição na qual os deslocamentos defensivos antes dos chutes a gol são encontrados.

**Objetivo:** O objetivo deste estudo foi elaborar um teste para a avaliação e controle da velocidade específica dos goleiros da equipe nacional cubana de pré-seleção de handebol. A pesquisa envolveu os três goleiros da seleção nacional cubana de handebol que se preparavam para o ciclo olímpico 2012-2016, e que posteriormente participaram do Campeonato Pan-Americano de 2015 em Havana.

**Materiais e métodos:** Foram utilizados métodos teóricos e empíricos, tais como sistêmico estrutural funcional, observação direta e medição.

**Resultados:** Foram apresentados os resultados das análises realizadas no estudo. De acordo com as observações feitas nas sessões de treinamento da preparação, verificou-se que não havia nenhum instrumento para avaliar e controlar a velocidade específica da posição dos goleiros, eles foram incluídos no controle e avaliação dos jogadores de campo; portanto, não houve avaliação do estado desta capacidade essencial nesta posição no handebol.

**Conclusões:** Após a aplicação do teste e a avaliação dos especialistas e dos membros da comissão nacional de handebol, o teste foi incorporado ao Programa de Preparação Integral do Desportista da disciplina devido aos resultados alcançados de forma ascendente pelos goleiros durante a preparação e a competição.

**Palavras-chave:** Andebol; Guarda-redes; Rapidez; Teste.

## INTRODUCTION

The demands that determine current handball and contemporary training trends require developing the training process in a context as close to competition. Different renowned authors of sports training and prestigious handball researchers have reflected their vision.

Handball is one of the sports disciplines that stands out with large annual volumes of scientific studies to raise the quality of the sport and its practitioners (Lozano *et al.*, 2016; González *et al.*, 2017; Tulha Duarte Ferreira *et al.*, 2018; Trejo and Planas, 2018; Quiñones *et al.*, 2019; Jiménez-Salas *et al.*, 2020). They are works focused mostly on the offensive game; on the contrary, to the studies of the specific goalkeeper position.



In modern handball the functions of the goalkeeper are very complex due to the continuous adaptations that must be made in the game to fulfill their specific tasks. **Bárcenas (1991)** considers that "the quality of the goalkeeper strengthens the performance of his/her teammates, undermining the morale of rivals in the face of good interventions and leading to the avoidance of responsibility for the attackers' shots" (cited in **Romero, 2012, p.2**).

**Antúñez and García (2008)** have reflected on the importance of the handball goalkeeper in the game and in the performance of the teams, specifically on the demands of the specific position and the fulfillment of the tasks carried out in such a complex environment influenced by circumstantial aspects the rules and the game.

Other authors such as **Pascual (2008) and Sá (2012)** summarize that the performance of the handball goalkeeper is essential for the outcome of the matches and the final classification of the teams, (cited in **Sá, Rui, Saavedra and Fernández, 2015, p.1**). Their actions are considered to be decisive in many moments of the match, being able to unbalance the balance for or against during the key moments of the match (**Vizcay, 2020**).

On the other hand, the tasks or obligations of the goalkeeper for each phase of the game are presented. In the defensive tasks, it presents the defense of shots, the interception, dissuasion and/or harassment in adversary counterattacks, the organization of the defense and the defense of the shots in collaboration with the defense. In the offensive tasks, it is exposed the putting into play of the ball, the beginning of the counterattack, as well as the individual and collective offensive actions outside the goal area (**Antúñez, 2003**).

The work of **Quiñones et al. (2020)** argues the current conditions of the elite game, valuing in the offensive game phase, an increase in the speed of actions and decision making. Added to this is the predominance of tactical relationships between two or three players in smaller spaces that cause greater use of collective tactical means and changes in the structure of the offensive game.

The analysis presented by the authors, the experience in the sports discipline and in the position studied, are consistent with the need to have goalkeepers more quickly in actions, fundamentally in defensive movements in the goal to avoid the transcendence of the attack.

**Jaramillo (2018)** when referring to the goalkeeper's speed, associates it with reflexes and the speed with which they execute the stops. Movements and performances in this position are defined with three types of speed:

- The speed of movement, to the movements that occur with running, for example, quickly catching the ball to go on the counterattack, protecting a ball that returns 6 meters after a stop, or the need to make an attack defense change as soon as possible.
- The reaction speed, which is commonly known as "reflexes", that is, the speed with which a goalkeeper perceives the opponent's gesture and/or the ball, decides what movement he/she is going to make and finally executes it.
- The gestural speed, to the movement of the extremities (arms and legs) to stop the ball, as well as the whole body to propel in more distant stops. (p.4)



When considering the words (Guerra, Stable and Bernal, 2021) when they comment that "the well-organized and planned training process ensures the achievement of the proposed objectives and to maintain these results achieved, a planning of periodic controls and their evaluations must be designed within of preparation as the most important tool you use as a coach. (p.269)

The term measurement is used with great frequency, this is a process by which quantitative and qualitative information is collected. The measurements are obtained through a series of procedures generally called physical test and test.

The test in sport are tests through which the degree of physical efficiency and ability of an athlete can be quantitatively determined (Yucra, 2001). Performance control is necessary, since it is necessary to receive periodic information on the athlete's state of preparation (Forteza, 1998; Pérez, 2008).

Similarly, Harre (1988) is cited when he defines that the evaluation, in addition to serving to control the reality of the plan, has as its primary function to determine the degree of deficiency of the methods and means of training applied. It is a process that identifies, captures and provides the information that supports decision-making and participants of the approaches, actions or results of the program to which it is applied. It allows, through assessments and analysis, the comparison of the different elements of the program with previously determined parameters or reference points for the integration of the set of useful information at each moment for decision making (Yucra, 2001).

It is coincided with this same author when he proposes principles for its effectiveness in the training process:

- This must be a systematic activity, that is to say, coherent when it comes to its application in the different phases of the process.
- Be included in this process.
- Take individual differences into account.
- It must be developed from different instruments.

Control and evaluation are important components for rectification of sports training. It is a necessity that allows the coach to order the various tasks of the process and offer an assessment of how the proposed objectives behave within the training plan (Guerra, et al., 2021).

It is a demand the need to continuously search for physical limits in the context of sports competition under the scientific method (García Manso et al., 1996; Sánchez 1993), and to use methodological approach scales to reproduce the competition activity as a model under training conditions (Verjoshanki, 1990). Added to this is the need to evaluate the specific speed of the female handball goalkeepers of the Cuban national pre-selection; the objective of this work is presented: to design a test for the evaluation and control of the specific speed of the female goalkeepers of the national handball pre-selection.



## **MATERIALS AND METHODS**

The three goalkeepers of the national women's handball team in Cuba participated in the study.

A documentary review was carried out; necessary in obtaining the conceptions to raise the objective of the work. The analytical-synthetic method was used in the analysis of the main elements in the work of the specific speed; the induction-deduction for the selection, design and organization of the proposed test, and the functional-structural systemic method, to build the proposal declared, for which the content is taken as a fundamental reference for the determination of this capacity that supports the efforts of the competition.

Direct observation was used for the training sessions of the previous preparation that consisted of two cycles, 16 microcycles distributed in 8 mesocycles and its fundamental competition was the First Division Pan American Championship. This allowed the collection of information necessary for the research. The survey was used to collect information from specialists regarding the importance and need to have a test to evaluate and control the specific speed of the goalkeepers of the national preselection. As well as, the criteria of the specialists to collect the most reliable evaluations for the elaboration of the test. Ten handball goalkeeper training specialists with more than 20 years of experience in the activity participated in the survey. Lastly, measurement was used, fundamental method in the study. The materials used were the goal, balls, measuring tape, chalk and stopwatch.

## **RESULTS AND DISCUSSION**

The results of the analyzes carried out in the study are presented below.

According to the observations made during the preparation training, it was found that there was not an instrument to evaluate and control the specific speed of the goalkeepers' position, it was included in the control and evaluation of the field players; therefore, there was no assessment of the state of this essential capacity in this position in handball.

The survey carried out with the coaches showed that they did not have a test like field players have to evaluate this physical capacity. All argue the differences between quickness and speed, but they do not identify it in the goalkeeper. The totality agreed on the implementation of a test to evaluate and control the work of this capacity.

When reviewing the governing document for the preparation of the goalkeepers (confidential document), it was found that the objectives and contents in the planning related to the work of the specific speed were planned but their evaluation corresponds to that of the field players.

The surveyed specialists declared their criteria in the preparation of the test as well as their assessment regarding the evaluation strategy.

Below is the description of the specific speed test for goalkeepers' handball.



For the design of the test, the criteria expressed in Morales (2021, p.16) were taken into account.

1. Name.
2. Goal.
3. Definition of what is measured.
4. Necessary instruments.
5. Description of the exercises.
6. Methodological indications.
7. Characterization of the athlete from the data obtained by the software.

These criteria were taken to the survey of specialists who have influenced the work of this position in Cuban handball, to collect evaluative and more reliable criteria for the preparation of the test. Where of these criteria all the respondents agreed on the following:

- Goal.
- necessary instruments.
- Description.
- methodological indications.

Giving way to your design

### **Specific speed test**

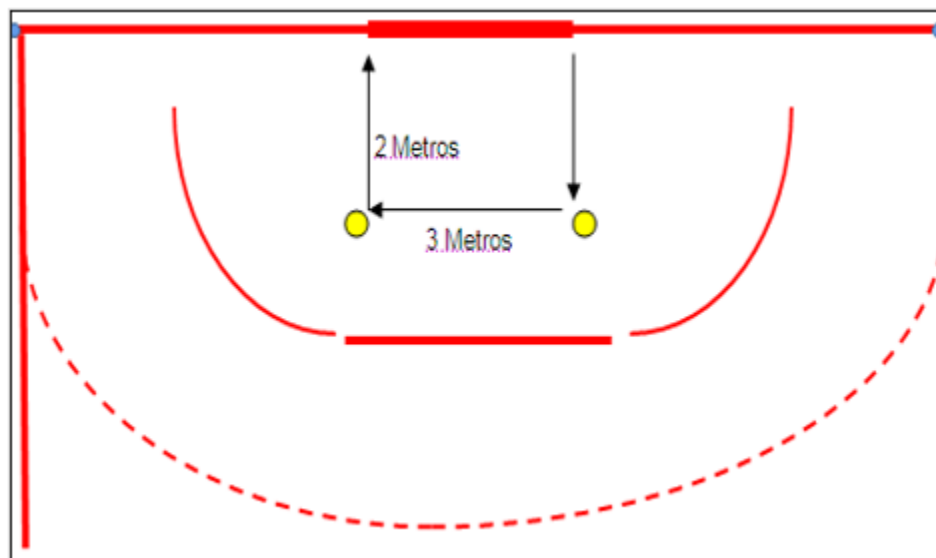
Objective: to evaluate the specific speed of the goalkeepers.

Necessary instruments: goal, 2 balls, measuring tape, chalk, stopwatch, notebook.

Description: In goal, starting from the fundamental position in the center, the first defensive movement is to the upper right corner, continues to the lower left lower angle, then the lower right angle and ends with the upper left corner. Finishing this route, going forward to a ball 2 meters away from the goal, then lateral movement to a ball 3 meters away and going back to touch the crossbar of the goal.

Methodological indications: at the beginning of the preparation the test is carried out without requiring the execution of the defensive movement technique, already in the second control it is carried out with the technique being required. You always have to reach the angle of execution. The test must be done in the shortest time possible; 3 opportunities are given and the best time is chosen (Figure 1).





**Fig. 1** - Specific speed test (made by Pedro Olivares)

It is important to point out that the movements that most affect the actions of the goalkeepers are chosen, so that it would be the most real to their competitive activity.

### Application of the test

The test was applied to the goalkeepers of the national handball preselection that were preparing for the Pan American Handball Championship held in Havana, 2015, who, before its application, became familiar with it. The movements are performed at a lower speed in order to master the test and improve its execution. It was applied for the first time at the end of the general preparation stage to find out what physical condition they were in, to plan exercises corresponding to their development. In a second moment, it is applied again at the end of the special preparation stage showing improvement in its results and it ends with its application in the pre-competitive stage, in which satisfactory results are achieved.

An evaluative table was prepared with the data from the first control carried out with the proposed test as a reference. That is to say, the average achieved by the three goalkeepers, in addition to the criteria of the experienced specialists in the work of this position in high performance; in order to draw up an evaluative strategy (Table 1). The evolution according to the application of the test is shown below.

**Table 1.** Pan-American evaluative table Havana 2015

Range	-5.16	5.16-5.30	5.31-5.50	5.51-5.60	+5.60
Evaluation	MB	B.	R	M	MM

MB: Very Good, B: Good, R: Fair



**Table 2.** - Results of the pedagogical test by stages of preparation

Goalkeeper	EPG	EPE	PPEc
1	5.33	5.13	5.04
2	5.22	5.00	4.88
3	5.00	4.90	4.79
Mean	5.16	5.01	4.90
Evaluation	B.	MB	MB

EPG: general preparation stage, EPE: special preparation stage, PPEc: precompetitive preparation stage  
 MB: Very Good, B: Good, R: Fair

After applying the specific speed test, superior results were shown in the three goalkeepers (Table 2). As the preparation stages progress, execution times decrease; where they demonstrate a good mastery of the test according to the results achieved. In general, a satisfactory implementation of the process of training the speed of the goalkeepers of the Cuban National Preselection of handball, applied in this research, is observed, endorsed by the criteria of coaches and specialists consulted.

**Table 3.** - Competitive results Pan American Havana 2015

Goalkeeper	Performance %	Evaluation
1	42.6	MB
2	44.0	MB
3	58.1	MB
Mean	48.2	

MB: Very Good, B: Good, R: Fair

Taking as a reference the results obtained at the international level by handball goalkeepers in the different competitions in the period 2008-2015, with an average total efficiency of 32.6 % (González *et al.*, 2017). The goalkeepers of the Cuban preselection in the Pan American Championship in Havana 2015 obtain relevant results (Table 3), although the best in competition is reached by goalkeeper 1; selected second best goalkeeper of the competition. It is valid to point out that despite the fact that her performance was lower compared to the other two goalkeepers, she was the one that had the most participation in the competition and is considered to have a high percentage of efficiency when compared to the aforementioned international levels.

The specific speed capacity is a fundamental aspect of the physical condition of the goalkeeper position, it can be considered the basis for all actions in this game position. According to Antúnez (2003) "there are many parameters that can influence the athlete's performance, and the way any of them can contribute to significantly increase that performance" (cited in Antón *et al.*, 2010, p.523).



## CONCLUSIONS

The designed test contributes to the process of control and evaluation of the work of the specific speed of the goalkeepers in the handball of the national preselection. It can be used in goalkeepers from elite categories and in players from other categories with experience in the position. It is valid to point out that the specific speed test for the goal position in Cuban handball was introduced in the Integral Program for the Preparation of the Athlete (PIPD), the guiding document for the methodological work in Cuba.

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**Conflict of interest statement:**

The authors declare that there are no conflicts of interest.

**Authorship contribution:**

The authors have participated in the writing of the paper and analysis of the documents.



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