

Volume 10 issue 3; 2025




# Ciencia y Deporte



## *Structure for planning sports training by directions in school handball goalkeepers*

*[Estructura para la planificación del entrenamiento deportivo por direcciones en  
porteras escolares de balonmano]*

*[Estrutura para o planejamento do treinamento esportivo por instruções para goleiros de  
handebol escolar]*

José Enrique Fernández Moreno <sup>1\*</sup>  Lexy Figueredo <sup>Fruto 1</sup>  Francisco Núñez Aliaga <sup>1</sup> 

<sup>1</sup> University of Granma. Faculty of Physical Culture. Granma, Cuba.

\* Corresponding author: henrybm63@gmail.com

*Received* : 28/02/2025

*Accepted* : 30/11/2025

---

### **ABSTRACT**

**Introduction:** This article was made based on detecting theoretical-methodological and practical deficiencies in the process of planning, execution and control of preparation in female goalkeeper athletes of the school category 13-15 years.

**Objective:** to design a structure for planning training by directions, based on a theoretical conception that frames the contents in the accumulation – transformation –

realization (ATR) model, in order to contribute to improving the sporting performance of goalkeepers.

**Materials and methods:** At the theoretical level, the structural-functional systemic, analytical-synthetic, and hypothetical-deductive methods were used; at the empirical level, observation, document analysis, surveys, expert judgment (Delphi method), and experimental methods through case studies were employed. Descriptive statistics included percentage analysis, mean, and standard deviation. Inferential statistics were used to compare the results obtained in the pedagogical tests where quantitative variables were observed, using the Wilcoxon signed-rank test and the Student's t- test, with SPSS version 25.

**Results:** the development of variables related to the conditioning and determining directions of the preparation and performance of handball goalkeepers is studied from the implementation of the planning structure, after being theoretically validated by the group of experts.

**Conclusions:** The structure fostered a marked development of the directions of preparation, measured and evaluated in 17 performance variables, through the case study in the four athletes of the target population.

**Keywords:** structure; planning; directions; effectiveness.

---

## RESUMEN

**Introducción:** el presente artículo se realizó a partir de detectar insuficiencias teórico-metodológicas y prácticas en el proceso de planificación, ejecución y control de la preparación en atletas porteras de la categoría escolar 13-15 años.

**Objetivo:** diseñar una estructura para la planificación del entrenamiento por direcciones, sustentada en una concepción teórica que enmarque los contenidos en el modelo acumulación - transformación - realización (ATR), de manera que contribuya a mejorar el rendimiento deportivo en las porteras.

**Materiales y métodos:** del nivel teórico, el sistémico estructural funcional, el analítico sintético, el hipotético - deductivo, y dentro del nivel empírico, la observación, el análisis

de documentos, la encuesta, el criterio de expertos (Delphi), el experimental a través del estudio de casos, de la estadística descriptiva el análisis porcentual, la media y la desviación estándar. La estadística inferencial en la comparación de los resultados obtenidos en los test pedagógicos donde se observaron variables cuantitativas, mediante la prueba de hipótesis de Wilcoxon y la prueba T Student, del paquete estadístico SPSS, versión 25.

**Resultados:** se estudia el desarrollo de variables relacionadas con las direcciones condicionantes y terminantes propias de la preparación y rendimiento de las porteras de balonmano a partir de la puesta en práctica de la estructura de planificación, luego de ser validada teóricamente por el grupo de expertos.

**Conclusiones:** la estructura, propició un desarrollo marcado de las direcciones de la preparación, medido y evaluado en 17 variables del rendimiento, a través del estudio de casos en las cuatro atletas de la población objeto de estudio.

**Palabras clave:** estructura; planificación; direcciones; efectividad.

---

## RESUMO

**Introdução:** Este artigo foi escrito em resposta às deficiências teóricas, metodológicas e práticas identificadas no planejamento, execução e monitoramento do treinamento de goleiras na faixa etária escolar de 13 a 15 anos.

**Objetivo:** Desenvolver uma estrutura para o planejamento do treinamento por direção, baseada em um referencial teórico que situa o conteúdo dentro do modelo de Acumulação-Transformação-Realização (ATR), contribuindo assim para a melhoria do desempenho atlético das goleiras.

**Materiais e métodos:** No nível teórico, foram utilizados os métodos estrutural-funcional sistêmico, analítico-sintético e hipotético-dedutivo; no nível empírico, foram empregados a observação, a análise documental, questionários, a opinião de especialistas (método Delphi) e métodos experimentais por meio de estudos de caso. As estatísticas descritivas incluíram análise percentual, média e desvio padrão. As

estatísticas inferenciais foram utilizadas para comparar os resultados obtidos nos testes pedagógicos onde foram observadas variáveis quantitativas, utilizando o teste de Wilcoxon para postos sinalizados e o teste t de Student, com o auxílio do SPSS versão 25.

**Resultados:** O desenvolvimento de variáveis relacionadas ao condicionamento e aos fatores determinantes na preparação e no desempenho de goleiros de handebol foi estudado após a implementação de uma estrutura de planejamento, validada teoricamente por um grupo de especialistas.

**Conclusões:** A estrutura promoveu um desenvolvimento significativo dos fatores de preparação, mensurados e avaliados em 17 variáveis de desempenho, por meio de estudos de caso com quatro atletas da população estudada.

**Palavras-chave:** estrutura; planejamento; diretrizes; eficácia.

---

## *INTRODUCTION*

In the social development of humanity as a species and in its evolution, physical activity has always played a fundamental role in fulfilling vital functions. Sport is a product of this activity, conditioned by the nature of its productive relationships and the general laws of social development.

Undoubtedly, sports training is the most dynamic aspect of sport, a social phenomenon that throughout history has based its progress on the development of society itself. "...the level of sporting success depends, in short, on the basic conditions of material life and the organization of society" (Matveev, 1990). Evidence shows that, since the earliest civilizations, there has been a concern for organizing athletic preparation for the ancient Olympic Games. Training has always been organized with the aim of ensuring that athletes participate in competitions in the best possible condition.

Currently, planning and organization remain fundamental aspects of athlete training.

The concepts that have emerged throughout history from the theory and methodology of sports training have simplified, practically from their inception, the complex task of planning, structuring, and implementing such training. The evolution of these concepts, transformed into knowledge, has fostered a gradual and systematic increase in the quality of preparation for elite athletes worldwide, integrating technological advancements, neuroscience, and ecological models.

The constant pursuit of personal bests, records, and results, coupled with evolving sports trends, makes improving athletic performance increasingly difficult and demands a scientific approach. This is especially true today, in an era of great scientific and technological advancements that have given sports an international profile, not only in the media but also in the way more and more countries are adopting their own training plans and programs. This has led to such a degree of evolution that, with the right perspective, the implementation of these plans and programs has gone from being a novel concept to a solid foundation for a wide range of opportunities.

In this sense, (Feu, *et al* 2020) They argue that "the academic and scientific contribution is fundamental for the field of sports performance to be based on solid and reliable concepts that help it progress in the right direction. But it is no less fundamental that the approach to practical reality provided by the field of training allows research to remain aligned with the real needs of sports performance."

In recent years, the competitive level of athletes has increased considerably, as has the development of their abilities and skills. The number and level of competitions have grown, requiring sports educators to pay special attention to the athletic preparation process.

The rapid development of sports training necessitates reinforcing the demands placed on professionals to achieve academic excellence and to promote the continuous scientific improvement required by the methodological systems of contemporary sports training.

Handball is a team sport involving cooperation and opposition with contact, where two teams interact. Among all the specific positions, the goalkeeper stands out because, as a finishing sport, every play aims to end with a shot or an action near the opposing goal; hence the importance of this player's performance.

A similar concept is that assumed by (Guerra *et al.*, 2021) It is a sport of cooperation-opposition, simultaneous participation, invasion, uncertainty, variable, sporting game," adding to the concept the need for training and control models in its preparation that resemble real competitive conditions.

On the other hand, (Muñoz *et al.*, 2012), define Handball is a team sport involving cooperation and opposition with contact, where two teams interact with each other. Among all the specific positions, the goalkeeper stands out because, "*as it is a finishing sport, each play ends with a shot or an action close to the opponent's goal, so the goalkeeper's effectiveness is a very important performance variable* ."

As he rightly argues (De Barros, *et al.*, 2022), "In handball, athletes perform different defensive and offensive actions and functions during a match, which requires various specific positions. The goalkeeper plays inside the area and can be considered the last defender and the first attacker."

In this sense, goalkeepers have specific needs encompassing physical, psychological, tactical, technical, and perceptual aspects, different from those of outfield players, requiring specialized training. Therefore, it is essential to provide information on the preparation, organization, monitoring, and evaluation of specific training for handball goalkeepers, thus contributing to successful goalkeeper training models given their importance to the team.

According to Gracia (2024), effective tactical decision-making plays a crucial role during matches. Training focused on game understanding and player autonomy improves responsiveness to varying and demanding situations. A technically competent player is more adaptable to different situations and more effective in decision-making.

In addition to the conscious physical, theoretical, and psychological preparation that must be integrated into the training of goalkeepers, this goes through several phases or moments in the technical and tactical order, in this sense (Ferrer, L. Mesa, L. Martínez, R. 2022), they subscribe to it in:

- Time for body adjustment,
- Time for intervention in response to launches and,
- Moment, tactic in the intervention against throws.

According to (Faicán -Arroyo, 2021), "...the role of the goalkeeper, their effective intervention in a match, does not require much explanation. It is considered that their participation in the outcome of the game exceeds 50%. However, regardless of their undeniable and considerable importance, in most cases they are deprived of systematic and constant training."

This importance is recognized by almost all researchers and professionals who work with players in this position; however, in practice, various factors at the base of the high-performance pyramid contradict this recognition: goalkeeper training has always been an arduous task for coaches. Often, the goalkeeper participates in training as an observer, a passer, or simply as a marker for a specific area of the field, while the rest of the players train at maximum speed, guided by the coach. Furthermore, in our country, the same training model is used for goalkeepers as for outfield players, despite their different roles in competition.

This raises a fundamental question: how can we assess the training level of our outfield players if our goalkeepers aren't performing at an acceptable level? It's clear that, while handball is a team sport, goalkeepers, due to the nature of their competitive role, shouldn't have the same training structure as their outfield teammates. Furthermore, their role exerts a significant psychological influence on opponents, teammates, and even the coaching staff in the lead-up to the main event.



Therefore, the problem is manifested in the contradiction between the traditional or conventional planning of handball goalkeeper training, based on long periods of preparation with a predominance of components far removed from the real context of the game, and the need to meet current competitive demands, which impose high expectations on players.

In this context, the theory and practice of sports training are looking for new ways to improve performance, particularly the accuracy in planning training loads.

This has led to the emergence of several planning methodologies or models, such as: cyclical periodization (Matveev, 1962); the pendulum structuring of sports training (Ariosev and Kalinin, 1971); the integrative model (Bondarchuck, 1984); high loads (Vorobiev, 1985); the structural scheme (Peter Tschiene, 1985); block structuring (Verjoshanski, I., 1985); the contemporary model (Issurin and Kaverin, 1986); and structural bells (Forteza, A., 1999). Other relevant approaches include sports training orientations (Harre, D., 1976; Forteza, A., 1999) and the integrated model (Navarro, F., 2000).

According to Dantas *et al.* (2022), in their work on criteria for identifying and evaluating sports training periodization models, "Periodization is the comprehensive and detailed planning of the time available for training, in accordance with the established intermediate objectives and adhering to the scientific principles of sports exercise." In our opinion, this also determines the type of structure or model to apply in the preparation of players in this position.

The constant search for alternatives leads to experimenting with adjustments based on structures, until now generally used in individual sports, in order to guarantee better preparation in the goalkeepers of the school team of 13 to 15 years of age in the province of Granma, Cuba.

According to Agudelo (2019), "Training organization is a pedagogical process that involves pushing the individual to their physical and psychological limits. Therefore, preconceived notions cannot be accepted, as errors lead to athletic failure or even detriment to the athlete's physical or psychological health. This is why we must study the models to be applied in depth and scientifically, especially when it comes to initiation into high-performance sports."

According to Acero (2007), "To develop the training work for goalkeepers at the beginner levels, it is necessary to discover their physical qualities, diagnose their attitudes, and work on their development." Simultaneously, in our opinion, it would be necessary to study and design the fundamental directions, which will be systematically improved with training.

According to Camacho et al., cited by Mosquera (2024), "...the ATR model has proven to be highly suitable compared to other models and, along with Matveev's classic model, has become one of the most widely used and consistently applied models." This statement supports our position in choosing this structure for our research, given the advantages it offers for raising the competitive level of athletes.

In their research (Carazo-Vargas, 2018), referencing the main proponents of this model (Issurin, 2010), the ATR model, also called the concentrated load model, is a contemporary periodization method that attempts to meet the demands of modern sport. It organizes training into three types of mesocycles, in which constant variations in workload are applied to develop a limited number of objectives in each block. The three specialized types of mesocycles are: a) Accumulation, b) Transformation, and c) Realization. Depending on their objective, the duration of the mesocycles ranges from two to six weeks.

As an international precedent for this research, the work carried out by Andersen, L. (2020), entitled "Periodization of training for handball goalkeepers: optimization of speed and agility", from the University of Copenhagen, Denmark, stands out. Its main

result is the development of a periodization model that significantly improved the reaction speed and agility of elite goalkeepers.

On the other hand, it is worth mentioning the research of López, M. (2023), entitled "Planning of psychological training for goalkeepers in high-level competitions" from the National Autonomous University of Mexico (UNAM), which produced emotional control and concentration techniques that improved mental stability and performance under pressure.

Similarly, Petrov, A. (2020) worked on "physical training planning models for Russian handball goalkeepers" at Moscow State University, Russia, obtaining an adapted physical training model that improved anaerobic endurance and post-exertion recovery.

In all cases, the studies focus primarily on the components of preparation and specific aspects of the psychological component, making valuable contributions in this field.

In Cuba, the contributions of Ruiz, A. (2018) stand out. Her research, titled "Model for the preparation of Cuban handball goalkeepers for international competitions," was carried out at the "Manuel Fajardo" Higher Institute of Physical Culture. Its main result focuses on establishing the foundations for current Cuban planning. She proposed a macrocycle structure with an emphasis on psychological preparation (30% of the total volume) and the simulation of competitive pressure in the final mesocycles, increasing the stability of performance in key events.

Hernández, R. (2022) focused on proposing a "model for planning the technical-tactical training of high-performance handball goalkeepers in Cuba," from the Manuel Fajardo University of Physical Culture and Sports Sciences (UCCFD). His main result is the proposal of a model structured in macrocycles, mesocycles, and microcycles, with an emphasis on tactical integration from the earliest stages.

González, JC (2023) focused on the "block planning of technical training for school-age handball goalkeepers in Cuba," representing the "Manuel Fajardo" University of Physical Culture and Sports Sciences (UCCFD). His results are derived from the

implementation of a block training plan concentrated on technical aspects (basic technique, static stops, jump stops, and footwork).

As in similar studies conducted abroad, the topics focus on specific training components, almost always maintaining an extensive periodization structure. These structures primarily address the percentage-based aspects of training, making quantitative and qualitative control difficult.

These elements lead us to our problematic situation, manifested in the contradiction between the traditional or conventional approach to planning handball training for goalkeepers—based on long preparation periods with a predominance of training components detached from the real context of the game—and the need to meet current competitive demands. In this regard, sports training theory and practice are seeking new ways to improve performance, particularly in the precision with which training loads are planned.

Therefore, the main objective of this research is to design a structure for planning training by directions, based on a theoretical conception that frames the contents in the accumulation – transformation – realization (ATR) model, in order to contribute to improving the sports performance of handball goalkeepers of the school category 13-15 years in the Granma province.

## ***MATERIALS AND METHODS***

In this research, the use of dialectical materialism as a general philosophical and methodological foundation allowed for a scientific conception of the world and a comprehensive analysis of phenomena. This led to the use of both theoretical and empirical methods, which enabled a deeper understanding of the object of study at each stage of the investigation.

Among the theoretical level methods used were the systemic structural functional, the analytical synthetic, the hypothetical-deductive, and among the empirical level methods and techniques, observation, document analysis, survey, expert judgment (Delphi), experimental through case studies, descriptive statistics, percentage analysis, mean and standard deviation.

Inferential statistics were used to compare the results obtained in the pedagogical tests where quantitative variables were observed, using the Wilcoxon hypothesis test and the Student's t-test, available in the SPSS statistical package, version 25, with a significance level  $\alpha = 0.05$ . The Shapiro-Wilk test was used to determine the normality of the data in the continuous variables, whose results are normally distributed.

This research was developed from September 2023 to July 2024, with a population made up of the four goalkeepers of the Granma province school handball team who prepared to participate in the National School Games through a case study.

In the factual analysis carried out based on the problems faced, and supported by the review of documents, observation of training sessions, interviews and surveys, the following manifestations or deficiencies were detected:

- Insufficient knowledge on the characterization of competitive handball goalkeeper training by coaches to scientifically and pedagogically assume the preparation process.
- The training sessions for preparing goalkeepers are planned using the traditional periodization model, which means that the best performance level of the goalkeepers is reached in a single stage of preparation, preventing an assessment of the actual state of preparation of the field players and goalkeepers from the training.
- Limited working interaction between goalkeepers and field players.
- Insufficient objective knowledge of the area where goalkeepers are most effective, and of the visual-motor perception skills that enable anticipation in their defensive work.

- The contents suggested by the Comprehensive Athlete Preparation Program (2025-2028) are presented as components rather than directions, which makes it difficult to quantify the work to be done and its objectivity, and does not address the work of visual-motor perception skills, which enable anticipation in their defensive work.
- There are many basic examples of sessions for preparing goalkeepers, but not by conditioning and determining directions.

The study was structured according to the methodological approach assumed; the training directions (conditioning and determining factors) in the training of handball goalkeepers complement each other, and together they become the core of the structure that we proposed in our research to face the preparation.

To arrive at the training directions that are evident in the game of goalkeepers in current handball, it is necessary to analyze some particularities of this discipline in its activity both in competition and training.

Handball is classified as a sport where actions are performed at high intensities. Its gameplay unfolds in both cyclical and acyclical patterns, characterized by the variability of motor responses in relation to a moving object (the ball). Its dynamics demonstrate work performed under a variable energy regime.

This initial definition was first submitted to expert criteria in conjunction with the methodological apparatus of the structure, to validate its implementation and then applied in practice, when planned within the macrocycle of the year 2023-2024.

Using the systemic structural functional method, a planning structure was designed by directions of sports training for handball goalkeepers in the 13-15-year-old school category, based on the contemporary ATR model (Issurin & Kaverin, 1986), for which the determining and conditioning directions of performance were defined, this structure model was designed in three macrocycles that made up the preparation cycle.

The training areas for goalkeepers defined in this research are: as conditioning factors for performance, maximum strength, strength endurance, speed-strength, aerobic endurance, anaerobic endurance, and flexibility; and as determining factors, explosive strength, reaction speed, basic technique, tactical technique (interrelation with outfield players), special coordination abilities, and competitive orientation. The training plan structure distributed the content across these areas, with specific emphasis on certain aspects.

The proposed control system was based on established directions, which gave precision to the training control.

## ***RESULTS AND DISCUSSION***

In the first stage of the investigation, the most current references regarding contemporary training trends could be determined, viewed from the understanding of dissimilar systems or models established in practice, which made it possible to delimit the advantages of the structure of the so-called contemporary ATR model of Issurin and Kaverin (1986) in relation to the development of preparation in short periods of time and the possibility of accentuating the specific contents characteristic of this sport modality.

It was confirmed that all current planning trends, reflected in the systems or models studied, are essentially based on Matveev LP's theories on sports training planning.

It was determined that the planning system used with the goalkeepers does not correspond to the current trends in this sport and to the demands that they, as players, need.

In light of the results obtained, it seemed essential to implement a specific training program for goalkeepers, addressing the variables most relevant to their optimal performance. In this regard, specific goalkeeper training should prioritize three

fundamental factors: physical-technical, perceptual, and tactical. All of these appear to be relevant to both the development and performance of this specific position.

Both the physical-technical and perceptual models have been frequently used in goalkeeper training. However, research on these models is scarce. On the other hand, the more current tactical model has its counterparts in different specific positions and also in other team sports, its effectiveness having been demonstrated, so it seems appropriate to explore it further in handball.

In the second stage of developing the structure, its elements were determined using scientific methods. This stage primarily employed systems thinking and modeling. Theoretical analysis allowed for the isolated evaluation of the specific components that characterize the methodological conception of the structure and the content in sports training planning, while the systems approach facilitated the understanding of these components and their interrelationships as an integrated whole. The theoretical modeling method was used to find the unity of the objective and the subjective in the projection of the sports training planning process for handball goalkeepers. Furthermore, it enabled the achievement of a sufficiently clear perception and representation of the object of transformation within a historically conditioned reality (traditional planning).

The application of the structural and functional systemic method as a logical framework for modeling allowed the object to be modeled by determining its components and their interrelationships, which together form a new whole. This involved defining, on the one hand, the structure and hierarchy of each component, and on the other, its dynamics and function.

To determine the training directions for the goalkeepers under study, competitive activity was characterized through different game indicators and its correspondence with physical abilities was defined, submitting this study to expert criteria.



This list included 30 experts who met the established criteria to be declared potential candidates. These experts came from the Technical Commission of the Cuban National Handball Federation, the Provincial Directorate of Sports in Granma, the Faculty of Physical Culture at the University of Granma, the handball department team at the "Pedro Batista" Sports Initiation School (EIDE), and handball coaches from the province of Granma. These 30 experts were categorized academically as follows:

- Doctors of science 8 (26.6%).
- High-performance specialists 2 (6.6%).
- Master of Science 15 (50%).
- Graduates in Physical Culture 5 (16.6%).

Through the results of a survey circulated to the specialists, the Competence Coefficient (K) of the same was determined, finally three were discarded, leaving the group of 27 experts.

This group of specialists was responsible for evaluating the planning structure specifically in five fundamental steps.

1. Theoretical foundation of the planning structure.
2. Methodological foundations on which the structure is projected.
3. Graphic structure used.
4. The contents of the preparation by directions of sports training.
5. Practical utility of the pedagogical control system.

The assessments, after three rounds of consultation with the necessary corrections, concluded with the following result (Table 1).

**Table 1.** - Ratings after three rounds of consultation with corrections

Steps	Very suitable	Quite adequate	Appropriate	Inappropriate	Not suitable
1.	21 (77.8%),	3 (11.1%)	3 (11.1%)	-	-
2.	24 (88.9%)	3 (11.1%).	-	-	-
3.	26 (96.3%)	1 (3.7%)	-	-	-
4.	25 (92.6%)	2 (7.4%)	-	-	-
5.	23 (85.2%)	2 (7.4%)	2 (7.4%).	-	-

In general, after reviewing the results of the previous assessments, the proposed planning structure for sports training directions was positively evaluated, reaching a consensus in the third round. The results were found to fall within the categories of very suitable, quite suitable, and suitable.

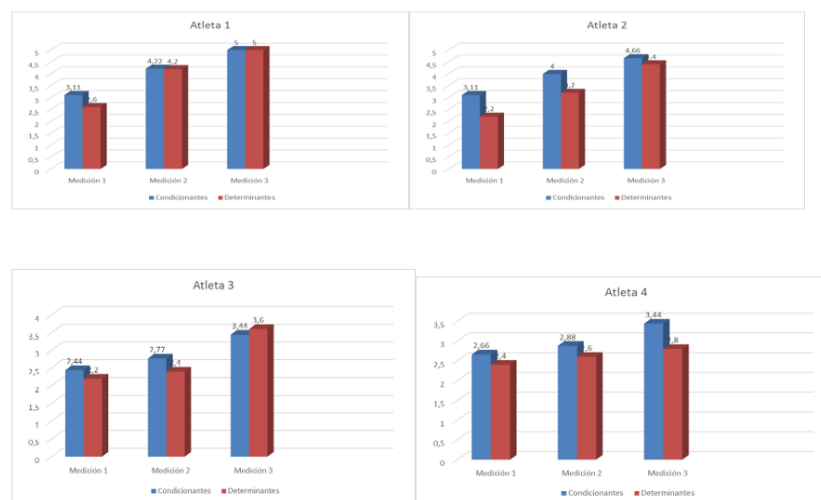
The proposed planning structure was implemented during the 2023-2024 macrocycle, where pretest tests (initial diagnosis in September 2023) and two posttests (in March and June 2024) were applied.

The initial and final state of the indicators used showed that the stimulus produced by the proposed structure was positive; the statistical analysis from a descriptive point of view allows us to observe a gradual growth, as well as from an inferential point of view.

For greater clarity in the analysis, it was necessary to consider the results of 17 indicators (ten conditioning and seven determining factors) measured before and after the implementation of the proposal. These measurements were made under the same conditions, and the SPSS 25 statistical package for Windows was used for processing, with a significance level of  $\alpha = 0.05$ . These indicators or variables were evaluated based on an adjustment made by the authors using the table of values established by the 2021 *Comprehensive Athlete Preparation Program* for handball, according to the corresponding age and sex, and converted to a scale of 2 to 5 points, with 2 (poor), 3 (fair), 4 (good), and 5 (excellent).

In the conditioning directions, the indicators measured were flexibility (trunk and legs), speed of movement, aerobic endurance, anaerobic endurance, fast strength, maximum strength (upper and lower body), and strength endurance (in arms and trunk), while in the determining directions, the indicators measured were power (long and high jumps without impulse), special coordination, reaction speed, basic technique, technical - tactical and competitive.

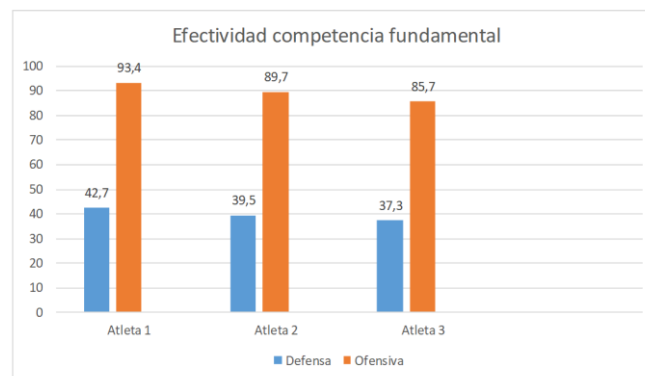
Consequently, according to these data, we observe that the values denote significant differences for each of the indicators in each of the athletes, values that are represented in the following graphs (Figure 1).



**Fig. 1. - Status of variable assessment by athletes**

In general, in each direction as previously stated there are significant changes in the results, the behavior is always superior in the conditioning directions, this is understandable due to the complexity that characterizes the determining directions with direct impact on competitive performance.

Based on the competitive performance shown by the athletes, the three with the best results were chosen to participate in the main event, and the effectiveness shown in the event behaved as follows (Figure 2).



*Fig. 2. - Effectiveness in game actions in matches of the main competition*

The number of actions the goalkeeper has to perform from a defensive point of view is significantly higher compared to the offensive one, hence the percentages obtained in this indicator are significantly higher in relation to defense.

In all cases, these effectiveness percentages correspond to what is currently required for the category worldwide. If we consider the results of the last U18 World Championship, the average effectiveness of the ten best goalkeepers with more than 90% of the playing time was 39.7%, while the average for our athletes was 40.72%.

Complementing these results is the national title for this 13-15 year old school team and the award for best player in the position for one of our athletes.

## CONCLUSIONS

Based on the reflections derived from the development of the investigative actions aimed at providing an answer to the problem and the objective, it is concluded that:

The most current references regarding contemporary training trends, viewed from the understanding of dissimilar systems or models established in practice, allowed us to confirm that all current planning trends, reflected in the systems or models studied, assume the essence of Matveev LP's theories on sports training planning; at the same time, theoretical currents are seen seeking contextualized alternatives due to changes in

the environment (commercialization, professionalism, scientific-technological advances, among others) that demand new ways of planning sports training in the sense of responding to competitive calendars.

It was determined that the preparation system for female handball goalkeepers in the school category, 13-15 years old, does not correspond to the relevance of these players from training to the fundamental competition.

The training areas for handball goalkeepers, as defined in this research, were: performance-conditioning factors, maximum strength, strength endurance, speed-strength, aerobic endurance, anaerobic endurance, and flexibility; and performance determinants, explosive strength, reaction time, basic technique, tactical technique (interrelation with field players), special coordination skills, and competitive orientation. The training plan structure distributed the content across these areas, with specific emphasis on certain aspects.

The proposed structure was implemented in the selection of goalkeepers for school handball in Granma province. The results obtained from the monitoring carried out, as well as the sporting achievements attained, provide evidence to support the conclusion that the initial idea stated in this research, based on the proposed objective, is valid under the conditions in which the structure was implemented. The opinions expressed by the experts demonstrate their positive assessment of the validity of the training structure presented to them.

## ***BIBLIOGRAPHIC REFERENCES***

Acero, R. (2007). El entrenamiento del portero de balonmano en las etapas de iniciación. E-balonmano.com: revista digital deportiva 3(2), 21-32. <http://www.e-balonmano.com/revista/articulos/v3n2-a1.pdf>

- Agudelo Velásquez, C. A. (2019). El modelo ATR como sistema alternativo de entrenamiento e investigación en el deporte. *VIREF Revista De Educación Física*, 8(1), 67-80. <https://revistas.udea.edu.co/index.php/viref/article/view/337983>
- Carazo-Vargas, P (2018). Adaptación del modelo de planificación ATR al entorno formativo. Aplicación en clases de taekwondo. *PENSAR EN MOVIMIENTO: Revista de Ciencias del Ejercicio y la Salud*, 16(2), <http://www.redalyc.org/articulo.oa?id=442057226001> DOI: <https://doi.org/10.15517/pensarmov.v16i2.32689>
- Martin Dantas, E. H., Barrón, J. C., Celestino Bispo, M. D., Salum de Godoy, E., Aquino dos Santos, C. K., Dias Bello, M. de N., & Gastélum Cuadras, G. (2022). Criterios para identificar y evaluar modelos de periodización de entrenamiento deportivo (Criteria for identifying and assessing sports training periodization models). *Retos*, 45, 174-183. <https://doi.org/10.47197/retos.v45i0.90837>
- De Barros, J. H, *et al.* (2022). Planning and execution of handball goalkeepers training: a descriptive study in youth categories teams in Brazil. *Sports Coaching*. Motriz, Rio Claro, 28, e10220009322 DOI: <http://dx.doi.org/10.1590/s1980-657420220009322>
- Faicán-Arroyo, W. D. (2021). Estudio sobre las direcciones de la preparación en porteros de fútbol de alto rendimiento. *Revista científica Especializada En Ciencias De La Cultura Física Y Del Deporte*, 19(51), 143-153. <https://deporvida.uho.edu.cu/index.php/deporvida/article/view/824>
- Feu, S., Ibáñez, S.J., y Antúnez, A. (2020). Innovaciones científicas para el entrenamiento en balonmano. Grupo de Optimización del Entrenamiento y Rendimiento Deportivo. Monografía 5. Universidad de Extremadura. I.S.B.N. Servicio de publicaciones UEX: 978-84-9127-059-1. Depósito Legal: CC-000121-2020.

- Ferrer, L. Mesa, L. Martínez, R. (2022). Metodología para la enseñanza-aprendizaje de los contenidos técnico-tácticos del portero de balonmano. *Revista Olímpica*. 19(3), <http://portal.amelica.org/ameli/journal/429/4293350004/>
- Gracia, C. (2021). Revisión bibliográfica sobre las variables determinantes de alto rendimiento deportivo en jugadores profesionales de balonmano. Grado en Ciencias de la Actividad Física y del Deporte. Universidad Miguel Hernández de Elche. <https://hdl.handle.net/11000/36964>
- Guerra Fontén, R., Stable Bernal, Y., & Bernal Jova, A. N. (2021). Control y evaluación de la preparación de los porteros de balonmano. *Revista Conrado*, 17(80), 268–276. <https://conrado.ucf.edu.cu/index.php/conrado/article/view/1843>
- Matveev, (1990). El entrenamiento y su organización. Roma. Escuela de deportes.
- Mihaila, I. *et al.* (2024). Characteristics of specific training in elite handball players specialized in goalkeeper position. *Pedagogy of Physical Culture and Sports*, 2024; 28(1):72–83. <https://doi.org/10.15561/26649837.2024.0108>
- Mosquera, E.A., Ramírez, J.P., Rayo A.F., Portilla, L.M., Escobar, J.C., Julián David Galeano, J.D., (2024). Aplicación del modelo ATR, una mirada reflexiva. *Revista Ciencia & Deporte*. 9(13). <https://www.researchgate.net/publication/386986805>
- Muñoz, A., Martín, E., Lorenzo, J., Revilla, J. (2012). Análisis de los diferentes modelos de entrenamiento para porteros de balonmano. *E-balonmano.com: revista digital deportiva* 8(3), 223-232. <http://www.e-balonmano.com/revista/articulos/v8n3-a1.pdf>

***Conflict of interest:***

The authors declare no conflicts of interest.

***Authors' contributions:***

Concept: **José Enrique Fernández Moreno.**

Literature search and review: **José Enrique Fernández Moreno.**

Instrument development: **Lexy Figueredo Fruto.**

Instrument application: **Lexy Figueredo Fruto.**

Data collection from the applied instruments: **Lexy Figueredo Fruto.**

Statistical analysis: **Francisco Núñez Aliaga.**

Creation of tables, graphs, and images: **Francisco Núñez Aliaga.**

General advice on the topic addressed: **Francisco Núñez Aliaga.** Drafting of the original (first version): **José Enrique Fernández Moreno.**

Revision and final version of the article: **Lexy Figueredo Fruto.**

Proofreading of the article: **Francisco Núñez Aliaga.**



This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

Copyright (c) 2025 *José Enrique Fernández Moren, Lexy Figueredo Fruto, Francisco Núñez Aliaga*