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Original article

Methodology for the development of special quickness in volleyball players, in the field defense

Metodología para el desarrollo de la rapidez especial de los voleibolistas, en la defensa del campo

Metodologia para desenvolvimento de velocidade especial na defesa de campo emjogadores de voleibol.

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ABSTRACT

The special physical preparation process constitutes one of the fundamental links for achieving good results in the competitive stage; however, coaches presented shortcomings in developing special quickness and field defense as independent aspects in school volleyball players. This gave rise to the need to develop this research. The objective was to develop a methodology for the development of special quickness during the preparation stage to improve the results of school volleyball players in field defense and it was stated as the action field the development of the special quickness in the field defense. The methodology was structured based on a theoretical-conceptual framework and an instrumental framework; its practical significance lay in offering coaches a working tool during the training of school volleyball players, to obtain better athletic results. Research methods such as systemic-structural-functional, document analysis, observation, surveys, and expert judgment allowed for the collection of information. The results achieved a theoretical and methodological characterization of physical preparation, with an emphasis on special quickness in field defense. The methodology allowed for the comprehensive development of special quickness in field defense as a new quality, since the actions were not performed independently but in team collaboration, tailored to the characteristics of modern volleyball.

Keywords: special physical preparation, special quickness, volleyball

RESUMEN

El proceso de preparación física especial constituye uno de los eslabones fundamentales para alcanzar buenos resultados en la etapa competitiva; sin embargo, se presentaron insuficiencias por parte de los entrenadores, consistentes en desarrollar en los voleibolistas escolares la rapidez especial y la defensa del campo como aspectos independientes, lo que suscitó la necesidad de desarrollar esta investigación, que tuvo como objetivo elaborar una metodología para el desarrollo de la rapidez especial, durante la etapa de preparación para la mejora de los resultados de los voleibolistas escolares en la defensa del campo y se precisó como campo de acción el desarrollo de la rapidez especial en la defensa del campo. La

metodología se estructuró, a partir de un aparato teórico-conceptual y un aparato instrumental, su significación práctica radicó en proponer a los entrenadores una herramienta de trabajo durante el entrenamiento de los voleibolistas escolares, para obtener mejores resultados deportivos. Se utilizaron métodos investigativos como el sistémico-estructural-funcional, el análisis de documentos, la observación, la encuesta y el criterio de experto que permitieron la recopilación de información. Como resultados, se logró la caracterización teórico-metodológica de la preparación física, con énfasis en la rapidez especial en la defensa del campo. La metodología permitió el desarrollo integral de la rapidez especial para defender el campo como nueva cualidad, en tanto las acciones no se realizaron de forma independiente sino en la colaboración en equipo, ajustadas a las características del voleibol actual.

Palabras clave: preparación física especial, rapidez especial, voleibol

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RESUMO

O processo de preparação física especial constitui um dos elos fundamentais para o alcance de bons resultados na fase competitiva, porém, houve inadequações por parte dos treinadores que consistem em desenvolver velocidade especial e defesa de campo como aspectos independentes em jogadores de voleibol escolar. à necessidade de desenvolver esta pesquisa, que teve como objetivo desenvolver uma metodologia para o desenvolvimento da velocidade especial, durante a etapa de preparação especial que afeta a melhoria dos resultados na defesa do campo de jogadores escolares de voleibol. A metodologia está estruturada a partir de um aparato teórico-conceitual e um aparato instrumental, seu significado prático reside em propor aos treinadores uma ferramenta de trabalho que os oriente durante a formação esportiva de jogadores de voleibol escolar, de acordo com as características do voleibol contemporâneo. melhores resultados desportivos, o que constitui uma experiência nova e essencial. A partir da utilização de métodos de observação, indutivo-dedutivo, analítico-sintético, sistêmico-estrutural-funcional e análise de documentos que permitiram a coleta de informações, conseguiu-se a caracterização teórico-metodológica da preparação física especial com ênfase na rapidez especial em a defesa do

campo. A metodlogia permite o desenvolvimiento integral de velocidade especial para defender o campo como uma nova qualidade, uma vez que as açãoes não podem ser realizadas de forma independente e requerem colaboração, ajusta-se às características do voleibol atual.

Palavras-chave: preparação física especial, velocidade especial, voleibol.

INTRODUCTION

Volleyball is a collaborative sport composed of six technical elements, including field defense. Like any sport, it consists of different stages of preparation necessary for the team to function properly and to ensure that players maintain adequate and consistent performance throughout the competition.

Regarding the organization of the game, volleyball is a sport of constant changes and modifications, carried out in a relatively short time, which are emotional; for example, the changes in rules for serving, defense of the field, the reception of the players, in the second pass with two hands above, and the duration of the matches in order to offer a good spectacle that satisfies the demands of the audience, which is not alien to the preparation process of the school volleyball player (Rodríguez, 2015).

School volleyball players must be prepared to perform a large number of actions per game, including rapid movement, covering distance in repeated interventions, with violent changes of direction and abrupt stops (Herrera et al. 2020). Therefore, it is necessary to provide them with the general physical capacities that serve as a foundation for special physical capacities, in order to form a unit and achieve good sporting results. One of the fundamental capacities for volleyball players is special quickness, both in movement and in the execution of any of the technical elements included in the game, such as field defense, considered an important aspect for achieving good results.

As a result of the systematization of the contents addressed, authors such as Salfrán and Figueredo (2020); Cardero et al. (2019); Salfrán and Herrera (2020) were consulted. In

addition, a bibliographic review and observations of school volleyball training and competitions in the 13-15 year-old category, for boys at the Sports Initiation School (EIDE in Spanish) in the province of Santiago de Cuba were made, and limitations in special quickness in defending the field were identified, due to the incorrect use of the basic technique in its three moments (before, during and after).

Likewise, slow movement speed when defending the ball, indiscriminate use of the Japanese Test No. 1 in the development of special quickness and little use of the potential of the physical preparation process in volleyball, when independently developing the physical capacity of special quickness and the sports motor skill of defending the field (Luong and Cortegaza 2010b; García and García, 2023 ; Castañeda and García, 2020).

Under this premise, special preparation for field defense requires the use of methodological tools that help volleyball players achieve speed in their movements and in the execution of technical elements included in the game, such as field defense.

It is necessary to work on quickness as a general physical capacity in school volleyball, for the development of special quickness as a fundamental capacity, since it is present in the quickness of complex actions, in translation, in the quickness of a body segment and in most of the actions of the game; so that it responds to the changing situations in a match of this contemporary volleyball (Salfrán and Figueredo, 2014).

As Zapata et al. (2021) point out, it is essential to develop parameters that allow school volleyball players to prolong efforts that correspond to the requirements of their age in terms of intensity and duration in the best possible way, so it is necessary to provide them with the basic general physical capacities to support their special capacities. These efforts must favor them at the highest level when demanding the relative intensity from the body for a short period of time, since many physical and competitive activities require a certain degree of strength, accompanied by the quickness of execution of the movement.

Quickness is distinguished by a set of exogenous and endogenous factors that condition its development as a conditional capacity. The former refers to external agents, which, like the

other capacities, constitute fundamental aspects for its integration; the endogenous factors constitute aspects that are purely specific to the organism of the school volleyball player, such as the type of muscle fibers, ATP energy reserves, phosphocreatine, maximum strength levels, body mobility, reaction quickness, motor action and translation, among others.

The above allows for a study of male school volleyball players from Santiago de Cuba who presented deficiencies in special quickness in defending the field, in accordance with the current demands of volleyball, so its analysis from an integrative perspective of the development of special quickness capacity based on the ability to defend the field, is considered a necessity.

For this reason, the objective was to develop a methodology for developing special quickness during the preparation stage, in order to improve the performance of school volleyball players in defending the field.

MATERIALS AND METHODS

The research population and sample consisted of 10 boys' volleyball coaches from the school category, eight of whom belong to the EIDE (Educational Training Center) and two from different sports teams in the Santiago de Cuba municipality; all with good competitive results. In addition, 12 volleyball players from the 13-15 age group, with two to four years of sporting experience, who had worked in the pioneer category and the student league at the EIDE (Capitán Orestes Acosta) in the Santiago de Cuba province, were included.

These coaches were intentionally chosen as a sample because they worked with the category considered the gateway to high performance and the one that presented the greatest deficiency in the special quickness in field defense, which formed the basis for ensuring the quality of the latter, along with the coaches' interest in improving the quality of results to assimilate the demands of the subsequent level and elevate athletic performance.

The research methods and techniques were based on the materialist-dialectical method as a fundamental theoretical and methodological basis for reasoning about the objective reality of training special quickness in school volleyball players in field defense.

The systemic-structural-functional theoretical method was used to analyze the different components that formed the structure and functioning of the proposed methodology and to logically organize the procedures.

Document analysis was used in the study of the comprehensive athlete preparation program and the improvement plans for coaches, which allowed to gather information about the development of special quickness in field defense in the school category collected in other official documents in Cuba, such as the Comprehensive Athlete Preparation Program (1984-2011), and the later named Comprehensive Athlete Preparation Program (PPID 2012-2019) Olympic cycle 17-20.

In the analysis carried out, it was noted that in both documents, the work directed at special quickness as a sporting capacity and the ability to defend at the same time was not methodologically oriented. Therefore, the insufficient development of special quickness in this technical element was perceived, and the need for its improvement to obtain better sporting results.

The coaches' survey was conducted to obtain accurate information regarding the development of special quickness in field defense during physical preparation. A survey was administered to 30 experts in the field, including municipal coaches, high-performance coaches, and higher education volleyball instructors, to determine their knowledge on the topic using an eight-question questionnaire.

Observation revealed the difficulty levels in the special quickness of field defense demonstrated by school volleyball players in training and in preparatory and official sports competitions.

Expert judgment (pairwise comparison) to assess the feasibility of the proposed methodology, corroborate its functionality, the relevance of its implementation, and improve and enhance it. Quantitative and qualitative aspects were taken into account when selecting experts. The selection process was based on scientific and technical qualifications, more than 10 years of professional experience, training, knowledge and specialization,

professional ethics, impartiality, intuition, broad approach, and independent judgment (Daudinot , 2012). The panel consisted of 30 experts, with the following requirements:

1. Have 10 or more years of coaching experience, five or more of which have been directly involved in coaching in the student, school, youth, and high-performance league categories.
2. Being a volleyball teacher.
3. Be an ethical, cooperative, analytical, critical and reflective professional.
4. Have a high level of competence.

The SPSS version 19.0 statistical package was used to process the data. The arithmetic mean, the proportion expressed in %, frequency distribution tables, and the nonparametric statistical test were used to analyze whether the values were normally distributed. The Shapiro- Wilks test was also used in the critical assessments issued by the specialists.

RESULTS AND DISCUSSION

In order to fulfill the proposed objective and to be able to form the methodology, an exploration of the current state of development of special quickness in the defense of the field of male school volleyball players in the 13-15-year category was carried out, through the application of the methods and instruments provided, whose main results were:

Document analysis facilitated a description of the actual treatment given to special quickness and field defense in volleyball. To this end, the documents governing and projecting the work of the National Institute of Sports, Physical Education, and Recreation were consulted, focusing on those considered by the national and provincial volleyball commissions of Santiago de Cuba, such as the athlete preparation program (19842011), later known as the PPID (20122024), the governing document and guide for methodological work in this sport.

The PPID focused on volleyball player preparation at different levels, addressing the objectives of their training at the beginner and advanced stages, making it an important tool for coaches. In the opinion of the researchers, the PPID treated exercises for developing

special quickness and field defense separately and lacked specific methodological guidelines for developing the skills and abilities addressed.

The methodological guidelines were written based on technical fundamentals, but their content did not take into account those aimed at special quickness, only those geared toward endurance as a more general capacity for long distances on the track. In this regard, those related to field defense focused on teaching the backstroke roll with a double-shoulder exit.

The aforementioned aspect constituted a deficiency in the development of special quickness in field defense that influenced the sporting results of the school category, so, to perfect this technical element it was necessary to work simultaneously on the skill of defending with the special quickness capacity.

The application of 130 systematic direct observations to the male school volleyball players of the EIDE "Capitán Orestes Acosta" of the province of Santiago de Cuba, had the objective of observing the quickness of movements and displacements in the defense of the field in search of a ball, which covered the different stages of preparation, was carried out in the period between the years 2015-2019, of which 100 were to training sessions and the remaining 30 to official competitions and tops, focusing on attention to the guidelines given by the coaches and the actions executed by the school volleyball players in the defense of the field.

This aspect constituted a deficiency in the development of special quickness in field defense, which influenced the sporting results obtained in the school category, so for its improvement it was necessary to work simultaneously on the skill of defending with the special quickness capacity.

Table 1. *Results of the observations made*

Results	%
The most common management style used by coaches was direct command, which limited the active participation of volleyball players in the execution of actions.	80
During the competition, the volleyball players showed poor attentional concentration, struggled to respond to various stimuli from their surroundings, and showed little perseverance in the face of certain failures, which affected the results obtained during the execution of the motor action.	75
When defending the court, the most common movements were short ones, which led to clumsy and uncoordinated movements among the school volleyball players. The position generally adopted was high, and they only lowered their position when they had the ball on top of them, which meant that the second pass was not carried out effectively and the construction of the counterattack was not executed with quality.	90
Lack of variability in the exercises prevented the school volleyball players from successfully defending balls attacked to the sides, as well as in front of them to the left or right, and made it difficult to successfully defend the first court and counterattack.	90

A survey was conducted among 30 experts on the subject, including municipal coaches, high-performance coaches, and higher education volleyball instructors.

Table 2. *Results of the survey of coaches*

	Correct answer	**They respond with deficiencies**	**They don't respond**
1	13(43%)	11(37%)	6(20%)
2	24(80%)	6(20%)	0
3	9(30%)	15(50%)	6(20%)
4	12(40%)	11(35%)	7(25%)
5	12(40%)	11(35%)	7(25%)
6	15(50%)	9(30%)	6(20%)
7	9(30%)	15(50%)	6(20%)
8	100%	0	0

In summary, the application of the different research instruments revealed the existence of methodological points of articulation that pointed to the systemic coincidence of these and the information collected, manifested in:

- Deficiencies in the development of special quickness and field defense skills, as these were worked on independently by the coaches, and the potential for addressing both was not utilized during sports training.
- The use of Japanese Test No. 1 for the development of special quickness by most coaches did not contribute to the development of technical skills in field defense in today's volleyball.

The results obtained confirmed the existence of the declared scientific problem, and a methodology was developed to promote the development of special quickness in field defense.

Methodology for the development of special quickness in volleyball players, in the defense of the field

The methodology's general objective was to develop special quickness in defending the court among school volleyball players in the 13-15 age group, based on the use of theoretical and methodological resources by coaches, in order to contribute to the improvement of sporting results.

The proposed methodology was integrative, systemic, contextualized, flexible, and procedural; it was based on philosophical, sociological, psychological, and pedagogical foundations; and it consisted of two subsystems: the cognitive-theoretical apparatus and the instrumental apparatus, which established relationships of coordination and subordination between them. The theory was expressed in the instrumental apparatus, composed of four stages, with subordination relationships between its components.

The first stage was diagnostic, with objectives and actions to be developed (diagnosis and awareness) and procedures to be followed.

The second stage of planning and organization, with general and/or partial objectives of the macrocycle, determined by each period and stage and the training mesocycles.

The third stage is application and readjustment, with its objective and actions, through special quickness exercises such as:

1st exercise: run 9 m forward and then 9 m back.

2nd exercise: 10 contacts at 4.50 m.

3rd exercise: 7 zig-z ag contacts, in rear zones.

4th exercise: defense in zone 5.

5th exercise: defense in zone 1.

6th exercise: defense in zone 6.

The fourth stage was an evaluation, with objectives and actions to be developed for the comprehensive assessment of special quickness in field defense.

The methodology's exercises included several procedures, including psychological integration, collaborative training, movement transfer, and the systematization of special quickness to defend the field.

Psychological integration: the coach, based on the psychological characteristics of the school volleyball players, explained and demonstrated the technical element of field defense, and the players represented, internalized, and executed it; first in place, then with short, medium, and long movements forward, backward, and laterally, and then with drops from a mid-low stance, to courageously defend the court.

The collaborative training: in volleyball, being a sport of collaboration, the coach as a first procedure explained the role played by the defense of the field, the collaboration between the first and second lines of defense, the communication between the defending players, the position adopted to defend the ball, and in the relationship with the opponent the quality of the reception of the opposing team, the skills of the setter, and the potential of the attackers.

Movement transfer: to develop capacity and skill, the coach applied the first and second procedures, and worked on movements to stimulate the development of special integration, speed, and the ability to defend the field.

Systematizing special quickness to defend the court: during the training process, volleyball players were guided towards achieving an adequate level of development of the special quickness capacity and achieving field defense during training planning, which materialized in the competition.

The implementation of these procedures required the use of specific instrumental resources to assess each school volleyball player's ability to integrate skill with capacity and thus standardize the diverse results obtained throughout the training process. The following indicators were therefore determined:

- Suitable initial location.
- Quick location according to the area to be defended.
- Accuracy and promptness of movements before defending.
- Speed in the decision to defend .
- Choosing the right technical medium.
- Result of the defense action.

Finally, to develop special quickness in field defense among school volleyball players, the IGHD test was used to monitor and evaluate special quickness in field defense. The special field test for special quickness was introduced, in coordination with training methods, with the following exercises:

Table 3. *Field test for special speed*

IGHD special quickness ground test	Reorganization of the IGHD special quickness field test for school volleyball players (Salfrán 2021)
No.1: Run 9 meters forward and then 9 meters back. No. 2: Zone 5 defense. No. 3: Zone 1 defense. No. 4: Zone 6 defense. No.5: 7 zig-zag contact in the saguera area. No.6: 10 contacts at 4.50 m.	No.1 : Run 9 meters forward and then 9 meters back. No.2: 10 contacts in 4.50 m. No. 3: 7 zig-zag contacts in the Sagueras area. No. 4: Zone 5 defense No. 5: Zone 1 defense. No. 6: Zone 6 defense.

Once the special field test was applied, the following results were observed in the tests carried out at the initial and final stages.

Table 4. *Initial test of the special stage*

	9 m	10 contact	Zigzag	Defense Position 5	Defense Position 1	Defense Position 6
Minimum	4.21	13.17	3.86	3.75	3.94	3.78
Maximum	4.47	15.55	5.28	4.61	4.44	4.71
Average	4.31	14.08	4.47	4.24	4.28	4.42
Standard Deviation	,709	,913	,333	,219	,136	,268

Table 5. *Final test of the special stage*

	9 m	10 contact	Zigzag	Defense Position 5	Defense Position 1	Defense Position 6
Minimum	4.19	13.14	3.82	3.72	3.91	3.63
Maximum	4.44	15.52	5.24	4.57	4.41	4.68
Average	4.28	14.05	4.44	4.21	4.25	4.31
Standard Deviation	,0701	,9171	,3347	,2184	,1306	,3365

Initial and final test results

The school volleyball players performed satisfactorily from one test to the next. There was a significant difference between the initial and final tests. The hypothesis test was confirmed. The viability and feasibility of the methodology used was recognized, given that the probability value was greater than the significance level established for the test. This demonstrated the scientific value of the proposal and, therefore, the effectiveness of the special quickness exercises for defending the field.

In addition, they managed to improve their athletic results and qualify for the second stage of the school games to be held in July, finishing third in the school games in this category.

The comprehensive development of special quickness to defend the field, as a new quality, was proposed based on the notion of independent actions, but rather collaborative actions, tailored to the characteristics of modern volleyball and contextualized by the specific physical preparation of the volleyball player. It was collaborative because it involved all factors: the coach, the captain with his leadership, and the entire team that executed the game actions in a coordinated manner.

Furthermore, this comprehensive development of special quickness for defending the field was intentional because it aimed to perfect the skill of defending with movement to enhance athletic performance. The coach also took into account the psychological aspects of these ages, volitional actions such as perseverance, decision-making, willpower, and courage; cognitive processes, perception, representation, thought, memory, imagination, and attention; and formative aspects, typical of the educational process of an adolescent in full development influenced by the environment, in recognition of their organism and the movements executed when defending.

The comprehensive development of special quickness in defending the field allowed for the selection of training methods, procedures, and resources that fostered high school volleyball players' successful performance in the game. Among the characteristics of this process were:

- Being creative because it allowed us to discuss with the coaches the actions to be developed in relation to the special quickness to defend the field.
- Being affectionate because it stimulated in the players feelings of belonging to the team, identity, love, and respect for their teammates and coach.
- It has a systemic character because the features of the subsystems that comprise it were identified, while also constituting the alpha and omega: beginning because through this process the gradual and systematic formation and development of the capacity for special quickness and the ability to defend the field were guaranteed; end because it encompassed elements of all its components.

Once the methodology was developed and implemented, its relevance and the soundness of the theoretical and methodological concepts used in the design were validated, and the feasibility and effectiveness of its application in sports practice were evaluated through expert judgment.

The experts consulted agreed on the soundness and appropriateness of the proposed procedures, as they fostered special physical preparation for school volleyball players and contributed to improving the work of coaches, leading to better sporting results.

Ten percent considered the methodology to be quite adequate; 5 percent considered it adequate. Eighty-five percent appreciated the methodological proposal's high degree of feasibility, as well as its usefulness in achieving special quickness in field defense, and 95 percent considered it effective.

The proposed methodology aimed to overcome the limitations in solving the existing difficulty in special quickness, based on the defense of the field in sports training. Similarly, the integration of the special quickness capacity and the defense ability was proposed, by working both aspects in unison. To this end, appropriate methods and exercises were used. The contributions of other authors did not explicitly state the idea of the integrated development of the special quickness capacity with the defense skill, which created the favorable conditions for developing the methodological proposal presented.

CONCLUSIONS

Document analysis revealed the value of developing special quickness in field defense in an integrated manner, based on the shortcomings, which supported the isolated methodological arrangement of physical capacity and athletic skill development in training.

The current state of special quickness in field defense identified as main deficiencies the lack of precision of methodological guidelines aimed at performing specific exercises to develop special quickness as a sports ability and the ability to defend at the same time, during training.

The methodology for developing special quickness in school volleyball players' defense of the court provided new specific procedures, exercises, and indicators for achieving the integration of ability and capacity, addressed at the competitive levels to which they aspire.

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The author is responsible for writing the work and analyzing the documents.