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Review article

The figures: their preparation in school artistic swimming

Las figuras: su preparación en la natación artística escolar

As figuras: sua preparação na natação artística escolar

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ABSTRACT

One of the tasks to be immediately solved in school artistic swimming, is related to the technical preparation that constitutes a fundamental part in the training process of artistic swimmers. In this article, it is offered the results of a bibliographical review that was carried out with the objective of address the main considerations about the process of technical preparation in school artistic swimming, with particular emphasis on the training of figures; in addition, the most relevant theoretical contributions and inconsistencies that justify the improvement of the studied process were specified. To achieve this, analytical-synthetic and inductive-deductive scientific methods were applied from the theoretical level, and documentary analysis as an empirical method, in order to reference the results of research on this subject from an analytical and critical perspective, which allowed establishing opinion and debate criteria to achieve an understanding of the topic developed; as conclusions, it was pointed out that the epistemological limitations detected are summarized in methodological insufficiencies present in the content, methods, dosage and distribution of the loads due to omissions of procedures, this made it difficult to correctly orient the training of the figures towards the fulfillment of the intended objectives.

Keywords: Training, figures in artistic swimming, technical preparation.

RESUMEN

Una de las tareas a resolver de forma inmediata en la natación artística escolar, se relaciona con la preparación técnica que constituye una parte fundamental en el proceso de entrenamiento de las nadadoras artísticas. En el presente artículo, se realizó una revisión bibliográfica que tuvo como objetivo abordar las principales consideraciones sobre el proceso de preparación técnica en la natación artística escolar, con particular énfasis en el entrenamiento de las figuras; además, se precisaron los aportes y las inconsistencias teóricas más relevantes que justifican el perfeccionamiento del proceso estudiado. Para lograrlo, se aplicaron como métodos científicos del nivel teórico, el analítico-sintético e inductivo-deductivo y como método empírico el análisis documental, con el fin de referenciar los resultados de investigaciones sobre esta temática desde una perspectiva analítica y crítica, lo que permitió establecer criterios de opinión y debate para lograr una comprensión del tema desarrollado; como conclusiones, se señaló que las limitaciones epistemológicas detectadas se resumen en insuficiencias metodológicas presentes en el contenido, los métodos, la dosificación y la distribución de las cargas por omisiones de procedimientos, ello dificultó la orientación acertada del entrenamiento de las figuras hacia el cumplimiento de los objetivos previstos.

Palabras clave: Entrenamiento, figuras en la natación artística, preparación técnica.

SÍNTESE

Uma das tarefas a ser resolvida imediatamente na natação artística escolar está relacionada à preparação técnica que constitui uma parte fundamental do processo de formação dos nadadores artísticos. Neste artigo, foi realizada uma revisão bibliográfica com o objetivo de abordar as principais considerações sobre o processo de preparação técnica na natação artística escolar, com ênfase especial no treinamento das figuras; além disso, foram especificadas as contribuições teóricas mais relevantes e as inconsistências que justificam o aperfeiçoamento do processo estudado. Para tanto, foram aplicados métodos científicos analítico-sintéticos e indutivo-dedutivos a nível teórico, e a análise documental foi utilizada como método empírico, com o objetivo de referenciar os resultados da pesquisa sobre este tema a partir de uma perspectiva analítica e crítica, o que permitiu estabelecer critérios de opinião e debate a fim de alcançar uma compreensão do tema desenvolvido; Como conclusões, foi apontado que as limitações epistemológicas detectadas estão resumidas em insuficiências metodológicas presentes no conteúdo, métodos, dosagem e distribuição das cargas devido a omissões de procedimentos, o que dificultou a orientação correta do treinamento dos números para o cumprimento dos objetivos previstos.

Palavras-chave: Treinamento, figuras na natação artística, preparação técnica.

INTRODUCTION

Technical preparation is one of the aspects of the preparation of the athlete and its objective is to create skills that allow the athlete to effectively use their potential during competition actions. For coaches, mastery of technique is a necessary condition to achieve sporting success. According to Romero and Becali (2014), technical preparation includes "(...) the teaching of basic positions, movements and actions, as well as the restructuring of motor habits" (p.334).

In each sports specialty, the technique acquires certain particularities. The technique in artistic swimming, according to FINA (2017) is contained in three technical elements: the basic positions, figures and routines. The first element is not exposed in isolation in any competition, as it is considered postures adopted in the water, basic for the teaching and training of the figures.

The figures are the highest expression of the technical preparation of artistic swimming and although they are not a spectacle of the competitive activity, they are the technical base for the realization of the routines (FINA, 2017). The training of the figures in the school category, even when their level of complexity is lower than in the larger categories, presents complexities in their preparation; Well, for the first time, the athletes must execute in a high, controlled way and with uniform movements in each section, all the figures that are summoned for their competition.

Figures are a combination of basic body positions and transitions performed in a manner and order established by the FINA Rule Description Book (2017). If no other requirements are specified in the description, the figures must be performed high and controlled, with uniform movements and with each section clearly defined. These have quaint names of birds and fish, such as heron, flamingo, dolphin, and porpoise; unfortunately, these names do not offer the description of the movements involved in the figures, as it happens with the names of the submerged ones and for the competition there is a mandatory group and three optional groups in each category.

Due to the importance of teaching technique in artistic swimming, it has been addressed from various research , including those carried out by Kingsley (1895), Hannula (2012), Weineck (1988), McGowan and McNamee (2009) , Carrasco (2015), Mateu (2015), FINA (2017), FINA (2017-2021), Solana-Tramunt *et al.* (2019) and González-Badillo (2020); these authors have framed their studies in the sports initiation stage, specifically in the acquisition and development of basic skills and their technical characterization; as well as the effect of force on the performance of some figures.

In the case of the documents oriented by FINA to organize the artistic swimming competitions, a manual is included to evaluate the figures where reference is made to the drawings of each figure and their degree of difficulty and includes, in the evaluation, a greater accuracy in judgment, with a scoring scale based on 10 points.

Other national authors such as Rackham (1980), Cortés (2009), Martínez (2012), Cortés (2013), Simón *et al.* (2016) and Brito (2020) have delved into the basic positions as a starting point for the training of techniques in the school category. More comprehensive studies such

as those by Hernández, Brito, and Wanton (2021) and Fons and Ruiz (2021) propose historical background of the figure training process and a preparation system to develop explosive strength in the lower limbs. In all cases the contributions are significant, but they do not cover the contents for the training of the figures that reveal the difficulty and virtuosity in the competitions.

The Comprehensive Program for the Preparation of the Athlete, hereinafter (PIPD), is a guiding document aimed at perfecting the teaching work based on the comprehensive training of artistic swimming athletes; however, it is considered that it still lacks innovative exercises for the technical preparation of the figures; therefore, in the authors' opinion, the existing theories or theoretical references do not fully explain the problem under investigation.

Another aspect to note is that, in sporting events, the qualification of the competitors in the figure tests determines the result of the routines and the final sporting result of the competition because the accumulated scores of the figures of each competitor are taken. of the team in the different events of the routines (solo, duet and team).

In this sense, it is necessary to conduct research oriented towards the preparation of the figures in the school category because these, as an event to compete, are the basis for teaching the routines and are implicit in the choreographies of the routines. Consequently, the study to be carried out has the following objective: to address the main considerations about the process of technical preparation in school artistic swimming, with particular emphasis on the training of figures.

DEVELOPMENT

Characterization of the process of preparing figures in artistic swimming

Synchronized swimming, currently called artistic swimming, is a competitive art aquatic sport that combines different techniques and also involves harmony and synchronization of movements; it is an expressive component of the body that unites the technical and the artistic. In artistic swimming, technical preparation occupies a very broad place; therefore, it is assigned a longer time. In this sport, the determination of the result in the competition depends on the accuracy and expression of the movements.

Romero and Becali (2014) from the technical-methodological point of view group artistic swimming in coordination sports and competitive art, a sport modality that requires a precise dosage of efforts and an accuracy of movements.

In the technical preparation of artistic swimming Brito (2020) raises aspects of great importance:

- The skill of artistic swimmers, in which the movements are performed seeking aesthetic appeal, with a broad sense of balance and rhythm.

- The endurance, flexibility, muscular strength and agility together with the musical interpretation, dynamic expression and a great sense of synchronization that swimmers must possess in technical executions.

With this, power, strength and highly developed and honed technical skills are displayed to achieve outstanding results. This entails a great preparation of the person who teaches or trains it together with the optimal conditions, both physical and morphological, of the athletes.

FINA (2017) establishes that technical preparation in artistic swimming includes in all age groups:

- Basic positions and basic movements or transitions.
- Figures with a compulsory group and three optional ones that are drawn in the competition. 8 figures are taught in each category, to compete in four. These are changing in each Olympic cycle.
- Routines (technical, free, combined and *highlight)* in solo, duet and team modalities.

In this sense, Rackham (1980) states that the artistic swimmer requires knowledge and skills in the different branches of aquatic work, such as strokes, swimming techniques and ornamental diving; for this reason, artistic swimming requires more and more multidisciplinary work, since a greater difficulty is constantly required in the sporting spectacle.

The field of activities covered by this discipline is so vast that the athlete who starts in it can feel overwhelmed by its immensity. Swimmers must know and present skills in different branches, not just aquatic work; but also, actions of acrobatics, jumps, ballet, dance and musicality together with the techniques of artistic swimming.

Ochoa (2008) defines that artistic swimming is a sport that requires great body strength, great agility and flexibility, grace and beauty, coordination, musical sense and artistic expression to be a highly competitive athlete; it is contemporary art and requires not only good training and a good routine, but also the preparation of the trainer to assume the training process.

Consequently, in artistic swimming more attention is paid to technical preparation at an early age. Proof of this are the research carried out by: Cancio (2005), Cortés (2009), Martínez (2012), Cortés (2013), Simón, *et al.* (2016) and Brito (2020) who emphasize the teaching of basic positions and basic movements or transitions, where beginners must assimilate:

- First, the adoption of the different basic positions out of the water (imitation), as well as the movements, angles and location of the hands (flapping), which allow them to stay in place or move in the water;
- Secondly, the adoption of basic positions in the water, that is, only with the work with the body (without flapping);

- And thirdly, the correct way to hold the body in the water in the different basic positions with and without teaching aids (with knobs).

These considerations are assumed for the basic teaching of artistic swimming, such as elements or basic skills to adopt different postures in the water; but, on the other hand, they do not constitute a form of competition. Therefore, the authors of this investigation is of the opinion that the object of the technical preparation of this sport is the figures and routines; as the figures are the highest expression and the technical base to carry out the routines.

On the other hand, for Cortés (2014) the coaches must include the technical-choreographic aspects within the preparations in the sports initiation; which, seen from other sports, corresponds to the technical-tactical preparation. Regarding this, it is in the interest of the author of this article to highlight, first of all:

- That the first years of sports activity should be like a kind of movement school, where general and technical preparation prevail over tactics, hence Ranzola and Barrios (1998) identified that when a good teaching process is carried out, without hurry, giving each one what they deserve, correcting all mistakes in due time; the technical preparation process runs more easily.

- Secondly, that the tactical preparation occupies an intermediate place, this requires physical conditions and technical elements to fight an end, but this is impossible when the sport is starting and they lack a technical level.

Another aspect to take into account is what is indicated in the (PIPD), where for Simón *et al.* (2016):

> "The athlete's preparation program is the fundamental guiding document for planning, which includes the objectives, contents and sequences, the forms of control and evaluation during the preparation stage (teaching programs and training plans). It contains the methodological indications for a more effective work of the trainers both in the special exercises and in the preparation of a routine, it also contains the normative entrance tests for each age and the evaluative scales of the same and for the pedagogical tests. (p.4)

Despite what was established in the previous quote, even in the PIPD in the school category that includes 11-12 years, there are few methodological indications for technical preparation. In the study of this program, it was possible to determine that the document lacks how to carry it out and, in the content, exercises for technical preparation are not specified; the organizational procedures and methods to be used for this category do not appear either. Hence, the need to guide research that resolves this problem.

In all cases the contributions are significant, but according to the authors´ criteria, technical preparation in school artistic swimming must have a predominant and relatively independent role, and at the same time, be subject to evaluation of sports performance; In this way, the development of the technique will depend on the correct teaching-learning process and improvement of the figures.

Figure training in school artistic swimming

Sports training has been transformed into a pedagogically complex process with very varied aspects and a specific form of organization that makes it a systematic and global action, didactically organized. Romero and Becali (2014) in this sense, refer:

> Sports training is a complex and specialized bioadaptive and psychopedagogical process that requires an integrating scientific direction of each one of the components of the teaching-learning process to obtain superior sports results, all aimed at improving physical potential, techniques, tactics, theoretical, psychological, educational and formation of ethical and aesthetic values in athletes with the purpose of reaching an optimal and adequate sports form, at the desired moment and for competitive demands. (p.152)

Seen in this way, it is nothing more than a pedagogical process that prepares the athlete to achieve sporting results. In sports training, indicators are established in its structure, where the technicians appear and depending on the sport, it is possible to ponder their role due to their importance. Sánchez (2005) considers training as:

> The fundamental form of technical preparation, as long as it requires a systematic practice, which is controlled regularly to verify the technical achievements achieved. Of course, the training is varied, depending on the particularities of the different types of sports. (p.114)

Sánchez (2005) and Román (2006) agree that mastering the technique carries within itself the unity of teaching and training and constitutes unique processes; Teaching is aimed at the assimilation of the correct procedures for the execution of physical exercises or motor actions and uses methods and a methodology built on general bases oriented, according to Ozolin (1983) towards:

- The creation of representations about the studied technique.
- The practical mastery of appropriate actions and movements.
- The assessment of what has been done.
- The determination of errors and their elimination.

In the training there are elements of teaching that ensure the highest achievements in the search for improvement; in this sense, Verkhoshansky (2001) establishes criteria for perfection of sports technique such as:

- It corresponds to the individual characteristics of the athlete.
- It guarantees an efficient and at the same time economical use of the athlete's energy potential.
- It reproduces in a stable way in extreme conditions, it is not altered before a maximum speed of execution and a high power of the efforts.

- It remains in a state of exhaustion and high psychic stress during the competition.
- It is flexible enough in changing situations.

In the training of technical elements for beginners, the teaching of classic, special and auxiliary exercises constitute the fundamental task. Where training loads are applied to these contents and methods, means and organizational procedures are used. A key aspect in the training process is the various didactic principles. The principles, refer to all aspects and tasks of the training, determine the content and the means and methods, as well as the organization of the training; therefore, they constitute a mandatory orientation for the coach's activity because they refer to the conscious and complex application of the training and educational process and it is reflected in successful practice.

Consequently, with these ideas, the principles formulated by the theory and methodology of sports training are assumed in the research and although there is no international consensus in this regard, the principles of sports training proposed by the authors Harre (1983) are reflected below, Matveev (1985), Ozolin (1983), Grosser *et al.* (1988), Hahn (1988), Forteza and Ranzola (1988), Collazo and Betancourt (2006) who agree in criteria and opinions:

- Principles of load.
- Principle of cyclical periodization.
- Principle of specialization.
- Principle of individualization.
- Principle of affordability.
- Principle of stability.
- Principle of the conscious.
- Principle of multidisciplinarity.

In artistic swimming, the training of the figures is the technical basis of the competitive activity and guarantees not only the assembly of a routine, in a much faster way, but also allows greater virtuosity in the sporting spectacle. In the school category, the training of the figures must be based on the design and control of each one of them.

For the correct design, individual particularities must be taken into account for an effective realization of the movement; as well as the distribution of muscular forces, in correspondence with the parts and phases of the exercises. Both aspects of hydrodynamics that constitute a foundation to know the proper angle that the arm must have to create resistance in each flapping or propeller movement to move the body in the realization of the figure.

Therefore, the design of the figures is the adjudication given to each part, attributed to the degree of conformity with the specific positions and movements in the description of the figure, where specific factors of accuracy intervene, given in:

a) Accuracy of lines, angles, arcs and circles. Examples:

1. A ballet leg is perpendicular to the surface.
2. A fish tail has the foot of the leg extended at the surface.
3. In a dolphin the body must describe a circle.

b) Accuracy of alignment of body parts. Examples:

1. In vertical alignment of ears, shoulder and hip joints and ankle bone.
2. In split vertical alignment of the head, shoulder and hip joints; horizontal alignment of shoulder and hip joints with the two horizontal lines square and parallel to each other.

c) Accuracy of tents and shrinks. Examples:

1. 90^{o} angle in front tent.
2. Back tent at an angle of 45^{o} or less, with legs and trunk extended.
3. Shrunk as compact as possible.

d) Accuracy in transition movements. Examples:

1. To assume a front tent position, the hips replace the head at the surface.
2. In an arched position with a stretched back and walk outs the head replaces the hips on the surface.
3. In a combo spin the up and down spins must be the same.

Regarding control, hydrotastic and apnea work are important for greater buoyancy, height and movement stability; these components encompass the unity between the general theoretical and methodological elements that must be considered today.

Figure control is the ability to maintain stable correct positions, or move the body smoothly, accurately, and without apparent effort through required transitions or to remain in place unless otherwise specified in the description or given a general feeling of playability. Therefore, the specific control factors are given in:

a. Extension of the whole body along the figure, unless otherwise specified.
b. Maximum sustained height of body parts in relation to the surface of the water. Uniform movement, constant speed of action through each transitional movement.

c. Transitions must be executed without pauses and stops.

Now, to determine how the training of the figures is progressing, feedback from this process is needed. In this sense, control is necessary, through measurement and evaluation and through different technical tests or control tests. Its application offers information on its quality and the needs for adjustments, modifications or other processes that the entire system or some of its elements must undergo.

On the other hand, Carrasco (2015) in his thesis performs a technical characterization of synchronized swimming, where he addresses the technical and artistic components as the most prevalent factors, with emphasis on the structural analysis of the techniques; however, the study and use of methods and procedures in the training of figures is insufficient.

Authors such as Cancio and Cento (2003) and Sanz (2011) consider that in the technical execution of figures, flexibility exercises are required in all joints, although they recommend focusing stretching on the coxofemoral joints and on the dorsal column in this sport. It is recognized that the work of flexibility is essential for the amplitude of the movements in the figures, instead its work must be done before the technical training.

Brito (2020) reflects on the main teaching-learning styles in the sports initiation of synchronized swimming or artistic swimming and makes a compilation of research and works by coaches with great experience in the sport that serve as a methodological tool, but the contributions based on the training of the figures are still insufficient.

However, Li *et al.* (2020), Podrihalo *et al.* (2021) and Ponciano *et al.* (2021) highlight the difficulty of technical actions in the arrangement and design of a set of movements; also, a success prediction methodology and personality traits are included for personalized instruction in artistic swimming, but all these contributions are introduced in the execution of the routines.

Simon *et al.* (2016) means teaching the figures with the help of the teacher, pairs, the overflow and auxiliary means without help in the deep part of the pool and counting the parts executed with a uniform rhythm. It also specifies the methods to be used for teaching, consolidation and improvement; however, there is still a lack of how to do it, exercises for the training of each figure are not specified in the content, nor are methodological variants provided that take into account the individual particularities of the athletes, nor are the most common errors reflected in each figure, the dosage and distribution of the load do not appear, nor the organizational procedures to be used in the training of the figures.

The need to streamline the figure training process in school category artistic swimmers is evident, and make changes where the objectives, contents, dosage and load distribution, methods and control in figure training are required. Finally, apply in this last category what is indicated by FINA (2017) which are the numerical values based on the difficulty of each figure and the percentage value based on ten points, which is currently not applied in Cuba.

CONCLUSIONS

The analysis of the process of preparing the figures revealed insufficient theoretical and methodological references to support said process; there was no evidence of an integrating logic in the dynamics of the training of the figures and between the objective, content and method categories, nor was a sufficient response provided to the individual needs of the artistic swimmers in their preparation.

The analysis of the training of the figures in artistic swimmers showed that the epistemological limitations detected are summarized in the scarce contents, methods, dosage and distribution of the loads declared in the methodologies, this revealed omissions of procedures that made it difficult to correctly guide the training of the figures. figures towards the fulfillment of the planned objectives.

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