

Leg exercises for choreographic preparation in artistic swimming for sports initiation

Abstract

The sports preparation of the Artistic Swimming at present is aimed at perfecting the specificities of performance in this sport. In this context, a task to be solved immediately is related to the difficulty of the coaches to face the choreographic preparation, which constitutes a fundamental part of the training process. For this reason, the objective of this research was to select exercises that, due to their characteristics, allow coaches to choreographically prepare their athletes, taking into account their feasibility to conceive execution routines in the sports initiation stage. Different methods were used such as document review, analysis and synthesis, interviews and techniques such as the methodological workshop. The investigative process allowed to establish as part of the choreographic preparation, a proposal of leg exercises to be carried out in the Dance Barre, which could improve the execution in this segment of the body during the performance of the routines. The proposal was valued as very suitable for its purposes by specialists, so it means a useful tool to minimize a problem for coaches, in order to achieve successful presentations of their athletes in the competition.

Keywords: *choreographic preparation, artistic swimming, sports initiation*

Introduction

Sports practice at an early age is of great importance for the physical, cognitive and affective development of children, especially in competitive art sports such as Artistic Swimming (Fons and Ruiz, 2021; Romero, et. al., 2022). This modality is also known as Synchronized Swimming or Synchronized Swimming and is distinguished by its technical requirements that make it a unique sport, since it is a discipline that combines Swimming, Gymnastics and Dance (Podrihalo, et. al., 2021; Hernández, Brito and Wanton, 2021). To this we can add that, according to the Federation Internationale de Gymnastique (FIG), in its Development and High Competition Program for age groups in Acrobatic Gymnastics (2021), the rapid increase in the degree of difficulty of acrobatic performances, It has been the result of increasing the volume and intensity of training at ever younger ages.

The protagonists, swimmers, perform in the modalities of solos, duos, teams or combined. The latter are also called combos, which perform a series of elaborate movements in the water, to the rhythm of the music. Although currently the discipline of mixed duos has been added, due to the demand of men interested in competing (ISF, 2021).

Sports training is a pedagogical, complex and specialized process that requires an integrating scientific direction of each of the components of the teaching-learning process to obtain sports results (Burt, Naughton, Higham & Landeo, 2020; Romero, et. al., 2022). This is an aspect that must be treated with great precision due to the complexity of the executions, hence the importance of carrying out a good choreographic preparation (ChP) of the athletes.

In this sport, as part of the ChP, the work of the legs is essential in carrying out adequate presentation routines. The athletes must demonstrate continuous movements, developing

their performance with elements of a high degree of technical difficulty. The practice of this discipline contains various peculiarities closely related to the character and typology of other disciplines such as Dance (Afre, Ganda and Noda, 2016). The power and potency in sport is manifested in the work of routines and choreography. They are designed with a harmonious character, where different arm and leg movements and combinations of these are performed with a high degree of complexity (Carro, 2000; Navarro, 2006).

One of the aspects that brings the most beauty to this sport is undoubtedly the majesty of the work with the legs carried out by the athletes when they stand out from the water surface. During the execution of the routines, the athletes must reflect that there is no effort in their demonstration, where different angles are formed between the legs and between them and the trunk (Cortés, 2013 and 2014). As in other sports, technical preparation is of great importance and requires work in accordance with the requirements from the base to the High Performance pyramid (Solana, et. al., 2019).

The practice begins from an early age between 5 and 6 years of age, although the base of the pyramid falls on the categories 7 - 8 years and 9 - 10 years, where work is done by Teaching Programs. All this means that when planning the preparation process, coaches take into account what is indicated in the Comprehensive Athlete Preparation Program (ISMPP) for these categories (Simón, et. al., 2016).

An aspect to consider in the sports initiation of this sport is the leg work during the execution of the routines carried out by the athletes, which usually last three to four minutes. The athletes hold their breath for long periods of time, up to 30 seconds, however, in the content proposed in the current Comprehensive Athlete Preparation Program (ISMPP) of Artistic Swimming, no reference is made to leg exercises that allow the trainers, the development of the PC in the classes. Therefore, in the opinion of the authors, it still lacks exercises for choreographic preparation. It has been possible to verify through the Methodological Preparations of this sport in the province of Villa Clara and the visits to training sessions of the Artistic Swimming coaches for sports initiation, that many of the exercises applied do not allow to specify adequate routines to solve the deficiencies of the athletes regarding the quality and beauty of footwork.

The choreographers and trainers, in their desire to solve their problems, transfer the content of the ISMPP of Rhythmic Gymnastics or another related sport to their training. In this sense, they take exercises that they consider basic for the CP, which they apply to the athletes three times a week, although to a certain extent decontextualized with respect to the characteristics of the competitive activity. From the above, it can be deduced that this preparation is carried out empirically, since these exercises are extrapolated without taking into account their contextualization to the inherent needs of this sport. To this it can be added that the trainers set up the routines using exercises based on their criteria and personal appreciations, without a solid foundation or simply taking exercises from other related modalities.

The investigations in this sense are scarce in comparison with other sports, despite the fact that the National Commission of this sport in Cuba guides working the Ch P three times a week. Although for some years there have been studies on Artistic Swimming such as those developed by Hernández, Brito, and Wanton (2021) that propose historical background of the training process of the figures, as well as that of Fons and Ruiz (2021) that It provides a preparation system to develop explosive strength in the lower limbs, these do not include the contents for the ChP in training, which include the difficulty and

virtuosity demanded by the competition. Taking into account the above, the objective of this work was to select exercises that, due to their characteristics, allow coaches to choreographically prepare their athletes, taking into account their feasibility to conceive execution routines in the sports initiation stage.

Materials and methods

The research is descriptive and for its development we worked with three populations. The first made up of four Artistic Swimming coaches at the School of Sports Initiation School (SIS) of Villa Clara, directly linked to the training of this sport in said center. This group had the characteristics that one had a degree in Physical Culture and the rest graduated from intermediate level, with an average of three years of work in sports.

A second population made up of five Provincial Methodologists of this sport, in the central region of Cuba (provinces of Villa Clara, Cienfuegos, Sancti Spíritus, Ciego de Ávila and Camagüey) who accompanied their delegations, during a Preparatory Competition held at the SIS from Villa Clara in March 2018. All of them graduated in Physical Culture, ages between 28 and 40 years old and three with a Master's degree in Sports Training. With these two populations we worked to diagnose the deficiencies and needs of the trainers regarding the ChP. We also worked with a third population made up of the 16 coaches who participated with their athletes in the Artistic Swimming competition of the High Performance National School Games in its 2019 edition. All provinces were represented and all of them were characteristic. They had more than 5 years of experience as trainers or judges. They were used in the research to establish exercises for the ChP of Artistic Swimming athletes and the characteristics that they should have.

We also worked with an intentional sample of 8 specialists with special characteristics, which were used to determine the relevance of the exercise proposal. The specialist criterion was considered, considering as such people who met the following characteristics:

- ✓ Have at least 8 years of experience as an Artistic Swimming coach.
- ✓ Hold the scientific category of Specialist, Master or Doctor in Physical Culture Sciences.
- ✓ Possess experience and category of Judge.
- ✓ Having worked in Artistic Swimming for sports initiation or linked to it in some way for at least 5 years.
- ✓ To have worked in the sport initiation of this modality.

Different methods and techniques were used such as: analysis and synthesis and inductive-deductive, document analysis, interview and specialist criteria. Methodological workshops and brainstorming were used as research techniques. The research went through three phases, the first had the objective of diagnosing the needs of the Artistic Swimming coaches to develop the ChP in the sports initiation of this sport and to establish the characteristics that leg exercises should have to develop adequate routines in this type of preparation in sports initiation stage.

The second phase had the objective of selecting leg exercises for Artistic Swimming and with this, adequately conceiving the ChP of the routines. Within the framework of the High Performance National School Games 2019, two sessions of methodological workshops were held with the aforementioned trainers. In the first, a specialized

conference was given by the main researcher regarding the needs of the CP and the deficiencies that occur in the legwork during the routines, which allowed opening spaces for discussion on the subject. In the second joint workshop with the coaches, there was a broad debate on the characteristics that the leg exercises should have in order to develop adequate routines in the ChP of Artistic Swimming in sports initiation.

In the third phase, the objective was focused on validating, through specialist criteria, the leg exercises to adequately conceive the ChP. The aspects for the assessments regarding the proposed exercises were: their practical utility, their relevance for the ChP, the objectivity of their structuring and the importance that their implementation could have. It was carried out in a methodological meeting with the specialists to assess the exercises proposed in the previous phase. To obtain these specialized criteria, it was carried out in a group manner with all those involved. In said procedure, the objective of the exercises, their description and their importance were reviewed.

Results and discussion

As a result of the first phase of the investigation, it was obtained that the main needs of the Artistic Swimming coaches for sports initiation are focused on aspects such as: perfecting artistic expression within routines, improving beauty, aesthetics and body expression of the athlete. leg work in the routines and the development of adequate choreography using different classical, folkloric and traditional dances. In addition, the need to clarify the positions of the legs was evidenced (Figure 1), which could later influence the execution of the routines.







POSITIONS LEGS	Position 0 Position gymnastic	Position 1	Position 2	Position 3	Position 4	Position 5
	Heels together, toes Heels together, out and the feet form one	Heels together, feet towards out the feet form a straight line	Heels separated by length approximately from the foot of the gymnast and the weight of the body distributed equally in both feet	One foot in front of the other with the talon of the foot of go ahead and check it out the inner part of the foot of back	The back foot is now parallel to the other foot and a little more back	One foot in front of the other the heel of the foot of forward aligned with the fingers of the back foot and touching them, and vice versa
Side view (sagittal plane)						

Figure 1. Leg positions for routines in Artistic Swimming. Source: Taken from FIG, 2021.

This phase also made it possible to determine the characteristics that the leg exercises must have to develop adequate routines in the ChP, which can be summarized as: look for a wide range of legs, correct position of the body (straightened, head erect, shoulders back, view to the front), maintained balance and combination of flexion, extension and pointing of the feet, as well as the modeling of individual forms of movements corresponding to the possibilities of the athletes. As a result of the second phase of the investigation, an initial proposal of 10 leg exercises was obtained to develop adequate routines in the ChP of Artistic Swimming for sports initiation. Subsequently, in table work developed by the researchers, and after a reasoned analysis of each proposed exercise, the initial proposal was reduced to a total of 6 leg exercises, which are shown below.

Exercise 1.

Name: Releve.

Objective: Work on the Dance Barre to contribute to the preparation of the foot and knee muscles for the performance of other subsequent exercises, in addition to strengthening the foot and ankles, as well as developing the arch of the foot for the performance of other subsequent exercises.

Exercise Description: Relevé means to rise up on the balls of your feet. In the exercise the athlete must remain in the standing position on the toes, pressing the ground equally with the big, second and third toes when facing the bar. Distribute the weight of the body on both legs, rotate the legs outwards keeping the knees extended, contract the buttocks and trunk muscles, as well as keep the trunk vertical and the hands resting in a relaxed way on the bar. Later, after touching one knee with another, you should gently lower your heels.

Graphic representation:



Figure # 1: I relieved. Source: Taken from FIG, 2021.

Importance: The importance of Relevé in Artistic Swimming is given because the technical figures are mostly performed with the legs on the surface, say Ballet, vertical positions, knight, squad, turns, etc.; which implies that aesthetically the lines of the legs must be well defined. Therefore, with the Relevé suit on land, the muscles of the legs and the plantar arch are strengthened, promoting a better technical mastery to later be transferred to training in the water.

Exercise 2.

Name: Demi-Plié and Grand-Plié.

Objective: In Dance Barre, work the small and large muscles of the legs, as well as the Achilles Tendon. Develop flexibility of the knee, coxofemoral joint and ankles.

Exercise Description: Plié means squatting. The athlete will have her knees fully extended, her pelvis in a neutral position, her abdomen in, her shoulders down, her head up and her eyes forward, with a general body sensation of permanent lengthening. For the execution of the Demi-Plié, the athlete will perform a small flexion of the knees (in 5th position with legs in front and in the rest of the positions outwards) with pressure on the heels against the ground. The Gran-Plié starts from the initial position with the knees fully extended, the pelvis in a neutral position, abdomen in, shoulders down, head up and eyes forward, with a general body sensation of permanent lengthening, a total flexion is executed where the Athlete gradually and gently lifts the heels off the ground, keeping the heels on the ground as much as possible and then when returning to the starting position the heels make first contact with the ground and the legs return to the starting position (except in the 2nd leg position in which the heels are never lifted off the ground).

Graphic representation:

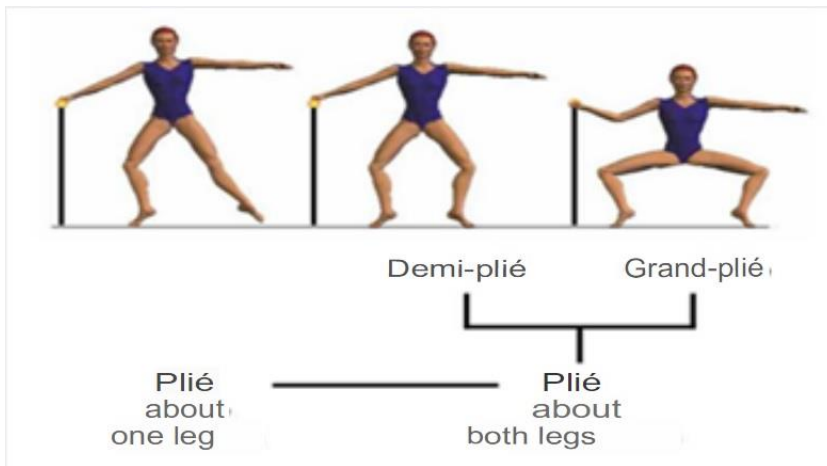


Figure # 2: Plié and Grand plié. Source: Taken from FIG, 2021.

Importance: The importance of this exercise in Artistic Swimming is given because it contributes to the correct execution of the athletes in the technique of Split Position and counter catalina rotation.

Exercise 3.

Name: Battement tendu.

Objective: At the Dance Barre, work the small and large muscles of the legs and strengthen the instep.

Description of the exercise: Tendu means extended, therefore, during the exercise the athlete moves her leg forward, to the side and back with her toes pointed and without lifting them off the ground until stretching. When practicing the Battement tendu starting in first, third and fifth position, the leg moves smoothly in a rolling motion and then returns to the starting position. At first the athlete should slide the leg over the entire foot, but gradually the intricacies should be increased. When executing the simple Battement tendu they include transferring the weight of the body onto the working leg, bending the knee and lifting it off the ground without a sliding movement and moving the end of the working leg to the side, while executing the movement forward and backward. Lines should be drawn on the ground to help the athlete understand the movement

Graphic representation:

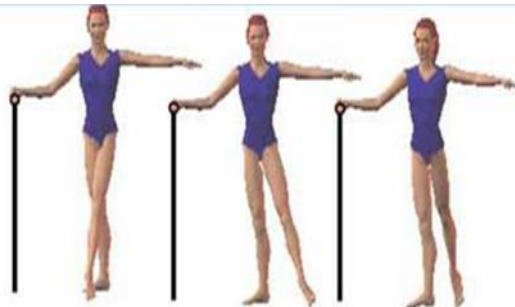


Figure # 3: Battement tendu. Source: Taken from FIG, 2021.

Importance: The importance of this exercise in Artistic Swimming is given because it contributes to the correct execution of the athletes in the technique of: Flamenco, Knight, Crane and Fish Tail.

Exercise # 4.

Name: Batement Tendu Jete, throwing the leg.

Objective: In the Dance Barre, promote a change in the muscular work regime from smooth to abrupt movements.

Description of the exercise: Tendu Jete means throwing the leg, so the movement starts from an extension of the leg sliding the sole of the foot along the ground until it reaches the starting position (Tendu). The athlete raises the toes with a balance of 25 to 45 degrees in an energetic way and returns to the starting position. You can lift your leg forward, backward, or to the side in easy glide motions. The toes of the working leg extended in the air should be opposite the heel of the supporting leg.

The athlete must return her working leg to the starting position without delay using the extended leg to vigorously touch the ground and without relaxing the instep at this point. It consists of rocking forwards and backwards at an angle of 90 degrees or more for first position, execute this movement through Battement Tendu touching the ground with pointed toes. He then lifts his leg (toes extended and knees drawn to their full height) and uses the Battement Tendu again, as he brings the leg back to the starting position by gradually lowering it with muscles tense and toes pointed. tip by sliding the toes after touching the ground.

Graphic representation:



Figure # 4: Battement tendu Jete. Source: Taken from FIG, 2021.

Importance: The importance of this exercise in Artistic Swimming is given because it pays tribute to the correct execution of the athletes in the technical execution of: Turns in a vertical position and Crane.

Exercise # 5.

Name: Grand battement Jete balance.

Objective: In Dance Barre develop the flexibility of the hip and knees.

Description of the exercise: the movement begins with the Battement Tendú technique and raises the working leg forcefully and then returns to its starting position. It is recommended that the athlete begin by learning the lateral jete battement from the position facing the barre and then backwards from this.

Graphic representation:



Figure # 5: Grand battement Jete balance. Source: Taken from FIG, 2021.

Importance: The importance of this exercise in Artistic Swimming is given because it contributes to the correct execution of the athletes in the technical execution of: Knight Position, Ballet, legs together and extended.

Exercise # 6.

Name: Rond de jambe par terre and en l'air.

Objective: In Barre Dance develop hip flexibility.

Exercise description:

A. Round of jambe par terre.

It consists of moving the extended leg level in an arc while the toes touch the ground. The exercise begins and ends with the same sliding movement as in simple Battement Tendu. The leg can move outwards (en dehors) or inwards en (dedans) smoothly and evenly. The thigh of the working leg is externally rotated and the weight of the body falls on the supporting leg. The athlete must concentrate on maintaining the position of external rotation of the free leg, especially on the heel. When practicing this exercise en dehors the coach should control the position of the athlete's working leg at the finishing point from behind, before returning the leg to the starting position. The termination point in front must be under control when practicing this dedans exercise.

Graphic representation:

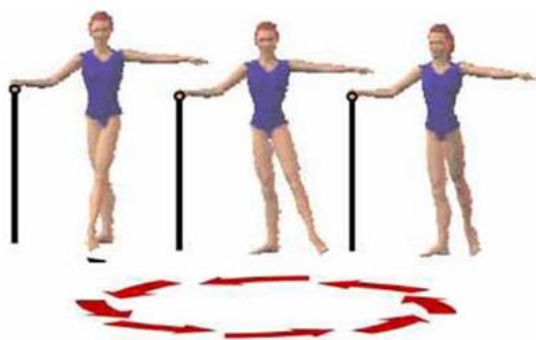


Figure # 6: Rond de jambe par terre. Source: Taken from FIG, 2021.

B. Rond de jambe par en l'air.

They are circular movements of the leg in the air. The oval shape is formed by the hamstring of the working leg that the athlete has raised to 45 degrees or less. The athlete can execute Rond de jambe en l'air in two directions outward or inward. In both directions the pointed toes of the working leg touch the calf of the supporting leg as the thigh rotates outward.

Graphic representation



Figure # 6a: Rond de jambe par en l'air. Source: Taken from FIG, 2021.

Importance: The importance of this exercise in Artistic Swimming is given because it pays tribute to the correct execution of the athletes in the technique for counter catalina rotation.

As a result of the third phase, the criteria of the evaluations made by the specialists were obtained (Table 1). They valued on the basis of the established level of significance (1- Very high, 2- High, 3- Average, 4- Low) which, based on their experience, gave each aspect the following aspects that appear in Table 1.

Table # 1. Evaluation of the specialists on the exercises for the CP in Artistic Swimming of sports initiation.

Criteria issued by the 11 specialists according to the assessed aspects				
A. Utility	Criteria issued			
	(1)	(2)	(3)	(4)
	8	-	-	-
%	100	-	-	-
B. Relevance for Choreographic Preparation	Criteria issued			
	(1)	(2)	(3)	(4)
	8	-	-	-
%	100	-	-	-
C. Objectivity of its structuring	Criteria issued			
	(1)	(2)	(3)	(4)
	7	1	-	-
%	87.5	12.5	-	-
D. Importance	Criteria issued			
	(1)	(2)	(3)	(4)
	8	-	-	-
%	100	-	-	-

Symbology: Significance levels (1) Very high, (2) High, (3) Average, (4) Low.

As can be seen in the table above, the significance criteria issued by the specialists regarding the proposed exercises were 75% rated Very High and 25% rated High.

Artistic Swimming has had multiple transformations in the competition mode in recent years, therefore, it increasingly demands a preparation that meets the technical requirements of this sport (Podrihalo, et., al., 2021), all which is evidenced in the research process that made it possible to demonstrate in its first phase, like other investigations (Hernández, Brito and Wanton, 2021) that coaches have a great historical need to address these issues, due to the difficulties that are encountered. present to them when developing the routines related to the PC.

One aspect that affects this sense is that the sport's PIPD does not establish leg exercises to be used in said preparation. In this sense, he agrees with other authors such as Laucerica and Muñoz (2011), who suggest the need to form solid postural and choreographic habits that guarantee the basis for subsequent technical requirements in this sport. The choreographic preparation for Artistic Swimming includes the entire system of influence exercises, aimed at educating the motor culture of the athletes, as well as the expressive arsenal (Laucerica and Muñoz, 2011). These reasons support that, in the second phase of the research process, it was possible to select and redesign leg exercises that have as a fundamental characteristic: they must be worked on the Dance Barre and based on their characteristics, the athletes will be able to transfer the acquired skills to the development of routines in the aquatic environment.

All this taking into consideration that the control of movements is characterized by great complexity, variety and delicacy (Fons and Ruiz, 2021). As a significant element of these exercises, the similarity in movement patterns, necessary energy systems and muscle groups present in the performance of the routines can be mentioned, hence their great utility (Calero, 2019; Fons and Ruiz, 2021). Although there are other investigations such as those developed by Simón et al. (2016) and Chirino, Zamora and Fernández (2022), they do not explicitly address exercises for the CP, but instead address other elements of sports preparation. The proposed exercises have as a fundamental basis for their selection the study carried out in the specialized literature on the subject, in the same way the manifestations given in practice in competitive activity.

Conclusions

The evaluative analysis carried out on the ChP in Artistic Swimming for sports initiation demonstrated the need to have leg exercises that guarantee the work of the routines based on the characteristics of the modality and the competitive demands.

The novelty of these exercises is that by including the Dance Barre, which will allow the athletes to better assimilate the learning of leg work that is carried out in the ChP routines. Although the proposed exercises are based on the need to perfect the ChP routines in Artistic Swimming for sports initiation and specialists give an adequate assessment of them, their effectiveness in practical implementation should be assessed.

Limitations of this study.

The limitation of this work is that it only remains a proposal; the authors will continue working on the assessment through its implementation in practice.

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References

Afre Socorro, M. A., Ganda Breijo, A., & Noda Rabelo, Y. (2016). Didactic material on technique and methodology of elementary exercises on uneven bars in artistic gymnastics. *efdeportes.com*, 20. 1-3. <https://www.efdeportes.com/efd213/ejercicios-en-barras-asimetricas-en-gimnasia-artistica.htm>

- Burt, L., A. Naughton, G., G. Higham, D., & Landeo, R. (2020). Training Load in Pre-Puberal Female Artistic Gymnastics. publish. <https://g-se.com/carga-de-entrenamiento-en-la-gimnasia-artistica-femenina-pre-puberal-2820-sa-o5fd140610ca8e>
- Calero., S. (2019). Fundamentals of optimized sports training. Department of Human and Social Sciences. Postgraduate Course of the Master in Sports Training. XIII Promotion (pp. 2-76). Quito: University of the Armed Forces ESPE. <https://www.researchgate.net/publication>
- Carro, R. (2000). Methodology for the improvement of the Assembly of the routines in Sports Aerobic Gymnastics. (Master's Thesis). Eastern University.
- Chirino, Y., Zamora, M., Fernández, JM (2022). System of exercises to develop flexibility in artistic swimming in children's and school categories. Olimpia Magazine, University of Granma. <http://portal.amelica.org/ameli/journal/429/4292987023/html/>
- Cortes, E. (2013). The teaching of the technique in the initiation of the synchronized swimming. Current trends in sports training. efdeportes.com, 184, 1-1. <https://www.efdeportes.com/efd184/la-iniciacion-del-nado-sincronizado.htm>
- Cortes, E. (2014). Methodological improvement strategy for the technical-choreographic direction in the initiation stage of synchronized swimming. (Unpublished PhD Thesis). UCCFD, Faculty of Physical Culture, Camagüey.
- Fédération Internationale de Gymnastique (FIG) (2021). Development and High Competition Program for age groups in Acrobatic Gymnastics. Lausanne, Switzerland. Available at: <https://www.gymnastics.sport/site/pages/education/agegroup-acro-manual-s.pdf>
- FINA Artistic Swimming Manual for Judges, Coaches and Referees (2017-2021). FINE. https://resources.fina.org/fina/document/2021/02/03/4d9cd6d0-5146-44ae-bf94-4ac757eaf34b/fina_as_manual_-_updated_august_2018_0.pdf

- Fons, K. and Ruiz, J. (2021). Preparation system to develop explosive strength in lower limbs of artistic swimming athletes. *Science and Sport*, 6(3), 32 - 45. <https://revistas.reduc.edu.cu/index.php/cienciaydeporte/article/view/3869>
- Hernández, L., Brito, E., and Wanton, E. (2021). Main historical trends in the training process of figures in artistic swimming (Review). *Olympia*, 18(1), 160-170. <https://revistas.udg.co.cu/index.php/olimpia/article/view/2206>
- Romero-Lorca, A.; de la Calle, L.; Steer, A.; Fernandez-Santander, A.; Blanco, M.A.; Rodelgo, T.; Andreu-Vázquez, C., and Gaibar, M. (2022). Artistic swimming in girls: anthropometry, genotype and sports performance. *International Journal of Medicine and Sciences of Physical Activity and Sport*. 22(85), 215-229. DOI: <https://doi.org/10.15366/rimcafd2022.85.014>
- Laucerica Rodríguez, Y., and Muñoz Aguilar, I. (2011). Preparation of choreography and acrobatics for the initiation of appreciation water sports. *EF.Deportes.com, Digital Magazine*, 153. 1-1. <https://efdeportes.com/efd153/coreografia-para-los-deportes-acuaticos-de-apreciacion.htm>
- Navarro E, D. (2006). *Methodology for teaching aerobic sports gymnastics choreography*. Havana, Editorial Sport.
- Podrihalo, O., Podrigalo, L., Jagietto, W., Iermakov, S., & Yermakova, T. (2021). Substantiation of Methods for Predicting Success in Artistic Swimming. *International Journal of Environmental Research and Public*, 18, 8739. 1-8. <https://www.mdpi.com/1660-4601/18/16/8739/htm>
- Simón, A., Batista, A., Bacallao, I., Brito, E., Prado, Y. and Hernández, L. (2016). *Comprehensive Program for the Preparation of the Synchronized Swimming Athlete*. Havana. INDER.
- Solana-Tramunt, M., Arboix-Alio, J. and Aguilera-Castells, J. (2019). Is Heart Rate Variability a Suitable method for Monitoring the Effect of a Training Session in Synchronized Swimming. *Med. Sci. Sports Exerc.*, 51, 28. https://journals.lww.com/acsmmsse/Fulltext/2019/06001/Is_Heart_Rate_Variability_a_Suitable_method_For.84.aspx

