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## *Methodological recommendation to mitigate the effect of the environment pressure on rhythmic gymnastics*

*Recomendaciones metodológicas para mitigar los efectos de las presiones ambientales en la  
gimnasia rítmica*

*Recomendações metodológicas para mitigar os efeitos das pressões ambientais na ginástica  
rítmica*

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## ABSTRACT

Gymnasts can receive injuries due to overload, segment fatigue and due to immaturity of the musculoskeletal system; all of them can constitute pressures that, at a certain point in sports practice, slow down the athlete's sustained performance. However, in the exploratory study it was determined that some rhythmic gymnastics athletes, representative of the Santiago de Cuba province, show other environmental pressures that have greater emphasis on the psychological. The objective of this work was to propose a group of methodological recommendations to mitigate the effect of environmental pressures on rhythmic gymnastics athletes. Among the empirical methods used are observation, survey and interview. Methodological recommendations were proposed, aimed at influencing sports performance, they are: pressure from the judges' body, compliance with elements of difficulty in the exercises and participation in events, in correspondence with the other gymnasts. The proposal is incorporated into a series of studies that address the monitoring of athlete preparation in general and, in particular, rhythmic gymnastics.

**Keywords:** injuries, rhythmic gymnastics, environmental pressures.

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## RESUMO

Ginastas podem sofrer lesões por sobrecarga, fadiga segmentar e imaturidade do sistema musculoesquelético; Todas elas podem constituir pressões que, em determinado momento da prática desportiva, retardam o desempenho sustentado do atleta. Porém, num estudo exploratório foi determinado que alguns atletas de ginástica rítmica, representativos da província de Santiago de Cuba, apresentam outras pressões ambientais que têm maior ênfase no psicológico. O objetivo deste trabalho foi propor um conjunto de recomendações metodológicas para evitar o efeito das pressões ambientais sobre atletas de ginástica rítmica. Entre os métodos empíricos utilizados estão a observação, o levantamento e a entrevista. Foram propostas recomendações metodológicas que visam influenciar o desempenho esportivo, são elas: pressão corporal dos juízes, cumprimento de elementos de dificuldade nos exercícios e participação em eventos, em correspondência com as demais ginastas. A



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proposta está incorporada a uma série de estudos que abordam o acompanhamento da preparação de atletas em geral e, em particular, da ginástica rítmica.

**Palavras-chave:** lesões, ginástica rítmica, pressões ambientais.

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## INTRODUCTION

Gymnastics is a physical activity that, if done efficiently, helps achieve successful results in practice; however, not everything is glory in the career of a gymnast, especially in the artistic one, where injuries, disorders and limitations can occur before reaching the age of majority and not being able to join a regular team at the national or international level.

According to research such as that of Diaz *et al.* (2004), gymnasts can be injured due to overload, segment fatigue and immaturity of the musculoskeletal system. All of these effects can constitute pressures that at a certain point in sports practice slow down the athlete's sustained performance.

It is assumed that gymnastics is a manifestation that depends on the bone strength of the body and, therefore, microtrauma and osteochondrosis are very common diseases, as well as hyperextensions of the trunk, lumbago and spondylolysis; in an athlete, these disorders can be caused by poor management, therefore it is the responsibility of the coach and the sports doctor in charge of the team to adopt a preventive strategy to mitigate or reduce these effects.

It is considered an absolute truth that all parts of the body are important in a gymnast, since the body acts as a system in each movement; however, some research has revealed that certain parts of the gymnast's body are more exposed. Among the most common pressures that can affect those who practice artistic gymnastics is the position of the soles of the feet when firming them on the mats.

In accordance with studies developed by Pérez *et al.* (2010), the pressures experienced by athletes when performing these positions are very common when they do not have the appropriate subjective or objective conditions; for example, when there is not enough



concentration to execute a technique, or when it is not possible to incorporate the feet in the correct position after a highly complex exercise. In all these biomechanics of the artistic gymnastics' athlete, the quality, the types of mattresses, the position of the metatarsus and the kinematics and interaction between athlete and mattress are also involved.

Rhythmic gymnastics is a sport dependent on the volitional aspect of the athlete and on attributes such as music, a factor that can contribute positively or counterproductively to its practice; the question then arises, how to encourage the good use of music when the results are not suitable? Potgieter (2012) set out to analyze the music factor and its impact, and then synthesize its incidence as a whole; the melody, harmony, rhythm, tempo and dynamics constituted parts of this analysis and it was revealed that the integration of these makes an athlete improve her spirit and recover energy, which is why it is indisputable that the coach of this sport must know how to use proactive melodies that encourage desire for action and success.

In different research, the existence of pressures such as the availability of air conditioning for the celebration of sporting events in this modality is addressed, considered a very precise sport where the lack of optimal conditions, especially the provision of an environment of high or low temperatures could decide the performance of an athlete, mainly if they are not trained for these climate variations (Acosta, 2016 and Alonso, 2016).

It is about these external pressures that Acosta (2016) refers to in his work, together with others, such as the presence of spectators, the influence of teammates, the time of the scoreboard, the presence of judges, the commitment or responsibility of comply with the elements of difficulty in the exercises and the participation of athletes in sporting events, in correspondence with the other gymnasts.

Prestige, merit, is particularly what offers security and confidence to gymnasts, which is why it is necessary to carry out methodological work to reduce the pressures that have an external component in their genesis; in this way, they are prevented from becoming internal pressures, since these factors of external origin, also named by other authors as environmental pressures (Iglesias, *et al.*, 2010 and Roffé, 2004) are not always part of the range of concerns in the preparation of an athlete.



Another pressure widely identified with this type of sport is that caused by poor weight and diet management. The slightest acrobatics that an athlete in this discipline must display depends directly on the control one has over the weight. When it comes to weight loss, it is also talked about pathologies related to diet, poor eating behaviors and compensatory behaviors in this type of disorder (Giel, et al., 2016 and Kontele, et al., 2022).

Basically, in this sport the demands of an athletic figure coincide, especially in women, and the diet that must guarantee that aesthetic posture. It is a challenge to maintain the standards of the sport, and at the same time, obtain a necessary amount of vitamins and proteins to keep the body healthy (Dallas, et al., 2016).

Without abandoning the issue of the female gender in rhythmic gymnastics, Kokubo (2016) investigated the relationship between the elite athlete's diet and body efficiency, demonstrated in training and competition sessions. It is not difficult to understand that the Japanese culinary culture, closely linked to natural resources, provides the necessary foods for the gymnast to reach high levels of flexibility, resistance, strength and skill in the handling of gymnastic implements. However, even with all the security that these conditions can provide, Japanese athletes are not exempt from failing, due to some inconvenience, especially in the emotional order.

In the Cuban reality, it is estimated that due to the strong economic and financial embargo imposed for more than 60 years and the strong global economic crisis, accentuated after the effects of the COVID 19 pandemic, the Island suffers from deficiencies, especially in technological availability in sports and rhythmic gymnastics is not excluded from this reality.

However, Cuban innovators and scientists create alternatives to care for athletes and radiate confidence, support and treatment to the most pressing environmental pressures. That is why the objective of this work is to propose a group of methodological recommendations to avoid the effect of environmental pressures on rhythmic gymnastics athletes.



## **MATERIALS AND METHODS**

The selected population was the youth rhythmic gymnastics team of Santiago de Cuba, made up of five athletes between the ages of 13 and 15 and belonging to the "Capitán Orestes Acosta Herrera" School of School Sports Initiation (EIDE in Spanish), based in training in the Alejandro Urgellés Multipurpose Room. Four rhythmic gymnastics coaches were also included, two from the school category and two from the youth category, all belonging to high performance.

Due to the similarity of the problematic situation of the object, the diagnostic model is transferred, but contextualized to the sport of rhythmic gymnastics, so depending on the characteristics of this sport, other pressures are added such as the Judges' body pressure (PCJ), defined as the pressure of having a group of respectable and experienced judges who will be attentive to the execution of the exercises; Diet monitoring (DM), in the case of these gymnasts, not only the athletic figure determines, but also issues linked to physical abilities and health; the pressure derived from compliance with the elements of difficulty in the exercise and finally, the participation of the athletes in events in correspondence with the other gymnasts (PCG) is added to the diagnosis, this indicator allows the level of security that the athletes have in the development of the activity, since it is a reason for guarantee to know that the athlete has already participated in other events and that gives her recognition. All these aspects have been brought together from the exploratory study based on surveys of athletes and interviews with experts in rhythmic gymnastics.

To guarantee the success of the diagnosis, observation, survey and interview were used as empirical methods. The survey was applied to athletes and the interview to coaches to obtain the degree of knowledge they have about environmental pressures, with emphasis on the sport of rhythmic gymnastics and it is important to highlight that athletes must argue the answers in the indicators (Pressures). To assess the implication of environmental pressures in the context of rhythmic gymnastics, the following factors were considered (Table 1).



*Table 1. - Indicators to obtain information through the survey and interview*

<b>Code</b>	<b>Environment pressure</b>
PP	Public pressure (spectator)
P.M	Marker pressure
PC	Peer pressure
AP	Judge body pressure
CED	Compliance with elements of difficulty in the exercises.
PCG	Participation in events in correspondence with other gymnasts

*Procedure in the application of empirical methods*

To carry out the scientific observation, an assessment was made of the environmental elements that bring together the training sessions, the characteristics of the facility, the environmental pressures that can influence the good performance of the gymnastics athlete and that are distinguished in the radius of action where they are developed.

Diagnosis of the preferably perceptible environmental pressures that can be observed during training.

The survey, it allowed the assessment of the level of knowledge, skills and attitudes that athletes have about environmental pressures, the relationship this has with the athletes' performance in training and in competitions. Using this method, the motivations and interests of the athletes were characterized, as well as the criteria they have regarding the preventive treatment they receive to mitigate the effects of environmental pressures that regularly affect training and educational training.

The interview, with the analysis of its results, it was valued the state of opinion, the knowledge and attitudes that the coaches and managers of the sports facility have about the environmental pressures that gymnastics athletes must have and above all, it was possible to know the conception they have about the influence of the subject on competitive results.



## RESULTS AND DISCUSSION

As a result of scientific observation, the environmental elements that make up the sports facility where the athletes' training takes place are not in optimal conditions, since this sport really requires adequate air conditioning and hydration service. However, the pertinent measures are taken to plan the necessary breaks and do not overload them with warm-up exercises, especially in summer time when the sun's rays affect tropical areas like Cuba with greater intensity. Furthermore, since there is no specialized technology to establish sprues that allow systematic hydration, as an alternative, the athletes bring bottles of water and these keep them hydrated throughout the session.

Regarding the environmental pressures observed, it can be stated that in three of the ten competitions visited, the athletes deducted points as the score advanced in favor of the rival team; this denoted that they were not able to overcome the technical and emotional factors and as the pressures progressed, they made more mistakes (Table 2).

Table 2. - Survey results. Athletes' options by levels of pressure severity

Environmental Pressures	High level	Medium level	Low level
PP	3	2	1
P.M	4	1	-
PC	2	3	1
AP	5	-	-
CED	5	-	-
PCG	5	-	-

As a relevant aspect, it was observed that the majority of athletes considered that the environmental pressures that most affected them were PCJ, CED and participation in events, in correspondence with the other gymnasts; this showed that the athletes place a high value on the prestige gained in tournaments, championships or presentations and feel a high respect for the judges who, in many cases, have contributed to their formation.



With this result, it was possible to corroborate the preventive work, in order to reduce the impact of these pressures on training and competitions, which has been minimal, so this constituted a starting point to propose methodological actions that make a difference.

In the interviews carried out with gymnastics coaches and managers, it was confirmed that 100% of them agree that environmental pressures are important aspects to take into account in this sport; however, they recognize that not enough work has been done to train athletes to control situations such as frustration, nervousness and disappointment.

Using this method, it was possible to verify that the interviewees are aware that poor management of environmental pressures can lead to a medal and in accordance with this, 100 % of the subjects involved in the diagnosis agreed that urgent decisions must be made so that the gymnasts are prepared to contain or overcome the effect of the environmental pressures detected.

*Methodological recommendations to reduce the effects of environmental pressures in rhythmic gymnastics*

The following intervention proposal is aimed at rhythmic gymnastics coaches, in order to ensure that athletes better control environmental pressures. The focus of these recommendations is based on the methodology of Popular Environmental Education (EPA), since its thematic axes relate to education, the subject and the social ethical dimension of the man-environment relationship (Cotos, 2009).

To assume any solution proposal, it is necessary to accept that environmental pressures can hardly be eliminated, postponed or ignored, since they are objective phenomena that appear and develop outside the will or decision of people. Success lies in overcoming them and most likely in knowing how to live with them, while ensuring that the athletes concentrate on other objectives that do depend on individual decisions. Based on the pressures that most affect the psychological tranquility of gymnast athletes, it is proposed:



1. What to do when it is known that athletes are stressed or feel pressured by the presence of the judging body in the competition?

Normally, what has been created around the image of a sports judge has become a myth, a belief that gives the judge values of inflexibility. If this is confirmed, some of the judges are invited to the training sessions and, if possible, to informal meetings that encourage the exchange of ideas in environments other than those of the competitions. In these spaces, recommendations are provided on how a high-performance gymnast performs in competition.

With this action, two problems are solved: the first, breaking the myth that the judge is not part of the training process and the second, providing the athlete with an environment of instruction, empathy and professional development.

2. What can be done to prevent athletes from becoming stressed by completing the elements with difficulty?

According to the EPA methodology, teaching should not be authoritarian, imposed or part of a recipe. True teaching is the one that flows naturally, the one that is suggested, the one that is conducted with samples of knowledge, evidence, so that in the end it is the student who decides which is the correct path, the most convenient for human development. . Knowledge is built between everyone, so it is recommended that the coach gather the group and hold a debate based on these questions:

- a) What is most important to you as a gymnast?
- b) What depends and does not depend on you, to overcome the exercises proposed in your sport?
- c) How do you evaluate individual responsibility and will to achieve the expiration of difficult elements during training?

In the exercise of debate, athletes exchange on the basis of respect for the criteria presented, even if they do not coincide. An advanced student can be prepared to provide specialized information on the topics to be discussed and potentials are exploited.



3. How to encourage gymnasts to perform exercises in competition, based on the characteristics of an athlete who is starting out in the sport?

It is considered that conversation and persuasion are the main resources that the coach has to solve problems with athletes, especially in the psychological order. It is important that the athlete knows at all times that he has elements for and against, at the beginning and as an established athlete.

However, more than a reason for tension, it should be a reason for learning and growth, since the word guides, but the example inspires. Therefore, there is nothing more honorable than sharing stages with athletes who have successfully remained in competition and this should be more than personal pride, a team pride. It is important to work with subjective elements, in balance with self-improvement and setting higher goals every day.

To carry out this work, we started from necessary references such as continuity of studies related to environmental pressures in sports, among them are those of Iglesias *et al.* (2010) who provide the concept that in combat sports, it is not enough to compete with mastery in skills, attack and defense techniques, but also to be prepared for the unforeseen, for sudden changes in the environment and its influence on the combat.

Snyder (1990) incorporates categories related to emotion that include nervousness, fear of pain and injury, frustration, and disappointment; It also recognizes the emotional social experiences that generate happiness after the effect of successful achievement. This author gives marked consideration to the technique of obtaining photos, since the impact that this medium creates is very significant, by recording the moment of victory or execution of some movement or repercussion technique for future technical-tactical strategies.

On the other hand, Acosta (2016) argues that some of the common pressures in many sports are the spectators and the scoreboard, and Saltos *et al.* (2023) provides not only an algorithm to apply the diagnosis, but also offers a dynamic to develop a proposal that reduces the harmful impacts of these environmental pressures.



Along these lines, Golenkova *et al.* (2023) have developed a system of actions from recreation to follow up on the irregularities observed in the diagnosis that revealed psychological disorders in athletes and Cabrejas. *et al.* (2023) establish an eight-week program to strengthen gymnasts' abilities, especially explosive strength, to reduce the chances of failing in exercises, as a result of the influence of some environmental pressure.

## CONCLUSIONS

In this research, information was provided on the state of the art regarding the environmental pressures linked to the sport of rhythmic gymnastics and a diagnosis was applied to determine the main environmental pressures that affect these athletes. Methodological recommendations were designed, aimed at achieving better sports performance (AP, CED and PCG). The proposal is incorporated into a series of studies that address the monitoring of the athlete's preparation in general and, particularly, the rhythmic gymnastics study of the EIDE "Capitán Orestes Acosta Herrera".

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The authors declare not to have any interest conflicts.

***Authors' contribution:***

The authors have participated in the writing of the work and analysis of the documents



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