

# PODIUM

Journal of Science and Technology in Physical Culture

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**Volume 19**  
**Issue 1**

**2024**

University of Pinar del Río "Hermanos Saíz Montes de Oca"





*Translated from the original in spanish*




*Original article*

## *Status of former athletes in situations of physical-motor disability: the need for sports detraining*

*Estado de los exdeportistas en situaciones de discapacidad físico-motora: la necesidad del  
desentrenamiento deportivo*

*Situação de ex-atletas com deficiências físico-motoras: a necessidade de destreino  
esportivo*

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*Received:* 10/04/2023.

*Approved:* 12/14/2023.

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## **ABSTRACT**

Sports detraining is an essential process to guarantee a smooth transition for former athletes from a prolonged period of sports life to a post-sports life. In this sense, the objective of the research was to determine the current state of the detraining process of former athletes in situations of physical-motor disability, in the province of El Oro. For the study, through simple random sampling, eight former athletes in situations of physical-motor disability were selected. Former athletes have an average experience in the sports field of 8.38 ( $\pm$  4.92) years. There was also interaction with coaches, Physical Education teachers, doctors, psychologists, family members and managers. Surveys were administered to all participants in the study, and anthropometric, medical, laboratory and functional tests were administered only to former athletes. Among the results obtained, it was possible to identify that there are limitations to face detraining as a training, pedagogical and social process, that retired athletes do not have sufficient information about this process and have a lack of significant projects, which is why it is revealed the need to design a detraining process, tailored to their specific needs.

**Keywords:** sports detraining, physical-motor disability, former athletes

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## **RESUMEN**

El desentrenamiento deportivo es un proceso esencial, para garantizar una transición fluida a los exdeportistas, de un periodo prolongado de vida deportiva a una vida posdeportiva. En este sentido, la investigación tuvo como objetivo determinar el estado actual que presenta el proceso de desentrenamiento de exdeportistas en situaciones de discapacidad físico-motora, en la provincia El Oro. Para el estudio, se seleccionaron, a través de un muestreo aleatorio simple, a ocho exdeportistas en situaciones de discapacidad físico-motora. Los exdeportistas tienen una experiencia promedio en el ámbito deportivo de 8.38 ( $\pm$  4.92) años. También se interactuó con entrenadores, profesores de Educación Física,



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médicos, psicológicos, familiares y directivos. Se aplicaron encuestas a todos los participantes en el estudio, y solo a los exdeportistas pruebas antropométricas, médicas, de laboratorios y funcionales. Entre los resultados obtenidos, se pudo identificar que existen limitaciones para afrontar el desentrenamiento como un proceso formativo, pedagógico y social, que los deportistas retirados no cuentan con información suficiente sobre este proceso y tienen carencia de proyectos significativos, por lo que se revela la necesidad de diseñar un proceso de desentrenamiento, ajustado a sus necesidades específicas.

**Palabras clave:** desentrenamiento deportivo, discapacidad físico-motora, exdeportistas.

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### RESUMO

O destreinamento esportivo é um processo essencial para garantir uma transição tranquila para ex-atletas de um período prolongado de vida esportiva para uma vida pós-esportiva. Nesse sentido, a pesquisa teve como objetivo determinar o estado atual do processo de destreinamento de ex-atletas em situações de deficiência físico-motora na província de El Oro. Para o estudo, foram selecionados oito ex-atletas com deficiências físico-motoras por meio de amostragem aleatória simples. Os ex-atletas têm uma média de 8,38 ( $\pm 4,92$ ) anos de experiência em esportes. Também interagimos com treinadores, professores de educação física, médicos, psicólogos, familiares e gerentes. Foram aplicados questionários a todos os participantes do estudo, e testes antropométricos, médicos, laboratoriais e funcionais foram aplicados somente aos ex-atletas. Entre os resultados obtidos, foi possível identificar que há limitações em lidar com o destreinamento como processo formativo, pedagógico e social, que os atletas aposentados não têm informações suficientes sobre esse processo e que carecem de projetos significativos, revelando, assim, a necessidade de se desenhar um processo de destreinamento ajustado às suas necessidades específicas.

**Palavras-chave:** destreinamento esportivo, deficiência físico-motora, ex-atletas.

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## INTRODUCTION

Currently, sports detraining has several interpretation approaches; there are those who associate it with a spontaneous and purely biological process, referring to the loss of sports training adaptations (Nakisaa and Ghasemzadeh, 2021 and Silva, *et al.*, 2022). Unlike this vision, in this study it is conceived as an essential process, to guarantee a smooth transition of former athletes from a prolonged period of a sporting life to a post-sporting life.

According to León-Reyes *et al.* (2021), it is a:

Process of reorienting very specialized adaptations and learning to more general and diversified ones, with greater usefulness in the usual tasks of human beings; and the transformation of a culture of performance into another formative culture of extension and intensification of the quality of life. (pp. 50-51)

Sport is regularly associated with good health and this is true to a large extent, because as long as the organism's adaptation thresholds are not exceeded or trauma of mechanical and external origin is not caused, the athlete manifests a healthy state even when the physical and psychological burdens are high; but when sports retirement occurs, the situation is different.

In this situation, the specific adaptations developed lead to alterations in the normal functioning of the body of the now former athlete, leading to chronic diseases with potential probabilities of psychological destabilization and death (León-Reyes *et al.*, 2022). In the case of short periods of having stopped sports training, difficulties with neuromuscular control have been identified (Córdova-Martínez *et al.*, 2022).

From the analysis of this background, it can be seen that there is an effort to improve this essential process that guarantees one of the universal rights of humanity: quality health. However, at the same time, it reveals a fundamental limitation, since most of them, in order not to be dogmatic, ignore the particularities of those athletes who have a disability. This reveals a contradiction between the realization of sport as a right to practice by any human being, for which the system of Paralympic events exists, and the subsequent care that the same practitioner must receive when he or she stops being an active athlete.



Despite the importance of developing sports training for former athletes with physical-motor disabilities, several problems have been identified with this process; among them are the low participation of former athletes with physical-motor disabilities in medical and psychological controls, the existence of limited sports training proposals and a restricted range of activities and purposes in sports training services, appropriate to their characteristics and individualities. In general, in these proposals, very little attention is paid to psychophysical stress profiles, sports injuries and recovery processes.

On the other hand, there is an excessive dominance of one dimension or component of sports detraining over the others, this suggests a limited interdisciplinary integration in sports detraining services and the predominance of a reactive rather than proactive approach in the detraining process, focused on the control of maladaptations rather than readaptation or the formation of healthy habits in the practice of physical activity.

In this sense, the research aims to determine the current state of the detraining process of former athletes in situations of physical-motor disability. To this end, it is recognized the need to use "(...) Indicators (...), the formation of longitudinal studies and chronological series to specify the behaviors that will serve as a reference system (...) visualization of the initial state and the investigation of the potential of ex-athletes and the assessment [of] lifestyles" (León-Reyes *et al.*, 2021, p.54).

## **MATERIALS AND METHODS**

The population of physically-motor disabled former practitioners of sports activities identified is 11. The inclusion criteria were having intensely and systematically practiced a sports specialty for a period greater than or equal to five years. The exclusion criterion was place of residence.

Of the 11 disabled former athletes identified, eight were selected through simple random sampling, which represented 72.7%, five males and three females. In the formation of the experimental group, the members were also selected randomly and were made up of three



former athletes, two male and one female, and the rest of the control group made up of three males and two females.

Former athletes with physical-motor disabilities are from the following sports: archery, in the open class; athletics, class T47; powerlifting, sport class; sporting pistol, SH1 class; sitting volleyball, class MD; swimming, class S10; table tennis, class SC9 and paratriathlon, class PT4. Eligible disability is classified as limb disability with an amputation. Former athletes have an average experience in the sports field of 8.38 ( $\pm 4.92$ ) years.

There was also interaction with 23 coaches and 19 Physical Education teachers, seven doctors, three psychologists, 17 family members and 13 managers. Coaches and Physical Education teachers had an average work experience of 12.62 ( $\pm 5.21$ ) and 14.42 ( $\pm 6.15$ ) years, respectively, and doctors 26 ( $\pm 8.66$ ) years. Of the family members, some with more than 5 years of experience, although not the majority, with an average of 2.29 ( $\pm 4.37$ ) years and the managers 29.93 ( $\pm 7.33$ ) years.

In data collection, the survey technique was applied. A survey was aimed at identifying the criteria and opinions of former athletes and personnel linked to this sphere of physical culture, namely coaches, Physical Education teachers, doctors, family members and managers of sports organizations. The questions asked about detraining services in terms of offers, integration of services, importance of this process, quality of services, among others. The questions have semi-open responses with a Likert scale with five ranges and were applied only once to each subject.

A second survey was applied, only to former athletes, with the intention of identifying possible patterns in the practice of physical activities. In this case it was a directed open question that expresses temporal values, in days of a week, hours and minutes corresponding to a day of activity. Physical activities were considered during the transfer to different social activities and those specific to the practice. It was applied for a minimum of 9 weeks and a maximum of 16, for the generality of the subjects. The application was carried out every week, with the purpose of providing information about the previous week in which the survey was carried out.



Measurements were made during anthropometric, medical, laboratory, and functional testing that determined performance levels and adaptive modifications. These were applied five times to each former athlete for a period of one year.

Weight (in kg) was measured using a seca 770 digital scale (Hamburg, Germany), with an accuracy of 0.1 kg, and height (H, in cm) was measured using a seca 208 wall stadiometer (Hamburg, Germany), with a precision of 1 mm. The triceps, anterior thigh and medial leg folds were obtained with a Holtain skinfold caliper (Holtain, Crymych, United Kingdom), with a precision of 0.2 mm.

The percentage of GM was calculated with the Slaughter equation, skeletal muscle mass (SMM) was estimated from the Poortmans equation, based on corrected muscle perimeters of the arm, mid-thigh and leg. All anthropometric measurements were taken by the same anthropometrist, with a technical measurement error of less than 2% for fat folds and less than 1% for the rest of the measurements, according to international criteria standardized by the International Society for Advancement in Kinanthropometry. Body composition variables were evaluated using anthropometry that allowed fat mass (FM) and skeletal muscle mass (SMM) to be estimated.

The data collected by the different instruments and tests applied were processed with the support of the analysis of empirical tables of frequencies, arithmetic mean, standard deviation and the coefficient of variation, these allowed establishing predominant levels of opinion or behavior of events, according to the ranges of assessment; establish the central value by which the remaining values gravitate to have an approximate idea of the average level of those recorded, in determining the dispersion and establishing the similarity of these with the average values and in the comparison of data dispersion levels recorded in the surveys, interviews and the observation protocol.

In addition, non-parametric correlations were determined between the different items using Kendall's Tau<sub>b</sub> and the statistical contrast between the data sets of the different participants and tests performed was also established. For this, the non-parametric contrast statistics Mann-Whitney Test and Kruskal-Wallis Test were used, both with a level equal to 0.1.





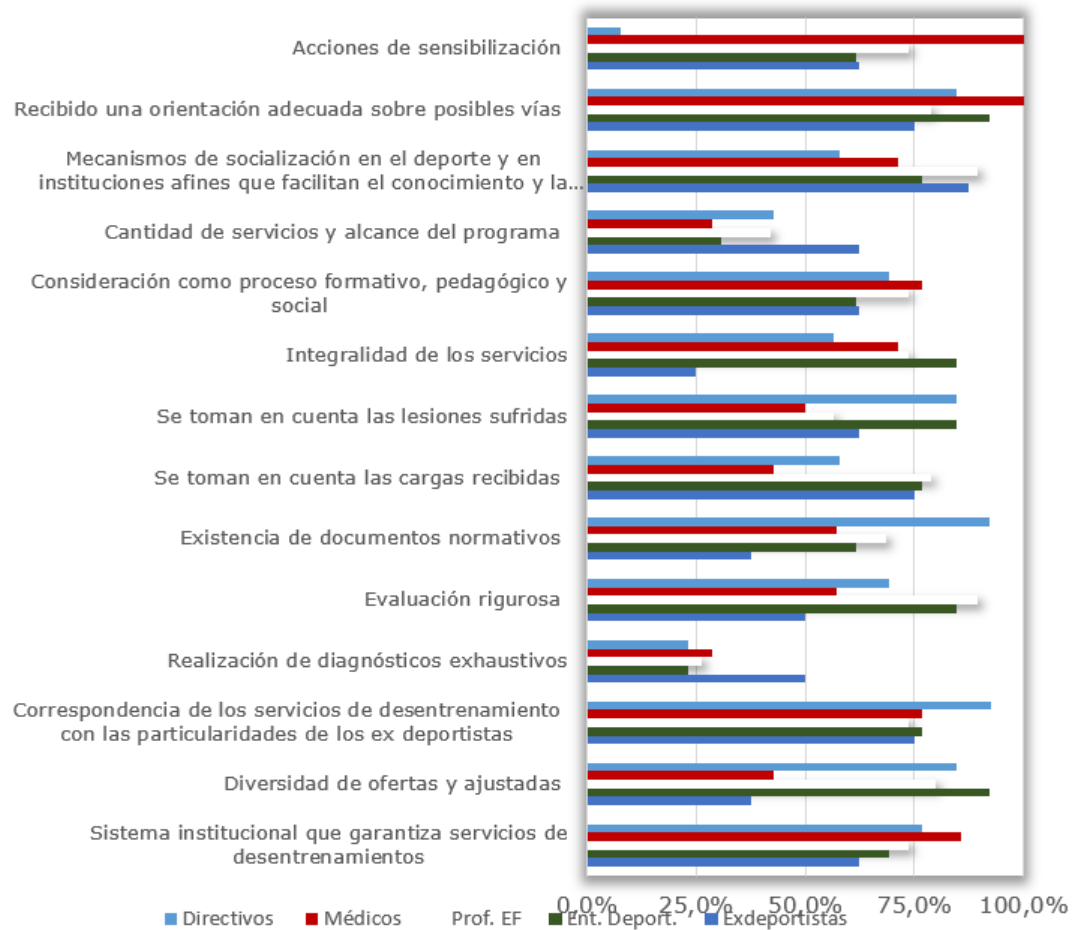
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## RESULTS AND DISCUSSION

Regarding the survey that evaluates the detraining services provided to former athletes, 100% evaluated that the institutional system that guarantees detraining services is still inadequate. Of them, 62.5 % are more critical. The same occurs with the diversity of offers and their adequacy, where 37.5 % expressed greater disagreement when analyzing various services.

Regarding the correspondence of detraining services with the particularities of former athletes with classifying disabilities, 75 % stated that such correspondence was missing, 50 % considered that this was not based on a comprehensive diagnosis and 37.5% denied that there was a document that guides the process of completing the training; 75 % and 62.5 % of former athletes thought that detraining programs do not take into account previous loads or injury records. Related to the services included in the training program, 25% of respondents claimed that there was no integration of these services; of the total number of respondents, 12.5 % considered that weight is given to one of the dimensions of training with emphasis on the medical part, considered as another treatment of this science and not as a training, pedagogical and social process. 62.5 % expressed that the number of services provided is very small and considered that the service is only a reduced training program. This behavior could be seen with great similarity when the responses of the subgroups of respondents according to role or profession were analyzed (Figure 1).





*Fig. 1. - Percentage of negative criteria of former athletes, coaches, Physical Education teachers, doctors and managers expressed in the survey*

The processing of the responses by each subgroup demonstrated different levels of agreement of criteria (Kendall's W;  $\alpha=0.05$ ) in relation to the detraining services and was higher in those directly involved in the sports preparation process. The agreement of the former athletes is considered, which indicates the need to implement a sports detraining process (Figure 2).





*Fig. 2. - Attribute agreement (Kendall's W, a>p)*

Positive and negative correlations can be seen among the responses, which indicates that there are levels of association between the criteria issued and, therefore, point to a recognition of the current weaknesses of the detraining services (Table 1).

*Table 1. - Correlations of criteria and opinions of the respondents*

The guarantees of the institutional system to provide a detraining service and the history of the injury registry. (former athletes)	0.889
Variety of sports detraining services offered and the existence of documents that guide methodologically. (doctors)	0.825
Existence of methodological documents affect in the same sense those referring to the level of adjustment according to disability. (doctors)	0.813
Existence of methodological documents and rigorous evaluations. (doctors)	0.775
Uses of the antecedent training load profile and oversizing of services. (Directors)	0.76
Variety of services and their adjustment to the particularities of disabled former athletes. (doctors)	0.707
Breadth of detraining program services and the existence of rigorous evaluations. (managers)	0.642
The determination and consideration of load profiles and the variety of services. (coaches)	0.595
Offer levels and exhaustive diagnosis. (Directors)	0.579
Comprehensiveness of services and the use of the injury registry. (Directors)	0.552
Existing disclosure and level of integration of services. (coaches)	0.537
Determination of antecedent training load profiles and the sufficiency of detraining service offers. (Prof. EF)	0.439
Guidance and rigorous evaluation. (former athletes)	0.282
The guidance received and the assessment of the injury record (former athletes)	-0.23
The consideration of load profiles and the degree of particularization of the services. (former athletes)	-0.291



Rigorous evaluation and development of detraining considering the training load profile. (former athletes)	-0.741
Training load profiles and performing the diagnosis. (doctors)	-0.745

To determine the existence of similarities between those involved according to the subgroup, comparisons were made between the response sets, through the use of non-parametric contrast statistics, which showed that the opinion states were similar in the respondents and revealed limitations in the sports detraining process (Table 2).

*Table 2. - Results of the contrast of opinions between the different subgroups of the sample*

Ítems	Comparison between all subgroups	Comparison between former athletes and the rest Mann-Whitney		
	Kruskall -Wallis ( $\chi^2$ )	P	(U)	P
Variety of services offered	6.156	0.291	224.5	0.354
Correspondence to the particularities of disabled former athletes	1.3	0.935	272.5	0.95
Existence of rigorous evaluations	8.525	0.13	276	1
Comprehensive diagnostics	6.453	0.265	-	-
Using background training load profiles	6.06	0.3	246.5	0.596
Use of the injury log	5.935	0.313	256	0.713
Service integration	5.194	0.393	271.5	0.936
Orientation	8.598	0.126	205.5	0.201
Spreading	2.929	0.711	263	0.811
Use of methodological guidance documents	-	-	216.5	0.281

In particular, a comparison was made between the former athletes and the rest of those involved and the existence of similarities in criteria and opinions was confirmed (Table 2).

In relation to the patterns of physical activity practices, difficulties were observed in performing intense exercises and walking; The trend towards a decrease in execution over the course of the nine weeks was also seen (Figure 3).



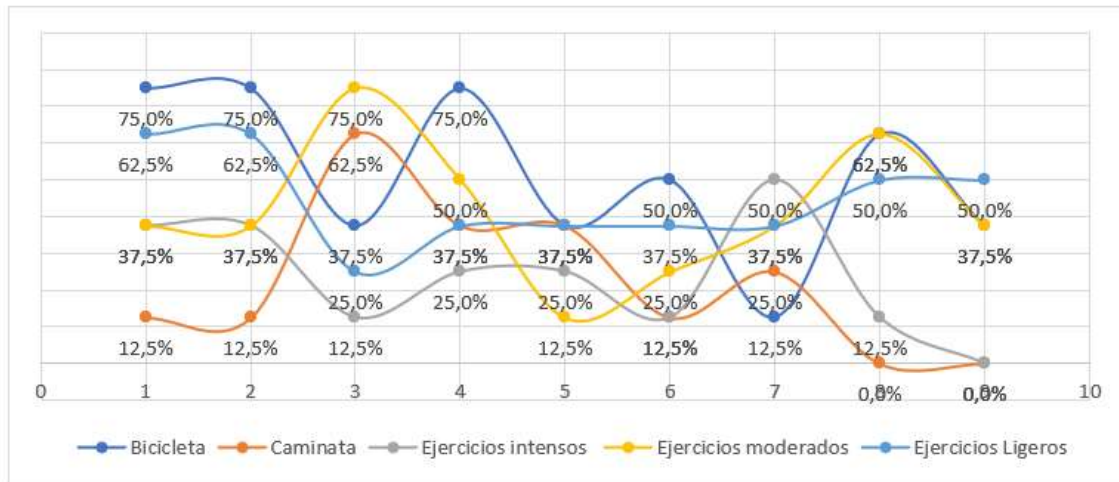


Fig. 3 - Participation in physical activities over a period of 9 weeks

When comparing the results obtained in the nine weeks, it was shown that there is quite similar behavior between all of them (Table 3).

Table 3. - Contrast on the performance of physical activities between 19 weeks

Kruskall-Wallis ( $\alpha=0.1$ )	Between nine weeks				Between the former athletes			
	frequency		Duration		frecuencia		Duration	
	$\chi^2$	p	$\chi^2$	p	$\chi^2$	p	$\chi^2$	p
<b>Bikes</b>	8.909	0.446	5.850	0.755	-	-	9.712	0.205
<b>Walks</b>	12.601	0.182	11.730	0.229	4.702	0.696	5.049	0.654
<b>Intense exercises</b>	9.713	0.374	8.621	0.473	1.444	0.984	1.342	0.987
<b>Moderate exercises</b>	9.025	0.435	8.197	0.514	7.438	0.385	9.117	0.244
<b>Light exercises</b>	7.630	0.572	4.383	0.884	10.040	0.186	7.317	0.397

The comparison between the sets of results obtained by each former athlete showed similarities in most aspects, so the situation can be considered generalized in all members of the sample (Table 3).

The comparison of the results obtained between pairs of weeks confirmed the little variation in the data and only differences in walking, cycling and low-intensity activities (Table 4).

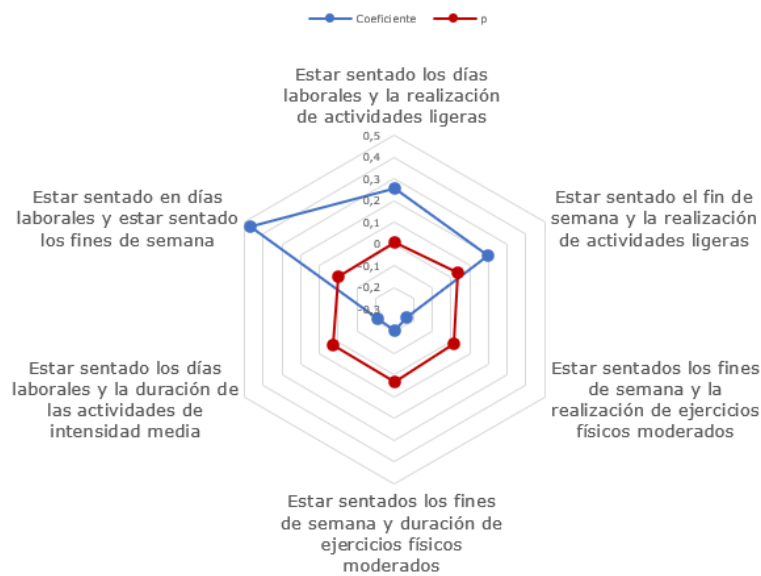


**Table 4.** - Contrast on the performance of physical activities between pairs of weeks

	Weeks compared		Mann-Whitney ( $\alpha=0.1$ )		Frequency, duration or both
			OR	p	
<b>Walks</b>	1	2	18,500	0.083	Frequency
<b>Bikes</b>	6	7	19,000	0.095	Frequency
	7	8	15,000	0.038	Frequency
<b>Light exercises</b>	2	3	18,000	0.090	Frequency
	2	3	18,500	0.100	Duration

It is worrying that there are negative correlations between the time spent sitting on weekends, the performance of moderate physical exercises and the duration of these exercises, since according to Shakoor *et al.* (2023), lack of physical activity and a sedentary lifestyle can lead to chronic metabolic disorders, such as insulin resistance and type 2 diabetes. Other negative impacts that corroborate the need for well-targeted detraining were verified by Wang *et al.* (2023) in the case of older people and badminton players (Silva Santos *et al.*, 2022)

It also happens that with the time spent sitting on weekdays and the duration of medium intensity activities, there is a positive correlation between the time spent sitting on weekdays and with that same condition, but on weekends (Figure 4).



**Fig. 4.** - Correlations in carrying out physical activities



The indicators of this study differ from those used by Nakamura *et al.* (2021) who are only limited to the capacity of stretching.

To measure body composition, health indicators, vital signs and results of physical activities, several repeated tests were applied on five occasions, every 12 weeks, and it was obtained that there is an average systolic pressure of 125.40 ( $\pm 5.305$ ) mm Hg, in a range 115 to 137 mm Hg; was observed more times, 127 mm Hg. At least 50 % of the measurements obtained values equal to and above 125 mm Hg.

The diastolic pressure was around 93.15 ( $\pm 10.618$ ) mm Hg with results of 76 to 113 mm Hg and according to the median, at least 50 % of the measurements obtained values equal to and above 92.00 mm Hg. This study coincides with the results obtained by Peteka *et al.* (2022) by corroborating changes in systolic and diastolic functional parameters. On the other hand, it presents differences in terms of the indicators used by (Swoboda *et al.*, 2019).

The total cholesterol results presented a mean of 217 ( $\pm 10,399$ ) mg/ dL and the blood glucose results had a mean of 99.28 ( $\pm 7,812$ ) mg/ dL, in ranges from 201 to 239 mg/ dL and from 86 to 115 mg/ dL. respectively.

Body composition showed an average BMI of 29.3078 ( $\pm 1.97267$ ), with results between 26.90 and 33.21 and at least 50 % equal to or above 28.11. The average skeletal muscle mass of 34.0078 kg and the average lean mass of 14.3898 kg/m<sup>2</sup>, with a percentage of 29.15 ( $\pm 2.82$ ); in this sense, changes in body composition are observed that point, in a similar way, to those identified by Álvaro-Cruz *et al.* (2017).

A comparison was made with the results of patterns in the practice of physical activities; similarities were perceived with the findings of Amaro *et al.* (2018), specifically with the association between composition and physical fitness level.

The results obtained on the indicators of physical activities show an average of 4299.43 steps at a maximum intensity of 191.55 ( $\pm 15.455$ ) ppm<sub>max</sub>, with an increase from the resting position of 120.3 ppm.



The general comparison between the data sets obtained by each former athlete demonstrated similarities in their results of systolic blood pressure ( $\div^2=4.087$ ;  $p=0.770$ ) and diastolic blood pressure ( $\div^2=3.796$ ;  $p=0.803$ ), total cholesterol ( $\div^2=10.708$ ;  $p=0.152$ ), blood glucose ( $\div^2=9.937$ ;  $p=0.192$ ), fat mass ( $\div^2=6.714$ ;  $p=0.459$ ), maximum heart rate ( $\div^2=8.312$ ;  $p=0.306$ ) and at rest ( $\div^2=9.737$ ;  $p=0.204$ ), in addition to the steps taken in physical exercise ( $\div^2=11.769$ ;  $p=0.108$ ).

These results coincide with those reported by Marín *et al.* (2021) because among the most important findings of this work are that the expectations of the athletes who retire are not met, there is no information on how to carry out this process and an insufficient correspondence is established between the training load profiles, depending on the sport and the individual characteristics of the athletes, particularly with regard to knowledge of detraining, as reaffirmed by Chávez *et al.* (2021).

Likewise, it is corroborated what González *et al.* (2022) indicated, who reiterates the lack of significant projects to address the sports retirement process. In this sense, limitations are revealed regarding evaluation and pedagogical attention that coincide with the results of Pérez *et al.* (2022) and Frómeta *et al.* (2022).

The study also revealed that there is a limited culture of sports detraining in the family and teachers linked to the training of the athlete, which coincides with what was stated by Padilla & Trejo (2023), as well as what is related to the existing shortcomings in performance of professionals in undergraduate training, for attention to sports detraining.

## CONCLUSIONS

The results achieved in the tests applied in the diagnosis corroborated the problem initially perceived and revealed the need to implement a detraining process adjusted to the specificities of former athletes, in situations of physical-motor disability.





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***Conflict of interests:***

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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