

Methodological proposal for a physiotherapeutic test to detect ligamentous knee injuries in athletes between 20 and 25 years who practice Crossfit

Propuesta metodológica de Test fisioterapéuticos para detectar lesiones ligamentosas de rodillas en deportistas de 20 a 25 años que practican Crossfit

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ABSTRACT

The idea of this research arises during the practical activity of physical-sports attention to Crossfit athletes who present injuries and the theoretical limitations for their treatment. Its objective lies in the development of a methodology to diagnose ligamentous knee injuries, in athletes between 20 and 25 years old, who practice Crossfit, in the City of Milagro, Ecuador for use during the Covid-19 pandemic stage. Investigation methods and techniques such as analysis-synthesis, systemic-structural-functional, documentary analysis, survey, control test and evaluation to the diagnosis of injuries in Crossfit athletes.

Keywords: Crossfit; Crossfit athletes; Covid-19; Ligamentous injuries; Methodology; Physiotherapeutic tests

RESUMEN

La idea de esta investigación surge durante la actividad práctica de atención físico-deportiva a atletas de Crossfit que presentan lesiones y de las limitaciones teóricas para su tratamiento. Su objetivo radica en la elaboración de una metodología para diagnosticar lesiones ligamentosas de rodillas, en deportistas de 20 a 25 años, que practican Crossfit, en la Ciudad de Milagro, Ecuador para su utilización durante la etapa de pandemia Covid-19. Se emplearon para la investigación los métodos y técnicas tales como análisis-síntesis, sistémico-estruc

tural-funcional, análisis documental, encuesta, entrevista, test de control y evaluación para el diagnóstico de las lesiones en los atletas de Crossfit.

Palabras clave: Crossfit; Atletas de crossfit; Covid-19; Lesiones ligamentosas; Metodología; Test fisioterapéuticos

INTRODUCTION

Crossfit is a training technique that connects movements from different disciplines, such as weightlifting, metabolic training or gymnastics. This sports practice was born in California in 2001 and was created by Glassman who designed a series of exercises to improve the performance of those who in his profession need to stay in excellent physical condition. According to Valle (2019), Crossfit is “a physical conditioning program based on a constantly varied training of functional movements, and that is developed with a high intensity”. (p. 1)

The fundamental objective of its practice is to keep the motivation of athletes intact in the long term. It can be done individually or in groups, and the sessions are usually short, varied and adaptable depending on the level of each participant.

The results of Crossfit crossed borders and the practice became popular in various gyms around the world. It is currently considered the fashionable sport. There are no routines or excuses, every day your training is different. It adapts to all levels and is aimed at any gender. It is made up of endurance sports and different physical activities. It is based on the work of different capacities and abilities: cardiovascular and respiratory resistance, muscular endurance, strength, flexibility, power, speed, agility, psychomotricity, balance and precision. All these activities are involved energetically for effective fitness.

Crossfit or “WOD” (work of the day) workouts last approximately 60 minutes. Functional exercises are developed, constantly varied, executed at high intensity, a total strength and physical conditioning program is used, which is based on the increase of the ten physical capacities most recognized by specialists in sports training with weights. During exercise, the aim is to develop strength and muscle tone and increase the functionality of the muscles to repeat the movements in different real-life situations.

Although various materials or elements are used in Crossfit, many exercises only require the body or body weight to perform, it is structured as follows:

Warm-up: Preheating is carried out to avoid possible injuries. The warm-up exercises are usually rope jumps, sit-ups, push-ups, squats, spinals, clown jumps, among others.

Stretching: The trainer or instructor performs a group stretch (stretch) of the muscles used in training in order to prevent injuries. The exercises are carried out inside the box (training place) and depending on their location they can also be carried out outdoors.

The athlete and the sports coach, according to what BBC (2017) pointed out, refer to Crossfit as "a physical conditioning process that can be practiced by anyone, with an intensity adaptable according to the needs of each one in a constant dialogue with their coach". (p. 3)

As it is a functional training, it is based on multi-joint or compound movements, very different from the typical ones that are done in a Gymtraditional, which target a specific muscle or muscle group. That is why its practice can bring with it a series of alterations and sports injuries resulting from various causes, among which are the insufficient performance of a medical-physical control to determine if the body can receive extreme physical loads and the diagnosis of capacities. of work, as well as the development of incorrect techniques in each of the movements. The intensity regulation is performed inaccurately depending on the physical condition. During the training process they maintain an incorrect development of conditioning and joint warm-up. Triggers of dehydration states are observed during training.

Taking into account all these causes, it is important to know which are the muscle injuries present in this complex sport, these can be identified by their deep and infrequent location, which is why they go unnoticed in regular examinations such as ultrasound. This being the main cause that leads athletes to a long period of inactivity.

Among the most common injuries are strains, tendonitis, back pain, bursitis, and fractures. The most common areas where they appear are in the shoulders, lumbar

pain, pain in the radio-ulnar-metacarpal and femuro-tibia-patellar joints. The latter is one of the joints that suffers the most during the practice of any sport, in general. According to Gardachal (2019) in the context of healthy knees together with an adequate technique and a correct management of the training load there should be no problems, if any of these factors fails, then serious injuries would come. Basically, some of the general aspects that can be behind some of the most frequent injuries in the knees of crossfit athletes are: lack of dorsiflexion, pronation of the foot and lack of activation of the plantar muscles, dysfunction in hip abductors, gluteus medius.

In studies carried out in 2019 in the Orthopedic Journal of Sports Medicine, 3049 Crossfit practitioners were followed. Of the total, 30.5% declared having suffered some type of injury in the last twelve months due to the practice of Crossfit. The most frequent injuries were to the shoulders (39%), back (36%) and knees (15%). The incidence of injuries was 0.27 per 1000 hours of Crossfit practice in those who trained between three and five days a week and 0.74 in those who did it three or less times a week.

In articles published by Graells in 2021 it was found that of a sample of 270 Crossfit participants aged between 15 and 30 years old, 152 men for 56.3%, 61 people 22.6% had an injury in the previous year, with a total of 80 lesions. The most common injuries were articular in 30.8% and muscular in 23.1%. Non-competing practitioners were more likely to be injured along with those who trained on a frequency of two or fewer days a week.

In research by various authors such as Ricardo (2015), Lucas (2015), Verdú (2015), Condo (2017) and Reyes (2019) address the use of Crossfit to improve and enhance the muscles according to the established parameters, as well as in the use of means for social communication from the virtual point of view, and the implementation of these exercises during Physical Education class.

This research aims in a viable way to diagnose ligamentous injuries of the knees, in athletes of 20 to 25 years of Crossfit from a methodological proposal for its use during the Covid-19 pandemic.

Regarding the structure of the methodology, according to Bermúdez and Rodríguez (1996) and de Armas (2013) it is made up of two structural apparatuses: the theoretical or cognitive apparatus and the methodological or instrumental apparatus. In its process condition, the application of the methodology presupposes a sequence of stages and each stage is in turn a sequence of actions or procedures, therefore it requires an explanation of how it operates in practice, how the stages are integrated, the methods, procedures, means and techniques, as well as the requirements during the process are taken into account.

METHODS

The research carried out is of a mixed type by combining the use of qualitative and quantitative methods. It used a non-experimental-cross-sectional design based on Hernández, Fernández and Baptista (2014) and it is an explanatory research, by proposing and supporting the steps of the methodology.

An intentional non-probabilistic sampling was carried out, by selecting male Crossfit athletes from the Pacific Garage Box, from the City of Milagro, with a total of 17 subjects, ranging in age from 20 to 25 years. In addition, the show included the Coach from the Crossfit Pacific Garage Box.

An analysis was carried out that allowed to decompose and synthesize the theoretical supports of Crossfit, as well as the sports disorders and injuries that are most presented in the sports preparation of Crossfit athletes.

The training plan in the Crossfit Pacific Garage Box, to determine the relevance of the structure of the training process and its correspondence with the objectives.

A survey was applied to find out the opinion of the athletes in the sample about the conditions they have to their preparation at home that allows them to supplement the preparation of the gym due to Covid-19.

The two selected coaches were interviewed to find out the shortcomings in the current training methods and planning that affect the possible injuries of the athletes, in addition to ascertaining the existing difficulties caused by the confinement in the stage of the Covid-19 pandemic. Control and evaluation tests were applied to the diagnosis of the most frequent injuries, the age range and the sex most affected among Crossfit athletes.

The tests were applied that allowed to determine which are the most frequent injuries present in the athletes of the Crossfit Pacific Garage Box, in Ciudad de Milagro and their causes.

The results obtained from the different instruments applied were taken as a starting point for the implementation and evaluation of the methodology in two of the stages.

RESULTS

Methodology for the diagnosis of knee ligament injuries in Crossfit athletes in Ciudad de Milagro, Ecuador

The proposed methodology is conceived as a system of relationships between the different categories and concepts; supported by principles and laws, which imply a transformation of the object. In addition, through the use of methods, techniques and procedures, the structural and methodological components that provide new evolutions of the process are materialized, which are projected in the pedagogical practice through indications, recommendations, methods and means, which guide a logical and coherent path towards the fulfillment of the planned objective.

For the development of the methodology as an organized and systemic process, four stages are conceived, each one consisting of steps and concrete actions, which guide Crossfit professors towards the training process in athletes who practice this sport. It starts with the diagnosis of the injuries present and which are the most frequent, and their incidence in detraining or sports inactivity, then adaptations to sports physical activities are made, in relation to the injuries present as well as prophylaxis in the manifestation of the symptoms of these pathologies.

Variations are also made to the contents, methods and procedures that are used during the development of the complex exercises, in addition the test for strength, flexibility and muscle amplitude is evaluated at various moments of the intervention, all these aspects are guided under the principles and the approach taken in the investigation.

The first stage of the methodology is that of exploration and diagnosis, in which the characteristics of the training process in athletes who practice Crossfit are determined. This diagnostic study has an integrative nature because it is where the physical and psychological state of each of the athletes is known, as well as the preparation from the methodological point of view of the coaches, based on the work they carry out taking into account that This stage is complex and varied, as it is going through a pandemic process (Covid-19) where health and sports safety measures must be taken to extremes for excellent performance.

The second stage is planning, adaptations to the program and methodological orientations of physical sports activities are made, counting on the recommendations of Crossfit coaches, to achieve physical-sports attention and the development of control and evaluation indicators to the tests to determine the lesions present.

In the third stage, the implementation of the methodology is developed that begins with the application of tests for the diagnosis of knee ligament injuries. In this part, the tests to be used in the proposed methodology are exposed.

No	Test for the diagnosis of knee ligament injury in Crossfit athletes
1	McMurray test
2	Patella displacement test (Glive Test)
3	The Lachman test in the prone position
4	Drawer test

The fourth stage constitutes the final phase of the investigative process, that is, control and evaluation, which allowed to judge the transformation process of the investigated object, based on planning and redesign.

To comply with the evaluation stage, a systematic evaluation process is carried out, through the daily control carried out by the coaches, in order to verify the behavior of each of the athletes during and after the application of the tests for the diagnosis of the injuries to the ligaments of the knees, in addition, sports health is controlled in terms of respiratory indicators since the Covid-19 virus can be contracted during the investigation process.

DISCUSSION

The relevance of this research lies in the proposal of a methodology that allows a viable diagnosis of ligamentous knee injuries in Crossfit athletes to apply in the current context of the Covid-19 pandemic.

To prepare the proposal, the criteria of several authors were consulted, among which Valle (2019) stands out, who accurately defines Crossfit from which the elements that he indicates as are functional movements and the high intensity in which they are they realize that they are of importance for the investigation because they constitute possible causes for the injuries in the athletes.

For the implementation of the methodology, the importance of what was proposed by BBC (2017) regarding the adaptability of the intensity according to the needs of the practitioners and the mediating function of the dialogue between this and the coach was valued, relevant element at the time of prevent injuries.

Gardachal (2019) points out the relationship between healthy knees and adequate planning and execution of training as a primary element to avoid injuries and that was considered for the development and application of the methodology.

The studies consulted in relation to the subject of the research showed that 15 out of every 100 athletes suffer from knee injuries, which places this type of injury as the third most common among Crossfit practitioners and that constitutes one of the reasons that They motivated its development since not many were found that addressed this issue.

During the review and analysis of the investigations by Reyes (2019), Condo (2017), Ricardo (2015), Lucas (2015), Verdú (2015), although they address the importance of Crossfit for muscle development, it is appreciated that they are still excluded the negative results that the practice of this sport can cause on health and the long-term effects.

The study in the literature of the theoretical-methodological references that support the methodology as a scientific result, allows to assume for its construction the criteria of Bermúdez and Rodríguez (1996) and de Armas (2013) since they collect the ways (methods) to achieve the objectives and the procedures, which in close

systemic interrelation, allow the study and transformation of the physical-sport care process in Crossfit athletes in the context of sports training.

The proposed methodology allows, based on its structure, operation and the transit of its stages, to organize the physical-sports care process, in addition it allows specialists in this sport to improve the sports training process to prevent, correct and rehabilitate the present injuries produced. during complex physical activities, taking into account the characteristics of the class group. As well as the sports needs and potentialities in a stage where extreme situations are experienced.

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