PREVALENCE AND LOCATION OF PAIN IN CROSSFITTERS IN A CITY IN THE SOUTH OF MINAS GERAIS

PREVALÊNCIA E LOCAL DE DOR EM PRATICANTES DE CROSSFIT EM UMA CIDADE DO SUL DE MINAS GERAIS

PREVALENCIA Y LOCALIZACIÓN DEL DOLOR EN PRACTICANTES DE CROSSFIT EN UNA CIUDAD DEL SUR DE MINAS GERAIS

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ABSTRACT

Introduction: CrossFit was created to develop the physical and motor skills of athletes in all categories, aiming for the physical limit of everyone who practices it, in accordance with their toning capacity. Objectives: Considering that the quest for these limits has resulted in an increasing number of CrossFitter injuries, the objective of this study was to define the levels of pain and the anatomical regions affected among CrossFitters in the city of Alfenas. Methods: The Corlett diagram was used in association with the Visual Analog Scale, which ranges from 1 to 10. Three CrossFit gyms in the city of Alfenas were visited and their CrossFitters were invited to participate in this research. Those who agreed to participate (109) signed the informed consent form. Results: Of the total number of participants interviewed, 86.63% reported having some type of pain in their daily CrossFit routine. Of the total number of respondents who experienced pain, 56.68% were women and 43.32% were men. The three areas that stand out with the highest prevalence of pain were shoulders at 51.37%, the lower back at 44.03%, and the knees at 40.36%. The One-way ANOVA test was applied with $p \leq 0.05$ and there was no statistical difference between the pain groups (trunk pain, right limb pain, and left limb pain). Conclusion: When we applied the Corlett diagram to verify the degree and anatomical regions of pain in CrossFitters in the city of Alfenas, it was evident that CrossFit is a sport that, by demanding a lot from those who practice it, ends up causing moderate to severe pain, especially in the shoulder, lumbar, and knee regions. ***Level of evidence II; Retrospective study***.

Keywords: Pain; Injury; Resistance training.

RESUMO

*Introdução: O CrossFit foi criado para desenvolver as habilidades físicas e motoras de atletas de todas as categorias, visando o limite físico de cada praticante, de acordo com sua capacidade tônica. Objetivos: Considerando que a busca desses limites tem acarretado cada vez mais lesões nos praticantes, este estudo visou estabelecer o grau de dor e a região anatômica afetada decorrentes do CrossFit na cidade de Alfenas. Métodos: Para tal, foi usado o diagrama de Corlett associado à Escala Visual Analógica, que varia de 0 a 10. Três academias de CrossFit da cidade de Alfenas foram visitadas e os frequentadores foram convidados a participar desta pesquisa e todos que concordaram em participar (109) assinaram o termo de consentimento livre esclarecido. Resultados: Do total de entrevistados, 86,63% relataram ter algum tipo de dor na prática diária de CrossFit. Do total de entrevistados que apresentaram dor, 56,68% eram mulheres e 43,32% homens. Entre os três locais de maior prevalência de dor destacaram-se ombros, 51,37%; parte inferior das costas/do dorso, 44,03%; joelho, 40,36%. Foi aplicado o teste ANOVA One Way com p ≤ 0,05 e não houve diferença estatística entre os grupos de dor (dor no tronco, dor no membro direito e dor no membro esquerdo). Conclusão: Ao aplicar o diagrama de Corlett para verificar o grau de dor e a região anatômica nos praticantes de CrossFit da cidade de Alfenas, evidenciou-se que o CrossFit é um esporte que, por exigir muito dos praticantes, acaba acarretando dores de moderada a grave, principalmente nas regiões do ombro, lombar e do joelho. **Nível de evidência II; Estudo retrospectivo**.*

Descritores: *Dor; Lesão; Treinamento de força.*

RESUMEN

Introducción: El CrossFit fue creado para desarrollar las habilidades físicas y motoras de deportistas de todas las categorías, apuntando al límite físico de cada practicante, según su capacidad tónica. Objetivos: Considerando que la búsqueda de estos límites ha resultado en cada vez más lesiones en sus practicantes, este estudio tuvo como objetivo establecer el grado de dolor y la región anatómica afectada resultante del CrossFit en la ciudad de Alfenas. Métodos: Para ello, se utilizó el diagrama de Corlett asociado a la Escala Visual Analógica, que varía de 0 a 10. Se visitaron tres gimnasios de CrossFit en la Ciudad de Alfenas y se invitó a los frecuentadores a participar en esta investigación y todos los que aceptaron participar (109) firmaron el formulario de consentimiento informado. Resultados: Del total de encuestados, el 86,63% informó tener algún tipo de dolor en la práctica diaria de CrossFit. Del total de encuestados que presentaron dolor, el 56,68% eran mujeres y el 43,32% hombres. Entre los tres lugares de mayor prevalencia de dolor, se destacaron los hombros, 51,37%; espalda baja, 44,03% y rodilla, 40,36%. Se aplicó la prueba ANOVA One

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*Way con p≤ 0,05 y no hubo diferencias estadísticas entre los grupos de dolor (dolor de tronco, dolor de miembro derecho y dolor de miembro izquierdo). Conclusión: Al aplicar el diagrama de Corlett para verificar el grado de dolor y la región anatómica en los practicantes de CrossFit en la ciudad de Alfenas, se evidenció que CrossFit es un deporte que, al exigir mucho a sus practicantes, termina provocando dolor moderado a severo, especialmente en las regiones del hombro, la espalda baja y la rodilla. **Nivel de evidencia II; Estudio retrospectivo**.*

Descriptores: Dolor; Lesión; Entrenamiento de fuerza.

INTRODUCTION

CrossFit is a program created by Greg Glassman in 1995 with the objective of developing the physical and motor skills of athletes in all categories through physical activities of varied intensity to achieve the physical limit of each participant according to their tonic capacity, but which could be harmful to them. CrossFit is based on three distinct types of movement: weightlifting, cyclic (walking and running) and gymnastic (rings and bars) movements. Exercises incorporated into CrossFit, such as gymnastics and Olympic weightlifting, require the correct positioning of joints and vertebrae, which makes the risk of injury to the participants even higher when performed improperly.[1]

This training method is divided into three phases. The first is a warm-up based on preparing the body for the subsequent activities. The second phase is where the person's ability is worked and can be varied by learning a new movement or composed of a series of strength exercises. Finally, the last is the main division, called WOD (workout of the day), characterized by a combination of different types of effort that prioritize maximum exertion, among them weightlifting and gymnastic movements, in addition to climbing and running.[2-6] This maximum exertion leads to the main types of injuries: contusion, which results from a hard blow to any part of the body; sprain, which is an abnormal stretching of muscle fiber; cramping, an involuntary and painful muscle contraction, and tendinopathy, which is characterized by the loss of tendon function.[1]

The prevalence of injuries in CrossFitters ranges from 5% to 73.5%. The most affected regions of the body are the shoulders, followed by the back and the knees. Regarding the factors associated with injuries, the type of exercise performed, and the duration of the CrossFit session stand out. Studies have reported an association between sex and the prevalence of injuries, with men suffering a higher number of injuries than women. Age is one of the factors that are not associated with injuries and CrossFit can be safely practiced by people between 18 and 69 years of age.[1] Other data also show that the damage caused by the practice of CrossFit occurs in different magnitudes, which vary by type of exercise. The most common injuries are those that affect the musculoskeletal system.[7]

However, there are reported cases of individuals affected by injuries due to the exaggerated intensification of this activity. The implementation of limits on the use of weights may be a critical factor in trying to prevent cases of injury among students actively participating in this modality. In addition, activities compatible with each biotype can be effective in both preventing the triggering of worse damage and promoting the proper practice of the activities. However, there are not enough statistical data in the literature to report the main pain sites individually.

This article seeks to analyze the main pain sites in CrossFitters, thus aiming to expand and improve the amount of statistical data found in the current literature.

METHODS

For this purpose, the Corlett diagram associated with the analog scale for pain ranging from 0 to 10 was used. We visited three CrossFit gyms in the city of Alfenas and invited their members to participate in this study by signing the informed consent form approved by the Institutional Review Board. Interviews of the one hundred and nine CrossFitters who agreed to participate were conducted three days a week from 8:00 to 12:00, 13:00 to 17:00, and 18:00 to 20:00 for a month. No distinctions were made in terms of the body mass index or the participants' length of experience with the modality. The one-way ANOVA test was applied with $p \leq 0.05$.

RESULTS

Of the total number of interviewees from the three gyms in the city of Alfenas, 83.65%, of whom 43.32% were men and 56.68% were women, reported having some type of pain while performing CrossFit. .

Figure 1 below compares all participants in terms of the pain related to CrossFit training, divided into two groups: participants without pain, those who had no discomfort during their daily CrossFit routine, and participants who reported pain in any isolated or associated region related to the day-to-fay practice of CrossFit..

Figure 2 shows the total number of participants, those with pain, and those without pain by sex.

As shown in Figure 3, the locations where people experienced pain are divided into: pain exclusively in the upper limbs (UL), including shoulders, arms, elbows, forearms, wrists, and hands; pain exclusively in the lower limbs (LL), including thighs, knees, legs, ankles, and feet; pain in the trunk, including the head, neck, cervical region, upper back, middle back, and lower back, also known as the lumbar region, as well as the pelvis or hip; and mixed, denoting participants who reported simultaneous pain in more than one region.

In Figure 4, the mixed category, which included 71.56% of the participants, was further divided according to the number of occurrences, where the percentage was higher as the number of the interviewees who reported pain in a specific region increased.

According to Figure 5, when evaluating the number of occurrences in limbs, the right and left regions of each region of the Corlett diagram were compared and represented as approximate percentages. These percentages are relative to the total number of participants. The same individual may have pain on both sides and each side was counted separately.

Figure 6 shows a comparison of the top three regions affected in the total population.
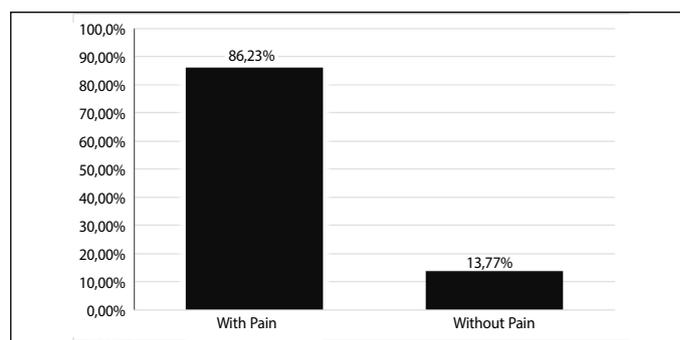
Figure 1. Incidence of pain.
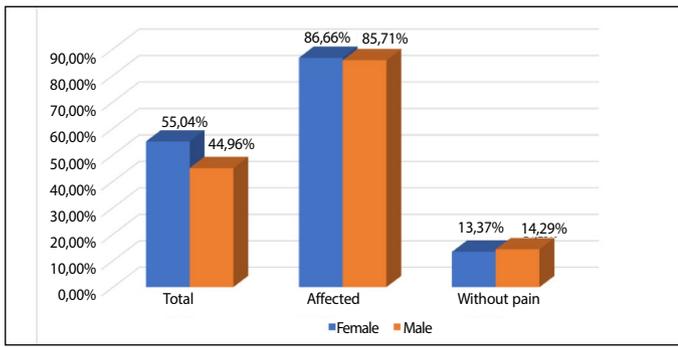
Figure 2. Number of occurrences by sex.

Figure 3. Number of occurrences.

Figure 4. Mixed regions.

Figure 5. Number of occurrences by limbs.

Figure 7 shows that the trunk region was also divided into parts according to the Corlett diagram: the neck, representing the muscle structures of the neck; the cervical region, representing the structure of the cervical spine; the upper back, representing the muscular region from the first thoracic vertebrae; the middle back, between the lumbar region and the end of the thoracic vertebrae; the lower back or lumbar region; and the pelvis, representing the hip region on both sides.

Figure 6. Main regions affected.

Figure 7. Trunk.

DISCUSSION

Figure 1 shows that only 13.77% of the 109 interviewees did not report discomfort during their day-to-day CrossFit routines. However, different data were found by Minghelli, where 108 (40%) of the 270 participants experienced discomfort over the course of a year, and 80 (29.62%) had discomfort for up to six months of training, totaling 188 individuals affected. Claudino reported that 74% of CrossFitters had some type of injury during 1000 hours practicing this modality, and 50.85% had an injury related to training, 64.48% of whom required medical attention to deal with the injuries.[10] When comparing works in the literature, a higher than 50% chance of developing some type of discomfort was observed, whether due to the sport's high demand for physical effort, to improper performance of the technique or positioning of the body, to the failure of the participants to seek help from the coaches, or even the negligence of the coaches themselves in supervising students during the activities.[9,1]

Comparing CrossFit to other activities, like traditional bodybuilding, we see that both the percentage of pain and risk of associated injuries are substantially higher. In a study of 80 bodybuilders conducted by Soares, only 20% presented some type of injury related to the sport. When compared with traditional bodybuilding, CrossFit has a 1.3 times greater chance of causing injury or pain. In addition, 34.81% of the bodybuilders experienced pain, as compared to 50.85% of the CrossFitters.[10] In a study of manual work activities, such as construction assistant work, that evaluated 183 participants over 18 years of age from 13 different states in the United States, 78% experienced work-related pain.[12] This number is very similar to the 74% of CrossFitters in Claudino's study and the 86.23% in the present study. This is due to the high loads of physical effort demanded in the practice of CrossFit and the search for surpassing limits promoted by the AFAP (as fast as possible) and RFT (rounds for time) culture that stimulates the participant to be increasingly faster and perform the greatest possible number of exercises, which are not necessarily executed with quality, harming several muscles and joints.

As shown in Figure 2, there was a .95% greater incidence of pain in women, due in part to the greater number of female participants.

Claudino reported a difference in musculoskeletal injuries between the sexes with males predominating and p=0.03. According to Dominski, this is related to lower demand for assistance from CrossFit coaches among males, although there was no evidence of this in the present study.

Evaluating the participants who had some type of discomfort in Figure 3, 71.56% had pain in more than one region at the same time, much higher than the percentages for UL, LL, and trunk in isolation, since CrossFit exercises are designed for movement of the entire body. Exercises like the clean, the clean and split jerk, and the burp, as well as others among the 46 CrossFit routines, lead to the simultaneous involvement of many joints and muscles. Among the isolated regions, the UL, at 9.17%, had the highest percentage since this is related to the main joint affected by injuries, the shoulder, involved in the broad gymnastic movements of activities such as the overhead squat, push press, and kettlebell swing and snatch. The amplitude of the movements leads to scapular dyskinesis, affecting the excursion of movement of this joint, overloading the glenohumeral joint and destabilizing it between the scapula and thorax.[1,9] This is followed by the trunk, where the main representative was the lumbar region defined in the Corlett diagram as the lower back, which is most associated with the clean and deadlift exercises which require bearing a heavy weight load and making wide movements. The isolated region with the third highest incidence is the LL, which did not present a standalone relationship with the knees, but rather with the legs and thighs since these regions together with the knees support a large amount of load during several actions, like the ass to the grass and the back squat.

Of the regions analyzed in Figure 4, UL was in first place, followed by LL, and finally by the trunk, with differences of 2.56% between the first and second and 1.28% between the second and third. UL was in first place due to the significant involvement of the shoulders and wrists, while LL was well represented by knees, legs, and thighs. The greatest contributor to the trunk was the lower back for the reasons mentioned above.

When checking the number of occurrences in the limbs in Figure 5, involvement of the shoulders, elbows, wrists, hands, knees, and ankles was greater on the right side, while arms, forearms, thighs, legs, and feet were predominant on the left, resulting in a slight overall predominance of pain on the right side. However, there was no significant statistical difference between the right and left regions, and the slight difference can be explained by the greater number of right-handed people in the general population.[13] In addition, no data were found in the literature that made such a comparison.

As can be observed in Figure 6, there was a predominance in the shoulder region with 51.37% of the individuals affected, which is consistent with the findings.[9,1,8,14] This is the predominant region for the reasons already explained in this article. The second most affected region is the lower back with 48 individuals (44.03%), which will be discussed below. The third most affected limb region was the knee in 44 individuals (40.36%), as it is the support region for most of the exercises and suffers from dislocation, meniscus, and ligament injuries.[8]

It is worth mentioning the subadjacent limb regions that presented the higher rates: the wrists, thighs, and legs, respectively. The joints of the wrist region are especially affected, being one of the main regions impacted in exercises that simulate overhead shots such as the ground to overhead. Legs and thighs follow due to the muscle effort required and the main injuries involve bruising and, in some cases, rhabdomyolysis.[1,8]

According to Figure 7, the most affected region of the trunk was the lower back with 48 individuals (72.64% of those with trunk involvement), followed by the middle back. This region is one of the main regions impacted by CrossFit exercises and, although it is not the most affected by pain, it is in first place for the highest level of complications, especially those resulting from the involvement of the nervous system, such as nerve root injuries. They have an incidence of 83.1% and an average duration of symptoms of 6.4 months, often requiring physiotherapy. However, in cases where the complications are more consistent and complex, surgical intervention is necessary.[15]

CONCLUSION:

This article concluded that the main locations of pain in the practice of CrossFit were the shoulders, the lumbar region, and the knees, respectively, with special attention given to the wrists, thighs, and legs. However, more extensive studies are necessary to further clarify the pathologies associated with pain.

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