

# PREVENTION OF JOINT INJURIES IN OUTDOOR SPORTS UNDER THE INFLUENCE OF COVID-19



ORIGINAL ARTICLE  
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PREVENÇÃO DE LESÕES NAS ARTICULAÇÕES EM ESPORTES AO AR LIVRE SOB A INFLUÊNCIA DA COVID-19

PREVENCIÓN DE LESIONES ARTICULARES EN DEPORTES AL AIRE LIBRE BAJO LA INFLUENCIA DEL COVID-19

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## ABSTRACT

**Introduction:** With the normalization of the prevention and control of the covid-19 epidemic, the proportion of outdoor sports in sports has gradually increased, but the risks have increased, resulting in joint injuries. **Objective:** Explore the prevention of joint injuries in outdoor sports under the influence of covid-19. **Methods:** 88 men and 64 women with ankle injuries, 45 men and 33 women with knee injuries, for a total of 133 men and 97 women volunteers were investigated by questionnaire, which included joint injuries, causes of injuries, and treatment methods after joint injuries, and the data were analyzed. **Results:** Currently, most joint injuries in outdoor sports belong to minor injuries, which can recover after some minor readjustments and will not cause much impact on the sportsmen. However, there are also some serious injuries. **Conclusion:** The athletes themselves must be fully prepared, including the use of protective gear and equipment, psychological adjustment, and learning knowledge about sports protection. Coaches and volunteers should give scientifically based and sensible guidance according to the actual situation of the sportsmen to reduce the incidence of joint injuries as much as possible. **Level of Evidence II; Therapeutic studies - investigation of treatment outcomes.**

**Keywords:** COVID-19; Injuries, Sports; Accident Prevention.

## RESUMO

**Introdução:** Com a normalização da prevenção e controle da epidemia de covid-19, a proporção de esportes ao ar livre no esporte tem aumentado gradualmente, mas os riscos têm aumentado, resultando em lesões articulares. **Objetivo:** Explorar a prevenção de lesões nas articulações em esportes ao ar livre sob a influência da covid-19. **Métodos:** 88 homens e 64 mulheres com lesões no tornozelo, 45 homens e 33 mulheres com lesões no joelho, num total de 133 homens e 97 mulheres voluntárias foram investigados por questionário, que incluiu lesões nas articulações, causas de lesões e métodos de tratamento após lesões nas articulações, tendo os dados sido analisados. **Resultados:** Atualmente, a maioria das lesões nas articulações em esportes ao ar livre pertencem a lesões menores, que podem recuperar-se após alguns pequenos reajustes, o que não causará muito impacto nos esportistas, porém há também algumas lesões graves. **Conclusão:** Os próprios esportistas devem estar totalmente preparados, incluindo o uso de aparelhos e equipamentos de proteção, o ajuste psicológico e o aprendizado dos conhecimentos sobre proteção esportiva. Os treinadores e voluntários devem dar orientações cientificamente fundamentadas e sensatas de acordo com a situação real dos praticantes do esporte, a fim de reduzir ao máximo a incidência de lesões articulares. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

**Descritores:** COVID-19; Lesões Esportivas; Prevenção de Acidentes.

## RESUMEN

**Introducción:** Con la normalización de la prevención y el control de la epidemia del covid-19, la proporción de deportes al aire libre en el deporte ha aumentado gradualmente, pero los riesgos han aumentado, dando lugar a lesiones articulares. **Objetivo:** Explorar la prevención de lesiones articulares en deportes al aire libre bajo la influencia del covid-19. **Métodos:** 88 hombres y 64 mujeres con lesiones de tobillo, 45 hombres y 33 mujeres con lesiones de rodilla, un total de 133 hombres y 97 mujeres voluntarios fueron investigados mediante un cuestionario, que incluía las lesiones articulares, las causas de las lesiones y los métodos de tratamiento después de las lesiones articulares, y se analizaron los datos. **Resultados:** En la actualidad, la mayoría de las lesiones articulares en los deportes al aire libre pertenecen a lesiones menores, que pueden recuperarse tras unos pequeños reajustes, que no causarán mucho impacto en los deportistas, sin embargo, también hay algunas lesiones graves. **Conclusión:** Los propios deportistas deben estar totalmente preparados, incluyendo el uso de equipos de protección, la adaptación psicológica y el aprendizaje de los conocimientos sobre protección deportiva. Los entrenadores y los voluntarios deben dar orientaciones con base científica y sensatas, de acuerdo con la situación real de los deportistas, para reducir al máximo la incidencia de las lesiones articulares. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

**Descriptorios:** COVID-19; Lesiones en Deportes; Prevención de Accidentes.



## INTRODUCTION

Driven by sports events, people's sports awareness and level are improved.<sup>1</sup> The traditional sports theories and methods can no longer meet the needs of modern people for sports training. Both professional athletes and sports lovers urgently need to learn sports knowledge. These knowledge can make them have a formal training mode and master standard training actions, which can help people improve training efficiency, avoid the damage caused by sports, prolong sports life, and maintain good physical function and sports state.<sup>2</sup> Even if they are injured in sports, using these professional knowledge can help them recover quickly and avoid the secondary injury caused by sports injury. It has no impact on the subsequent life, or even has no impact on the subsequent life.<sup>3</sup> There are many kinds of injuries caused by sports, and sports joint injury is the most common and easy to suffer from. How to effectively prevent sports joint injury is what athletes need to learn most.<sup>4</sup> There are many kinds of sports joint injuries, among which the most common are ankle injury, shoulder injury and knee injury.<sup>5</sup> Most of the reasons for these injuries are because the athletes are not proficient in technical movements, lack of necessary warm-up movements and lack of necessary self-protection awareness.<sup>6</sup> For prevention strategies, we should guide them from two aspects: coaches and athletes.

## METHOD

In order to further study the prevention of outdoor sports joint injury under the influence of covid-19, this paper uses the way of questionnaire to study the problems of outdoor sports enthusiasts with ankle injury, including the injury situation, the cause of injury and the treatment after joint injury, so as to explore the ways to prevent joint injury and prevent the deterioration of joint injury.

In terms of the selection of questionnaire research objects, in order to further accurately locate the respondents and reduce the time cost and labor cost of object screening as much as possible, this paper contacted some sports lovers with a history of outdoor sports joint injury according to the principle of complete voluntariness to investigate the related sports injuries, including 133 men and 97 women. Through preliminary consultation and screening, it can be seen that 88 men and 64 women are sports lovers with ankle injury, 45 men and 33 women are sports lovers with knee injury. The study and all the participants were reviewed and approved by Ethics Committee of Xi'an Physical Education University (NO.2019XPEU-09SD). These volunteers have filled in the relevant questionnaires truly and effectively. After obtaining some first-hand data, use Excel software to integrate, input and analyze the obtained data, and make the research results clearer by making charts.

## RESULTS

### Joint injury in outdoor sports

In the investigation of ankle injury, 88 men and 64 women with a history of ankle injury were investigated, as shown in Figure 1. The ankle injury with the highest proportion was sprain, of which 32 cases were male, accounting for 36.36%, and 27 cases were female, accounting for 42.19%; The second was ankle strain, in which 28 cases were male, accounting for 31.82%, and 19 cases were female, accounting for 29.69%; The third is skin damage, of which 13 cases were male, accounting for 14.77%, and 7 cases were female, accounting for 10.94%; The fourth is tendon injury, in which 9 cases were male, accounting for 10.23%, and 7 cases were female, accounting for 10.94%. It can be seen that ankle injury is a common problem in the process of outdoor sports. When ankle injury occurs, the degree of injury is relatively light. It can return to normal through timely and effective medical treatment, which will not have too much impact on future life.

The occurrence of knee joint sports injury varies with different sports events. However, according to the analysis of the characteristics of knee joint injury, the occurrence of knee joint injury is closely related to the special technical requirements. Knee joint is a very important joint in the human body, which plays an important role in the weight-bearing movement of lower limbs. Knee joint injuries are also common in clinic. Knee joint injuries mainly include:

In the investigation of knee joint injury, through the investigation of 45 men and 33 women with a history of knee joint injury, as shown in Figure 2, the knee joint injury with the highest proportion is meniscus injury, including 15 men, accounting for 33.33%, and 12 women, accounting for 36.36%; The second was cartilage injury, in which 12 cases were male, accounting for 26.67%, and 7 cases were female, accounting for 21.21%; The third is AL, that is, the injury of internal and external collateral ligament, in which 5 cases occurred in men, accounting for 11.11%, and 6 cases occurred in women, accounting for 18.18%; The fourth is CL, that is, cruciate ligament injury, in which 6 cases were male, accounting for 13.33%, and 3 cases were female, accounting for 9.09%. It can be seen that the degree of knee joint injury is relatively heavy compared with that of ankle joint, and many of them belong to irreversible injury. Even after timely medical treatment, it will also bring some sequelae and affect future life. At the same time, the frequency of knee injury is smaller than that of ankle.

### Causes of joint injury in outdoor sports under the influence of covid-19

In order to explore the prevention strategy of outdoor sports joint injury under the influence of covid-19 epidemic, it is necessary to analyze the causes of outdoor sports joint injury, so as to improve the sports situation.

In the investigation of the causes of joint injury in outdoor sports, 133 men and 97 women with a history of joint injury were investigated, as shown in Table 1. For men, the main cause of joint injury in outdoor sports is "too intense exercise and failure to pay attention to safety", accounting for 25.56%; The second is "no necessary warm-up and stretching before exercise", accounting for 19.55%; "Excessive fatigue during exercise leads

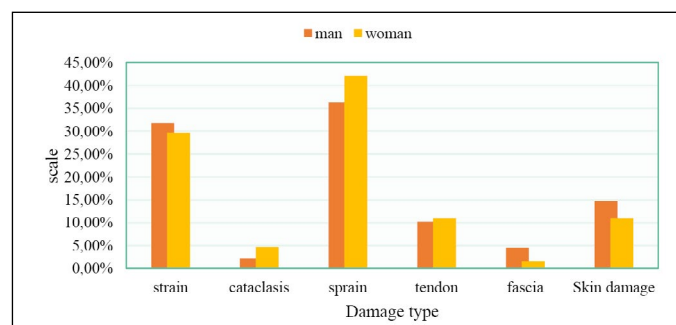


Figure 1. Ankle injury.

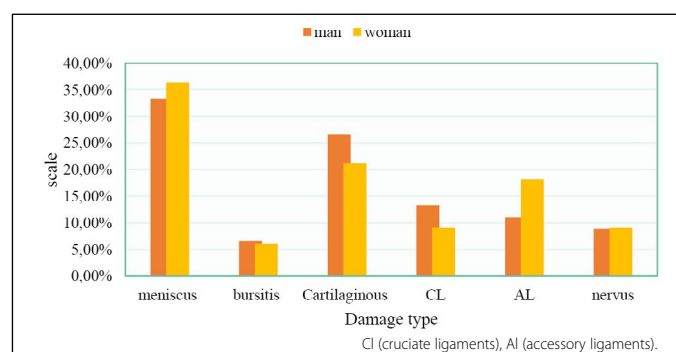


Figure 2. Knee injury.

**Table 1.** Causes of joint injury in outdoor sports.

Cause	Male		Female	
	Number of people	Proportion	Number of people	Proportion
Not skilled enough to master exercise skills	15	11.28%	11	11.34%
The necessary warm-up and stretching before exercise	26	19.55%	19	19.59%
Stress during exercise, inadequate attention	9	6.77%	18	18.56%
Sports equipment does not meet actual needs	16	12.03%	27	27.84%
Exercise is too intense, not paying attention to safety	34	25.56%	8	8.25%
Excessive exhaustion during exercise leads to physical overdrift	17	12.78%	7	7.22%
Affected by other physical discomfort	16	12.03%	7	7.22%

to physical overdrift”, “sports equipment does not meet the actual needs”, “affected by other physical discomfort” and “not proficient in sports skills”, the proportion is roughly the same, slightly more than 10%.

For women, the main cause of injury of outdoor sports joints is “sports equipment does not meet the actual needs”, accounting for 27.84%; The second is “no necessary warm-up and stretching before exercise”, accounting for 19.59%; The third is “nervous and inattentive during exercise”, accounting for 18.56%; The fourth is “not proficient in sports skills”, accounting for 11.34%.

### Treatment of joint injury in outdoor sports under the influence of covid-19

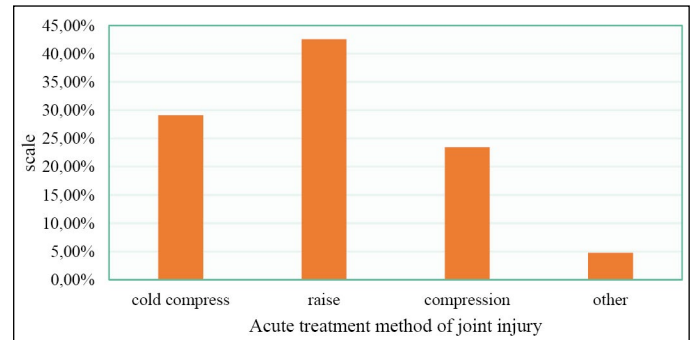
For outdoor sports, joint injury is an inevitable probability event. Timely medical treatment at the first time of joint injury can effectively reduce the harm degree of joint injury and reduce the severity of joint injury as much as possible. On the contrary, if we can not carry out timely and effective treatment, the joint injury will gradually worsen, and eventually pose a certain threat to the health of athletes. Especially under the influence of covid-19 epidemic, medical resources fluctuated to a certain extent. Some minor injuries and recovery sometimes have the problem of difficult medical treatment, which requires sports lovers to deal with and recover themselves. Therefore, to explore the prevention of joint injury in outdoor sports under covid-19 epidemic, we should also analyze the treatment of joint injury, including acute treatment of joint injury and chronic treatment of joint injury for a period of time. (Table 2)

In the investigation on the acute treatment methods of joint injury in outdoor sports, through the investigation of 230 athletes with a history of joint injury, as shown in Figure 3, the first one in the acute treatment methods of joint injury is “raising the affected part”, accounting for 42.61%; Followed by “cold compress”, accounting for 29.13%; The third is “pressure bandage”, accounting for 23.48%. By consulting sports personnel and medical workers of relevant disciplines, it can be seen that these methods can effectively improve the affected area in the first time of joint injury. At this time, the wounded need to seek medical treatment in time while dealing with acute injury, so as to strive for better medical timeliness. (Figure 4)

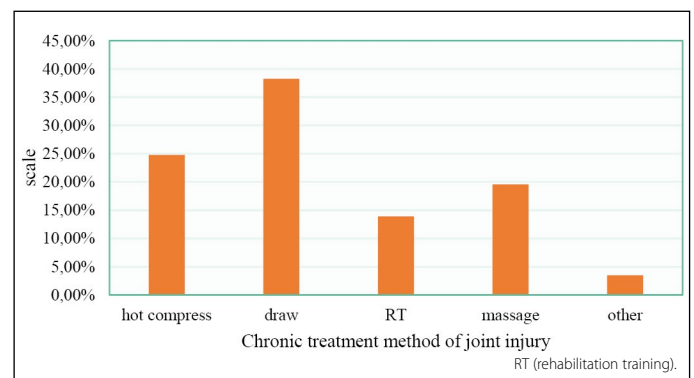
In the investigation of chronic treatment methods of joint injury in outdoor sports, through the investigation of 230 athletes with a history of joint injury, it can be seen that, as shown in Figure 3, stretching training accounts for the first in the chronic treatment methods of joint injury, accounting for 38.26%; Followed by hot compress, accounting for 24.78%; The third is massage, accounting for 19.57%; The fourth is RT (rehabilitation training), accounting for 13.91%.

**Table 2.**

Approach	Number of people	Proportion
Cold compress	67	29.13%
Raise the affected area	98	42.61%
Stamping	54	23.48%
Other	11	4.78%



**Figure 3.** Acute treatment of joint injury.



**Figure 4.** Chronic treatment of joint injury.

## DISCUSSION

### Common causes of joint injury in outdoor sports

Many entry-level sports enthusiasts and even senior enthusiasts are not proficient in technical movements due to the lack of professional training guidance in daily sports. The technical action is not standardized and the training content arrangement is unreasonable, which may lead to the injury of each joint to varying degrees under different stress. We should learn relevant sports knowledge before sports, which can improve sports efficiency and avoid the damage to the body caused by accidents during sports.

Warm up is a necessary link before all sports. Warm up can make the body gradually enter the state of motion and make the nervous system play a role. Proper stretching before exercise can improve the flexibility of ligaments and muscles, and avoid the harm of ligament strain and tear under the action of stress. It can make the joint flexibility meet the basic requirements of movement and reduce some avoidable sports injuries.

Many sports personnel lack the necessary sense of self-protection. Without any examination after injury, continue to exercise with pain, which is easy to cause secondary injury to the joint. Especially in the cold weather environment, it is necessary to take necessary heat preservation measures for the joints and wear relevant protective equipment.

### Prevention strategy of joint injury in outdoor sports under the influence of covid-19

Coaches should pay attention to the teaching of standardized technical movements, use different auxiliary means to strengthen the training of vulnerable parts, help athletes, and reduce the harm caused by sports while improving sports efficiency. The training plan should vary from person to

person. According to different age, gender and ability, we should consider many aspects and customize a targeted training plan suitable for athletes. Strengthen athletes' awareness of injury prevention and develop good sports habits. In the teaching process, not only the one-way teaching of technical actions, but also the principle of coordination of multiple parts. For athletes who have been injured, professional explanations should be given to their injuries and told to prevent secondary injuries.

Affected by covid-19, many outdoor sports areas are limited, and the replacement of the original habitual places will lead to maladjustment and damage to athletes; The psychological influence under the action of covid-19 leads to the possibility that athletes may not be in the best physical and mental state, resulting in sports injury. Athletes should pay attention to the study of technical movements and sports principles. In the training process, they should act according to their ability and try to adopt incremental training. After reaching the personal maximum, they should stop sports immediately. At ordinary times, we should pay more attention to core strength and joint strength, and strengthen the training of physical coordination and explosive power. Attach great importance to the warm-up before exercise, fix the exercise time every day, and maintain good exercise habits. Reasonable diet, reasonable work and rest, and maintaining good physical function and exercise state can effectively avoid the damage caused by exercise.

## CONCLUSION

Covid-19 epidemic brings the fluctuation and inclination of medical resources to a certain extent. Therefore, for outdoor sports lovers, non-urgent or minor joint injuries are likely to be difficult to get medical treatment. Therefore, it is very necessary to strengthen the prevention of joint injury in outdoor sports, learn the treatment methods after joint injury, and prevent the deterioration of joint injury. According to the research and investigation, most of the current joint injuries in outdoor sports are minor injuries, and only a small number of severe joint injuries occur, and the problems are largely caused by insufficient preparation and excessive psychological pressure. Therefore, outdoor sports enthusiasts themselves should make adequate preparations, including the wearing of equipment and protective equipment and the development of warm-up stretching activities, so as to maintain good preparation for their own outdoor sports. Coaches should provide scientific guidance according to the actual situation of sports lovers, so as to build a safer sports environment for outdoor sports lovers in the covid-19 period, reduce the threat of sports injury as much as possible, and achieve the goal of win-win.

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**AUTHORS' CONTRIBUTIONS:** The author has completed the writing of the article or the critical review of its knowledge content. This paper can be used as the final draft of the manuscript. Every author has made an important contribution to this manuscript. Lu Jiaxin: writing and execution. Liu Xinmin: data analysis and article reviews.

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