

# CHARACTERISTICS OF MAJOR SPORTS INJURIES IN HIGH-PERFORMANCE ATHLETES



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CARACTERÍSTICAS DAS PRINCIPAIS LESÕES ESPORTIVAS EM ATLETAS DE ALTO DESEMPENHO

CARACTERÍSTICAS DE LAS PRINCIPALES LESIONES DEPORTIVAS EN ATLETAS DE ALTO RENDIMIENTO

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## ABSTRACT

**Introduction:** The focus of attention in high-performance athlete injuries tends to be on physical recovery, neglecting psychological factors and their practical social impacts on the rehabilitation of the injured athlete. In this phase, giving attention to the importance of athletes' thoughts, emotions, and motivation can speed up the biopsychosocial rehabilitation process. **Objective:** To analyze the characteristics involved in the major sports injuries of high-level athletes to provide a reference for athletes and coaches during recovery. **Methods:** This article analyzes through bibliographic research the characteristics of the major sports injuries in high-level athletes, including physiological, psychological, and social factors. **Results:** The physical impact of injuries requires patience and persistence for recovery, including additional muscle strengthening to compensate for the loss of residual joint proprioception, ensuring performance recovery. Mental factors such as insecurity when returning from games, reduced self-confidence, and fear of hurting the team must be worked through in parallel in multi-professional care and during long recovery periods. **Conclusion:** Sports injuries can occur in athletes of all levels. For elite athletes, the impact of injuries, especially severe ones that need to interrupt training or even surgery, will lead to forced suspension of training or competition, preventing the improvement of sports performance, decreasing the quality of the sports career, and may even lead to physical or psychological disability in severe cases. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

**Keywords:** Athletic injuries; Athlete, Elite; Rehabilitation.

## RESUMO

**Introdução:** O foco da atenção nas lesões dos atletas de alto desempenho tende a ser a recuperação física, negligenciando os fatores psicológicos e seus impactos sociais práticos na reabilitação do atleta lesionado. Atentar-se a importância dos pensamentos, emoções e motivação dos atletas nessa fase pode agilizar o processo de reabilitação biopsicossocial. **Objetivo:** Analisar as características envolvidas nas principais lesões esportivas dos atletas de alto nível, a fim de fornecer referência para atletas e treinadores durante a recuperação. **Métodos:** Este artigo analisa através de pesquisa bibliográfica as características das principais lesões esportivas dos atletas de alto nível, incluindo fatores fisiológicos, psicológicos e sociais. **Resultados:** O impacto físico das lesões requer paciência e persistência para recuperação, incluindo o fortalecimento muscular adicional visando compensar a perda da propriocepção articular residual, garantindo a recuperação do desempenho. Fatores mentais como insegurança na volta dos jogos, redução de autoconfiança e medo de prejudicar o time devem ser trabalhados paralelamente num atendimento multiprofissional e deve-se compensar os aspectos de socialização nas recuperações de longo prazo. **Conclusão:** As lesões esportivas podem ocorrer em atletas de todos os níveis. Para os atletas de elite, o impacto das lesões, especialmente as graves que precisam interromper o treinamento ou mesmo a cirurgia, levará à suspensão forçada do treinamento ou da competição, impedindo a melhoria do desempenho esportivo, diminuindo a qualidade da carreira esportiva e podendo até mesmo levar à incapacidade física ou psicológica em casos graves. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

**Descritores:** Traumatismos em Atletas; Atletas de Elite; Reabilitação.

## RESUMEN

**Introducción:** El foco de atención en las lesiones de los atletas de alto rendimiento tiende a centrarse en la recuperación física, descuidando los factores psicológicos y sus impactos sociales prácticos en la rehabilitación del atleta lesionado. Prestar atención a la importancia de los pensamientos, las emociones y la motivación de los deportistas en esta fase puede acelerar el proceso de rehabilitación biopsicológica. **Objetivo:** Analizar las características implicadas en las principales lesiones deportivas de los atletas de alto nivel, con el fin de proporcionar una referencia para los atletas y los entrenadores durante la recuperación. **Métodos:** Este artículo analiza a través de la investigación bibliográfica las características de las principales lesiones deportivas de los atletas de alto nivel, incluyendo factores fisiológicos, psicológicos y sociales. **Resultados:** El impacto físico de las lesiones requiere paciencia y persistencia para la recuperación, incluido el fortalecimiento muscular adicional destinado a compensar la pérdida de la propiocepción articular residual, asegurando la recuperación del rendimiento. Los factores mentales, como la inseguridad para volver a los juegos, la disminución de la confianza en sí mismo y el miedo a dañar al equipo, deben trabajarse en paralelo en una atención multiprofesional, y los aspectos de socialización deben compensarse en las recuperaciones a largo



plazo. **Conclusión:** Las lesiones deportivas pueden producirse en atletas de todos los niveles. En el caso de los deportistas de élite, el impacto de las lesiones, sobre todo de las más graves que obligan a interrumpir el entrenamiento o incluso a operar, conlleva la suspensión forzosa de los entrenamientos o de la competición, impidiendo la mejora del rendimiento deportivo, disminuyendo la calidad de la carrera deportiva y pudiendo llegar incluso a la incapacidad física o psicológica en los casos graves. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

**Descriptores:** Traumatismos en Atletas; Atletas de Élite; Rehabilitación.

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## INTRODUCTION

Sports injury refers to all kinds of injuries in the process of sports, which is closely related to sports training, sports technology, sports events, sports environment and equipment.<sup>1</sup> Sports injury is an important factor to limit high-level athletes to achieve better results, and even directly lead to high-level sports away from the sports arena. Therefore, it is of practical significance to study the sports injury factors of high-level athletes.<sup>2</sup> Sports injury can occur in all levels of athletes, for master level athletes, the impact of injury, especially the impact of major injuries that need to stop training or even surgery, will lead to forced suspension of training or competition, hinder the improvement of sports performance, shorten sports life, and in serious cases may cause disability.<sup>3</sup> Because the injured athletes will experience both physical and psychological effects in the whole process of sports injury and recovery, it is also regarded as an event with tension, depression and other factors.<sup>4</sup> The influence of sports injury on the mental health of the injured and the effect of the psychological state of the injured on the recovery of physical injury has always been a concern.<sup>5</sup> Experts have found that psychological depression caused by injury will directly affect whether athletes can actively participate in the treatment of injury. This behavior will reduce the effect of sports rehabilitation and interfere with the recovery process.

Sports injury is actually a major accident for athletes, because it will pose a great threat to the physical, emotional and social life of the injured.<sup>6</sup> Sports injury will bring a series of adverse consequences, including physical pain, interference, loss and disappointment of life goals, lack of confidence in the future and isolation from their own sports.<sup>7</sup> When athletes suffer from sports injury, the rehabilitation process usually focuses on the recovery of the body. This ignores the importance of athletes' thoughts, emotions and motivation in the process of successful rehabilitation.<sup>8</sup> The phenomenological experience of these high-level college athletes will help to improve the understanding of sports injury, because these experiences focus on the whole process of sports injury, not just the physical or psychological aspects of sports injury and rehabilitation.<sup>9</sup> Sports injuries often force many excellent athletes to end their sports career early, but also suffer from injuries, and even have a significant impact on the future life of athletes.<sup>10</sup> There are many reasons for sports injuries. This paper mainly analyzes the characteristics of major sports injuries of high-level athletes to provide reference for the majority of athletes and coaches, so as to avoid or reduce the occurrence of injuries.

### Physiological characteristics

Excessive physical fatigue refers to the excessive physical fatigue caused by the large amount or intensity of training and the lack of recovery. Among the high-level athletes with serious injuries, wrestlers are the most common, followed by basketball players, which is significantly different from the distribution of low-level athletes. Wrestling and basketball are antagonistic sports, but wrestling is a typical contact sport, in which players of both sides directly confront each other and suppress their opponents to win points. The human body has a physiological limit in the process of exercise. After exceeding it,

it will feel tired, lose attention during training, and deform technical movements. In this case, continuing training will undoubtedly cause great damage to the body, and it will cause unnecessary sports injuries for a long time.<sup>11</sup> Muscle strength plays a very good supporting role in the fixation of each joint, just like in sprint, if the calf muscle strength is insufficient, it will not be enough to push the ground, and it will be at a disadvantage in the starting process. At the same time, strong muscle strength can protect joints well, and some joint injuries are caused by insufficient muscle strength attached around them during exercise.

Physiological factors of sports injuries of high-level athletes in colleges and universities mainly include unhealed old injuries, excessive fatigue, insufficient muscle strength, insufficient endurance, poor flexibility and poor sensitivity. Figure 1 defines the classification of injuries in high-level sports training. Figure 2 is the ankle proprioception evaluation test.

In addition to strengthening the prevention and control of athletes' injuries in special training and formal competitions, we should also focus on strengthening the supervision and management of injuries of low-level athletes in non-special sports activities and other scenes. Figure 3 is the right knee X-ray film of athletes with knee joint injury.

When athletes do jumping, the time of landing stage and the time ratio of push-out period to buffer period can reflect the sports nature and working ability of athletes to some extent. The ankle angle and time data before and after training are shown in Figure 4.

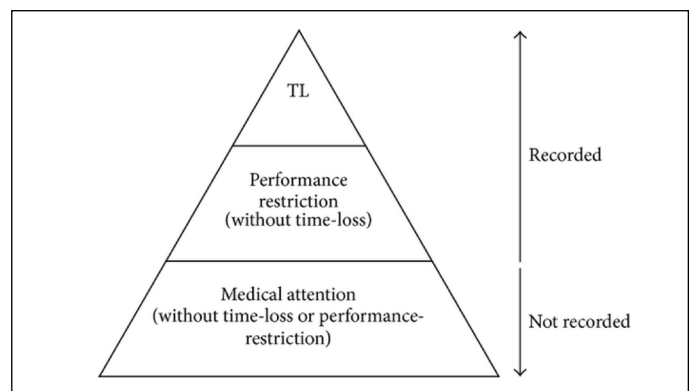


Figure 1. Classification of injury definition levels in high-level sports training.

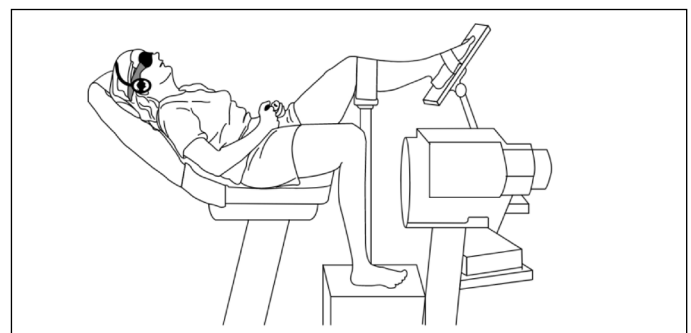


Figure 2. Ankle joint proprioception assessment test.



Figure 3. X-ray of the right knee of an athlete with knee joint injury.

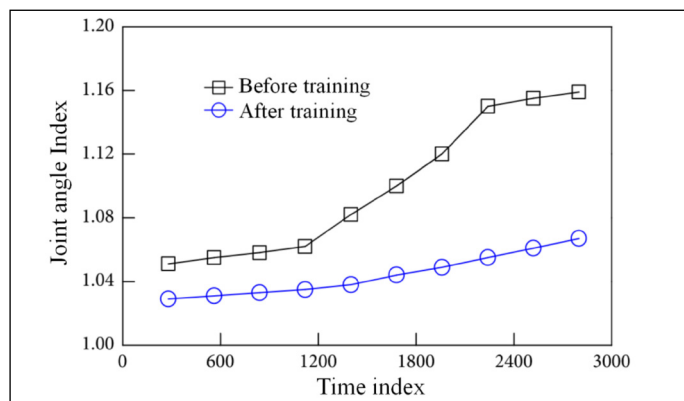


Figure 4. Ankle joint angle and time data before and after training.

Under the condition of poor flexibility, athletes' stretching ability will be insufficient when doing movements; under the condition of poor sensitivity, it will be unfavorable for the start of sprint; in addition, the ability to avoid obstacles will be insufficient in the process of sports. High-level athletes are mainly affected by their own factors, while low-level athletes are mainly affected by external factors. For example, the ratio of injuries caused by excessive fatigue and recurrence of old injuries of high-level athletes is higher than that of low-level athletes. Their training intensity is high in one training, and the decline of physical function leads to excessive fatigue. After excluding gender factors, low-level athletes are young, engaged in special training for a short time, and have low technical level, which may be an important factor that athletes are prone to injury. For the prevention of sports injuries, it is necessary to improve the prevention measures, technical movements and physical quality in the process of athletes' growth and training, so as to help reduce the occurrence of sports injuries.

### In terms of psychological characteristics

Through investigation, it is found that the psychological factors of sports injuries of high-level sprinters in colleges and universities mainly include depression during training or competition, high excitement during training or competition, inattention, poor self-protection awareness and so on. In training or competition, the internal distractions with distracted attention include self-distrust, anxiety, fatigue, pain, over-focus on one's own actions, etc., while the external distractions include audience, opponents or partners, environment, etc. Sports competition level is also a noticeable personal factor, because it can affect athletes' psychological reaction to sports injuries. Some athletes feel how uncomfortable it is to be unable to participate in sports training in their own major and how painful it is to watch others train. Low excitement during training or

competition is mainly due to athletes' physical discomfort, satisfaction with the arrangement of training or competition or other reasons, which lead to their unwillingness to participate in training or competition. That is to say, athletes train and compete from psychological resistance, while in actual training or competition, athletes continue to train and compete with their scalp in order not to be criticized.

When the players are nervous, the coaches can adopt the method of giving priority to language guidance and massaging muscles as a supplement. Athletes can also use deep breathing, meditation and other methods to adjust their inner tension. Figure 5 shows the psychological coordination of cross-project teams.

Although individual and collective athletes show the same changes in thoughts and feelings after injury, collective athletes are more likely to experience depression and frustration caused by missing teammates and losing training. In the process of training or competition, coaches should always remind athletes to keep a high level of attention.<sup>12</sup> Once the athletes are absent-minded, the coaches should give necessary reminders, and every detail of technical action requires the athletes to finish with high attention. In running training, coaches can repeatedly emphasize the things that athletes need to pay attention to. After a period of time, athletes will naturally think of coaches' requirements in similar situations, thus focusing on the things that they need to pay attention to, thus improving their sports performance. Table 1 shows the investigation of psychological training plan.

When the injury occurred shortly before the major competition and lasted until the start of the competition, the sense of disappointment and loss of the injured will obviously increase, and the time of injury plus the severity of injury and the loss of the competition season will cause dramatic changes and turbulence in the emotions of the injured. Test the accuracy change of athletes' psychological behavior operation under different integration scales, as shown in Figure 6.

Excessive excitement during training or competition refers to excessive excitement during training or competition, and it is impossible to make a correct understanding of technical movements and

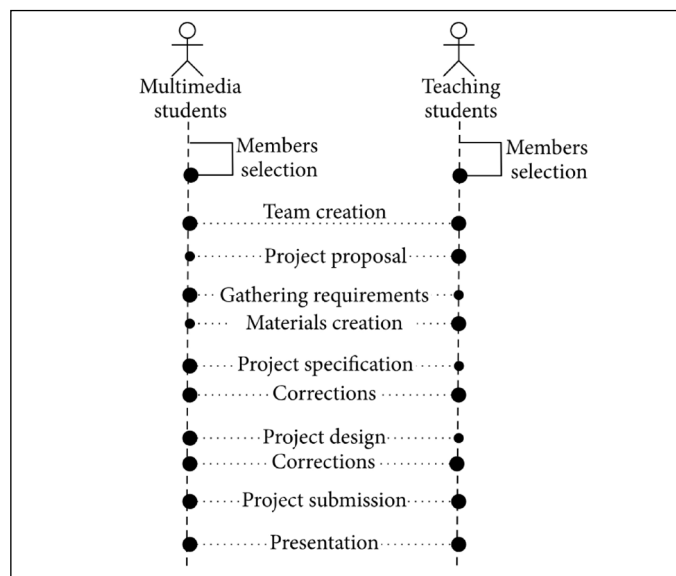
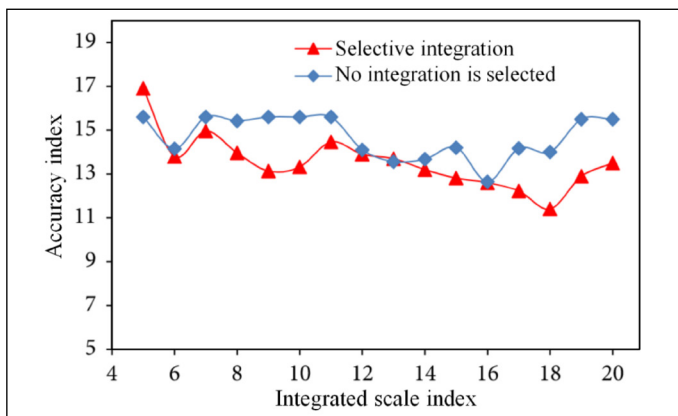


Figure 5. Psychological coordination across project teams.

Table 1. Survey of psychological training plans.

	Number of people	Proportion (%)
Make a systematic psychological training plan	24	12
Arrange according to experience	176	88



**Figure 6.** The impact of different integration scales on the accuracy of athletes' mental behavior.

make a correct judgment on possible events during competition.<sup>13</sup> Therefore, in the process of training or competition, coaches should adjust the excitement of athletes, and should not be in a high state. Athletes who have experienced injuries are more likely to know how to cope with and deal with current sports injuries in terms of cognition, emotion and behavior. Personal injury experience provides useful information for the injured. This not only enables them to diagnose and predict injuries on the spot, but also helps them understand and prepare for future tasks.

## CONCLUSIONS

Sports injury is considered to be a major and depressing event, because it will have a disturbing impact on athletes' lives. The reaction of injured athletes to sports injuries can be manifested in cognition, emotion and behavior. For the prevention of sports injuries, it is necessary to improve the prevention measures, technical movements and physical quality in the process of athletes' growth and training, so as to help reduce the occurrence of sports injuries. Low excitement during training or competition is mainly due to athletes' physical discomfort, satisfaction with the arrangement of training or competition or other reasons, which lead to their unwillingness to participate in training or competition. In the process of training or competition, coaches should always remind athletes to keep high attention level. Once the athletes are absent-minded, the coaches should give necessary reminders, and every detail of technical action requires the athletes to finish with high attention. The purpose of athletes' competition and training is to win, but before that, we should keep athletes' health from harm or minimize harm, and carry out scientific training and teaching for the purpose of people's all-round development. The sports injuries of athletes in high-level sports teams are not caused by a single factor, but may be caused by many factors every time. Therefore, athletes should take precautions against various injury factors during training or competition.

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The author declare no potential conflict of interest related to this article

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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. YS: writing and performing surgery.

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