

## MUSCULOSKELETAL INJURIES IN AMATEUR SAND VOLLEYBALL ATHLETES: CAUSES, SYMPTOMS AND IMPACTS ON PERFORMANCE

John Henry de Oliveira Vale<sup>1</sup>, Marcela Godinho Miranda do Vale<sup>2</sup>, Mariana dos Anjos Furtado de Sá<sup>3</sup>, Renata Pessoa Portela<sup>4</sup>, Ana Clara Cunha Parente<sup>5</sup>, Gabriel de Oliveira Vale<sup>6</sup>, Matheus Quarella Munhoz<sup>7</sup> and João Alberto Navarro Nazaré<sup>8</sup>

### ABSTRACT

The study analyzed the main injuries in amateur sand volleyball athletes, focusing on the causes, symptoms and impact on sports performance. A total of 25 athletes were investigated using structured questionnaires. The results indicated that the most affected joints are shoulders (24%), ankles (12%), knees (16%) and lumbar (12%), highlighting that explosive movements and landings increase the risk of injury. In addition, 28% reported joint instability, while 36% showed visible signs of injury, such as swelling and redness. Ankle instability and knee pain were associated with biomechanical factors and chronic overloads. It is concluded that the absence of adequate technical support and the lack of effective prevention strategies contribute significantly to the occurrence of injuries among amateur sand volleyball athletes. Thus, it is essential to implement preventive measures and strengthening programs to minimize risks and promote the safe practice of sport.

**Keywords:** Sand volleyball, Sports injuries, Injury prevention, Joint instability.

### INTRODUCTION

Constant physical activity brings important benefits, such as improving people's health and quality of life. In general, exercising regularly and in a structured way contributes

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<sup>1</sup>Master in Health Education in the Amazon  
University of the State of Pará

<sup>2</sup>Master in Health Education in the Amazon  
University of the State of Pará

<sup>3</sup>Dr. in Rehabilitation Sciences  
University of the State of Pará

<sup>4</sup>Master in Society, Environment and Quality of Life  
University of the State of Pará

<sup>5</sup>Resident Physiotherapist in Trauma-Orthopedics  
University of the State of Pará

<sup>6</sup>Undergraduate student in Physiotherapy  
University of the State of Pará

<sup>7</sup>Undergraduate student in Physiotherapy  
University of the State of Pará

<sup>8</sup>Undergraduate student in Physiotherapy  
University of the State of Pará



to the prevention of chronic diseases and cardiovascular problems, in addition to helping to reduce symptoms of anxiety and depression. It also promotes gains in self-esteem, self-concept, and perception of one's own image (CANDIOTTO *et al.*, 2023).

Currently, volleyball is one of the most practiced sports globally, both by professional and amateur athletes (KILIC *et al.*, 2017). The practice of sports requires an integration of repeated body movements, which can increase the probability of injury (JAMES *et al.*, 2014). However, the technical level of the athlete, whether amateur or professional, influences the physical demands and, consequently, the susceptibility to injuries.

Professional athletes, because they have a greater load of training and games, are more exposed to the risk of injury (BENEKA *et al.*, 2007). On the other hand, these athletes are expected to have a more refined technique and know better how to react in risky situations, which can help minimize injuries (BERE *et al.*, 2015). Thus, athletes with different technical levels may have different injury profiles.

The relevance of the study on the physical and health conditions of amateur sand volleyball practitioners lies in the frequency and impact of these injuries, which can compromise the quality of life and lead to early abandonment of the sport (BENEKA *et al.*, 2007). Unlike professional athletes, who have multidisciplinary teams for injury prevention and recovery, amateur practitioners usually have less support and technical guidance, which increases the incidence of joint and muscle problems. In this context, it is essential to identify the main injuries and symptoms faced by these athletes to support interventions that promote the safe and sustainable practice of volleyball (KILIC *et al.*, 2017).

The main objective of this study was to identify and analyze the most common types of injuries in amateur sand volleyball players in the city of Santarém-Pará, also investigating the factors that contribute to their occurrence and the symptoms reported by these athletes. In addition, it seeks to understand the impact of these injuries on the players' routine, including their sports performance and the influence they can have on the decision to continue or stop the practice of the sport. By offering a detailed analysis of the topic, the study aims to provide information that can serve as a basis for future research and interventions in the area of health and amateur sport. Thus, understanding the specific demands and risks faced by amateur athletes is key to developing safer and more sustainable sports environments.

## THEORETICAL FRAMEWORK

Despite the low physical contact with the opponent, volleyball has a high incidence of injuries, especially in the ankle, knee, shoulders, hands and spine. Ankle sprains account



for 41% of all injuries. This injury is characterized by an acute injury. It is in the attack zone where most ankle sprain injuries occur, since during the landing of a block, an attack or a jump lift, athletes can fall with one of their feet poorly positioned on the ground, on the foot(s) of their teammate or opponent, causing serious consequences (Goulart, 2017).

In the biomechanics of injury there are two sprain mechanisms, eversion and inversion. The highest prevalence of injuries is in the inversion mechanism, since the stabilizing structures of this movement are less strong when compared to the ligaments involved in the eversion mechanism. According to Goulart, (2017) the medial collateral ligament (deltoid) is stronger than the three lateral ligaments (anterior talofibular ligament, calcaneofibular ligament and posterior talofibular ligament), arranged laterally. In addition, the notch created by the fibula extends more distally than the tibia.

Thus, these are the factors that limit eversion and are responsible for the high incidence of ankle sprains due to inversion. The practice of volleyball manifests itself through a series of complex movements, requested and executed quickly and with muscle explosion. These actions involve changes of direction, jumps and landings performed quickly and consecutively from 250 to 300 motor acts (KILIC *et al.*, 2017).

Therefore, volleyball is among the sports with the highest rate of sprains recorded in practicing athletes, in addition to being the most common injury among them. The inversion mechanism is present in 90% of cases (KUHN, 2017). It is worth mentioning that the biggest concern, in most cases, is not related to the injuries of high-performance athletes.

Professional volleyball athletes can be accompanied by sports and health professionals, being welcomed by training centers that, through technology and biomechanical analysis, minimize the possibility of injuries (Spagnol *et al.*, 2011).

## **METHODOLOGY**

The study used a quantitative, cross-sectional and descriptive approach to explore the injury profile in amateur sand volleyball practitioners in the city of Santarém, as outlined in the research plan. The option for the cross-sectional method allowed the observation, in a timely manner, of characteristics and frequencies of injuries associated with the practice of this sport (Lakatos; Marconi, 2018).

The selection of participants was intentional, considering criteria such as a minimum age of 18 years and the regular practice of sand volleyball at the amateur level. Data collection took place in sports venues in the city, after the participants were duly informed of the research objectives. The study protocol was approved by the Research Ethics Committee of the State University of Pará (opinion No. 7,107,141).

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Data were obtained through a structured questionnaire composed of two parts. The first collected general information, including demographics, training frequency, and sports history. The second focused on musculoskeletal injuries through the Sports Readiness Questionnaire with a focus on musculoskeletal injuries, adapted from existing models, which evaluated aspects such as the type, location, and severity of injuries (Silveira Júnior et al, 2016).

The results were analyzed using descriptive techniques, such as calculation of means and absolute and relative frequencies. The information was organized in graphs and tables to facilitate the interpretation of the data. This methodology was effective in identifying patterns and factors associated with injuries, contributing with relevant information for the development of preventive measures and for the promotion of safer sports practices in the context of sand volleyball.

## RESULTS AND DISCUSSION

Table 1, generated from the questionnaire of musculoskeletal injuries for Sports Readiness, it is observed that a little more than half of amateur sand volleyball athletes have some type of pain that impairs their performance.

Table 01. Do you have pain in training, games (competitions) that impairs your performance or sports performance?

YES	13 (52%)
NO	12 (48%)

Source: authors, 2024

Among the 25 amateur sand volleyball athletes analyzed, 24% reported feeling pain in the shoulder during training or games, while 4% had pain in the wrist region. In addition, 12% reported discomfort in the lumbar region, 16% in the knee and another 12% in the ankle. The practice of volleyball involves a series of complex movements that require quick execution and explosive force, such as changes of direction, jumps and agile and repeated landings, with 250 to 300 motor actions. These physical demands can contribute to the development of pain and injuries, affecting athletes' performance (KILIC *et al.*, 2017).

The results of this research show that musculoskeletal pain significantly affects the performance of volleyball athletes, impairing the execution of the movements necessary for the practice of high-performance sports. The shoulder, for example, is one of the most affected joints, due to the great demand for strength and mobility in repetitive movements, such as serves and attacks. According to Goulart (2017), the high frequency of shoulder injuries in volleyball is associated with chronic overload of the rotator cuff muscles and



tendons, especially in athletes who perform these explosive movements constantly. This type of pain not only affects the attacking strength but also compromises the accuracy and efficiency of the plays.

Another relevant point is the impact of pain in the lower back, which affects a considerable portion of volleyball players. Jumping, landing, and trunk rotation movements overload the spine, generating discomfort that compromises the ability to move quickly and with stability. KUHN (2017) argues that the biomechanical demands of volleyball, especially on firm surfaces and during long games, favor the incidence of low back pain. Athletes who suffer from this type of pain often lose agility and defensive precision, in addition to having difficulty sustaining the pace during training and competitions.

In addition, knee pain poses a significant challenge for volleyball athletes, especially due to the repeated jumping and landing actions. According to JAMES *et al.*, (2014), the knee joint is vulnerable to impact injuries, such as tendinopathies and anterior cruciate ligament injuries, especially in sports that require constant bursts of force. These pains affect the athlete's ability to jump and land safely, limiting the range in blocks and the efficiency in moving quickly around the court. The decrease in the ability to absorb impacts can also lead to a progression of injuries, further impairing performance.

Finally, ankle pain, often reported by volleyball players, directly affects stability and mobility during sports practice. Goulart (2017) points out that ankle sprains are one of the most common injuries in sports that involve rapid changes of direction and jump landings, such as volleyball. Athletes dealing with ankle pain may have difficulty performing agile and precise movements, impairing defense and the ability to react quickly to opposing plays. This impairment of joint mobility not only limits individual performance but also impacts team dynamics as a whole, highlighting the importance of prevention and strengthening programs to reduce the risk of injury.

The results of this study point to a significant prevalence of complaints related to joint instability among volleyball athletes, highlighting how this problem can impact performance and increase the risk of injury, as observed in table 02.

Table 02. Do you complain of joint instability (slack in the joint, falsified joint)?

YES	07 (28%)
NO	18 (72%)

Source: authors, 2024

Joint instability is often referred to as the sensation of "slack" or "falsifying" in the joints, mainly affecting the ankles and knees, which are critically demanded during sports practice (JAMES *et al.*, 2014). Of those who reported joint instability, 8% stated that it was



in the wrist region, 4% in the shoulder region, 12% in the knee region, and 8% in the ankle region.

According to KUHN (2017), the high demand for sudden movements and changes of direction in volleyball puts the joints under considerable stress, increasing the likelihood of episodes of instability, which not only reduce the efficiency of the movement, but also compromise the athlete's safety.

Specifically, ankle instability is a recurring complaint among volleyball players due to the nature of the sport, which involves repeated jumps and landings. KUHN (2017) reports that episodes of ankle sprain can occur as a result of a poorly treated sprain or a chronic weakness in the joint stabilizers. This feeling of insecurity undermines the confidence of athletes when performing high-demand movements, such as blocks and quick defenses, limiting mobility and increasing vulnerability to new injuries. Functional impairment can also lead to a reduction in muscle explosion, which is essential for effective jumps, affecting the athlete's overall performance in training and competition.

In addition, knee instability is another critical problem that interferes with the sports performance of volleyball athletes. The knee is a crucial supporting joint that handles intense forces during jumps and landings. Studies such as Goulart's (2017) highlight that the feeling of "slack" in the knee can be caused by muscle imbalances or previous ligament injuries, such as the rupture of the anterior cruciate ligament. This instability compromises the athlete's ability to perform fast and safe movements, making them more susceptible to additional injury and limiting their agility and endurance. The presence of joint instability also affects the biomechanics of movements, forcing adaptations that can lead to overloads on other joints, further exacerbating problems and impairing the longevity of the sports career.

Table 3 shows that the results of the research highlight the frequent occurrence of visible signs of injury, such as swelling, heat, redness and spots in volleyball athletes.

Table 03. Do you have visible signs of injury (swelling, local warmth, redness, spotting, deformity, blockage, or locking)?

YES	09 (36%)
NO	16 (64%)

Source: authors, 2024

The athletes reported that these signs are noticeable especially after episodes of acute trauma during training or games. Of those who reported visible signs of injury, 4% in the wrist region, 8% in the shoulder region, 4% in the lumbar region, 8% in the knee region and 12% in the ankle region.



The incidence of swelling, for example, is commonly reported in the ankles and knees, areas vulnerable to twisting and intense impacts. According to Gomes *et al.* (2018), swelling is a natural inflammatory response of the body to soft tissue injuries, which can compromise the athlete's range of motion and functional capacity. The presence of swelling can indicate significant damage and the need for immediate intervention to prevent progression of the injury.

Another visible sign often observed is increased heat in the injured region, which suggests an active inflammatory process. Souza *et al.* (2016) explain that heat is a result of increased blood flow in the affected area, a defense mechanism that promotes the healing of damaged tissues. However, this temperature increase can be problematic for volleyball athletes, as excessive inflammation can limit the functionality of joints and muscles, affecting muscle mobility and strength. The control of the inflammatory process is, therefore, crucial for a safe and effective return to sports practice.

Additionally, redness and staining resulting from trauma, such as bruises and blows, are common and may indicate more serious underlying injuries. According to Silva and Fernandes (2017), redness is caused by the dilation of blood vessels in the injured area, and spots can be a sign of bruising, which can develop after a significant impact. These visible changes in the skin not only indicate injury, but can also affect the athlete's confidence during the execution of the movements. Athletes who exhibit these characteristics may be afraid to apply full force or perform explosive movements, impairing overall performance and increasing the risk of further injury from overcompensation or overprotection.

In Table 4, the results of the research indicate that postural deviations, such as changes in spinal alignment or differences in shoulder height, are common in volleyball athletes.

Table 04. Has any doctor ever told you that you have some spinal deviation or have you noticed?

YES	10 (40%)
NO	15 (60%)

Source: authors, 2024

These asymmetries can be caused by repetitive overload and unbalanced efforts during attack, defense, and blocking movements, which require a large mobilization of the trunk and upper limbs. According to Siqueira *et al.* (2010), intense practice and repetition of certain movements can contribute to postural changes, affecting the symmetry of the body and predisposing to injuries.





In addition, differences in arm or leg length were also observed among the research participants. Such asymmetries can impact the athlete's performance, especially in activities that require precision in jumping and reaching. Studies such as that of Costa and Oliveira (2019) suggest that imbalances in limb length can alter the biomechanics of movements, resulting in compensations that overload certain joints, such as the shoulders and knees, increasing the risk of chronic injuries over time.

The relationship between postural deviations and injuries in volleyball athletes was emphasized by Lima (2018), who highlights that misalignment of the spine and limbs can affect movement efficiency and compromise injury prevention. Adequate postural correction, combined with strengthening and stretching exercises, is essential to minimize the adverse effects of these asymmetries, ensuring better performance and preventing musculoskeletal complications in the future.

According to Ribeiro and Costa (2020), some changes are often perceived linked to the physical and emotional exhaustion caused by sports training, which was observed in some of the participants of this research and described in table 05:

Table 05. Have you noticed changes in mood, eating habits, or sleep related to training in the last 6 days?

YES	2 (8%)
NO	23 (92%)

Source: authors, 2024

Recent literature highlights that, for amateur athletes, the absence of psychological support and adequate recovery programs can aggravate these conditions (Lima & Santos, 2021). In addition, Ferreira *et al.* (2023) indicate that respiratory infections and sleep disorders are common during periods of intense training, which is compatible with the data observed in this research.

Gomes and Almeida (2022) state that perceived emotional changes can impact both sports performance and motivation for continuous practice. Thus, the data suggest a connection between the demands of the sport and the psychological exhaustion of athletes.

Therefore, the results obtained reinforce the need for more complete support, which involves both psychological monitoring and physical recovery programs, to preserve the health and maintain the motivation of amateur athletes, as pointed out by recent studies.

Table 6 shows the reduction in performance being mentioned by 40% of the athletes, regardless of whether they are related to the symptoms previously discussed.





Table 06. In the last 6 months have you noticed a drop in sports performance (performance)?

YES	10 (40%)
NO	15 (60%)

Source: authors, 2024

Lima and Oliveira (2020) explain that the combination of physical and psychological symptoms often results in decreased performance, especially in athletes who do not follow an adequate recovery program.

Research such as that of Pereira and Santos (2022) points out that an intense training routine, combined with a lack of time for recovery, can cause a drop in performance, which seems to be the case of the athletes analyzed in this study. This pattern reveals a failure in the management of the training load, which directly impacts performance.

In addition, Ferreira *et al.* (2023) point out that the perception of a drop in performance can be one of the first signs of overtraining, indicating the need for adjustments in the intensity and frequency of training to avoid injuries and exhaustion. Increasing awareness of this factor is essential to ensure healthier sports development. Thus, the data suggest a clear connection between training intensity and the reduction in performance of amateur athletes, highlighting the importance of recovery and follow-up strategies to prevent future problems.

## CONCLUSION

The results of this study revealed the high prevalence of musculoskeletal injuries among amateur sand volleyball athletes, with the shoulder, ankle, knee and lumbar joints standing out as the most affected. The analysis showed that explosive movements and frequent landings, inherent characteristics of the sport, are determining factors for the appearance of these injuries. In addition, issues such as joint instability and visible signs of injury were reported by a significant portion of the participants, demonstrating the direct impact of these conditions on sports performance and quality of life of athletes.

The lack of technical support and effective preventive strategies was identified as one of the main challenges faced by these athletes, reflected in a greater exposure to injuries and the difficulty of adequate recovery. These data reinforce the need for muscle strengthening programs, professional follow-up, and education on injury prevention, as a way to promote the safe and sustainable practice of sport.

It is concluded that, although sand volleyball provides significant benefits to physical and mental health, a more structured approach is essential to mitigate the risks associated with amateur practice. This study contributes with relevant information to support future



initiatives aimed at injury prevention, promoting the well-being and sports performance of these practitioners.





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