UNIVERSITY OF L]UBL]ANA



Case report Pain Relief Treatment of Fresh Sacral Fracture for a Professional Snowboarder one Month before Participation in the Winter Olympic Games

Breznik Katarina^{1*}, Pilih Klemen Aleš², Jerković Parać Božena³, Jeromel Miran⁴, Vauhnik Renata¹

- 1. University of Ljubljana, Faculty of Health Sciences, Department of Physiotherapy, Ljubljana, Slovenia
- ^{2.} Department of Traumatology, Slovenj Gradec General Hospital, Slovenj Gradec, Slovenia
- ^{3.} Department of Anesthesiology, Slovenj Gradec General Hospital, Slovenj Gradec, Slovenia
- 4. Department of Diagnostic and Interventional Radiology, Slovenj Gradec General Hospital, Slovenj Gradec, Slovenia
- Correspondence: Katarina Breznik; <u>kat.breznik3@gmail.com</u>

Citation: Breznik K, Pilih KA, Jerković Parać B, Jeromel M, Vauhnik R. Pain Relief Treatment of Fresh Sacral Fracture for a Professional Snowboarder one Month before Participation in the Winter Olympic Games. Proceedings of Socratic Lectures. 2025, 12, 84-89. https://doi.org/10.55295/PSL.12.2025.111

Publisher's Note: UL ZF stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

Abstract:

Sacral fractures result from trauma, stress, or low-energy impacts, especially in weakened bones. These fractures often present with nonspecific symptoms and require advanced imaging for diagnosis. Treatment varies based on fracture severity, with options ranging from conservative to surgical approaches. Pain management can involve pharmacological and non-pharmacological methods, such as acupuncture. A multidisciplinary approach is essential for recovery, particularly for athletes, to ensure early mobilization and avoid complications. In the case of a professional snowboarder who sustained a sacral fracture before the 2022 Winter Olympics, a CT-guided pain block and acupuncture enabled him to compete pain-free just 32 days post-injury. This case highlights the importance of an individualized, multidisciplinary approach when managing fractures in high-performance athletes, balancing both the healing process and the need to return to competition.

Keywords: Sacral fractures; Pain relief; Professional sport; Treatment; Symptomatic improvement







85 of 131

1. Introduction

1.1. Sacral fractures and treatment

Sacral fractures can result from high-energy trauma, repetitive stress, or low-energy impacts, particularly in individuals with weakened bones. They are categorized into traumatic fractures, stress fractures (fatigue and insufficiency types), and low-energy fragility fractures. Traumatic sacral fractures often occur alongside pelvic ring injuries (Barber et al., 2023; Wagner et al., 2015). Stress fractures include fatigue fractures, caused by repetitive stress on a healthy bone (commonly in athletes), and insufficiency fractures, which result from normal stress on weakened bone, particularly in older adults with osteoporosis (Shankar et al., 2024). Low-energy fragility fractures, also linked to osteoporosis, may be associated with spinal disorders (Barber et al., 2023).

These fractures often present with nonspecific symptoms like diffuse pain in the lower back, pelvis, or buttock, leading to frequent misdiagnosis. While plain radiographs are usually ineffective, advanced imaging such as magnetic resonance imaging (MRI) or computed tomography (CT) scans significantly aids diagnosis (Shankar et al., 2024; Wagner et al., 2015). Treatment approaches depend on severity: non-operative management, such as rest and gradual activity resumption, works well for stable fractures, whereas surgical intervention is required for more severe cases. Despite their clinical relevance, sacral stress fractures remain under-recognized, with limited standardized treatment protocols and research into risk factors and outcomes (Barber et al., 2023; Shankar et al., 2024).

The AOSpine sacral classification system divides sacral fractures into three types: Type A fractures are stable and managed conservatively, Type B fractures involve instability and may require surgery depending on severity, and Type C fractures compromise spinopelvic stability, requiring surgical intervention. However, there is limited agreement at the subtype level, leading to variability in treatment approaches. Further research is needed to improve classification reliability and establish evidence-based treatment protocols (Camino-Willhuber & Urrutia, 2022; Lambrechts et al., 2023).

C0 sacral fractures, often classified as type 2 in the Fragility Fracture of the Pelvis system, can be managed nonoperatively if stable. If instability or discomfort prevents mobilization, surgical stabilization may be necessary. Sacroplasty and transiliac-transsacral screw fixation are minimally invasive options, while triangular osteosynthesis may be required for more complex fractures. For neurological issues, nonoperative management is typically effective, but surgical decompression may be required if symptoms persist. The treatment goal is early mobilization to avoid complications from prolonged bed rest (Lambrechts et al., 2023).

1.2. Pain relief treatment

Effective pain management in both elite athletes and the general population often requires a multidisciplinary approach that integrates pharmacological and non-pharmacological strategies. Wang (2018) highlights the critical role of advanced imaging-guided techniques—such as fluoroscopy, CT, and ultrasound—in delivering precise and safe interventional treatments for conditions like spinal pain, joint pain, and neuropathic pain. These methods facilitate targeted administration of therapies like corticosteroids or anesthetics, reducing risks of complications and enhancing efficacy.

Elite athletes frequently use medications such as non-steroidal anti-inflammatory drugs (NSAIDs), opioids, and anesthetics to manage pain. While these are effective for shortterm relief, particularly for acute injuries or post-competition recovery, the potential for dependency and adverse effects from long-term opioid use necessitates a careful, balanced approach. Complementing pharmacological treatments with non-drug strategies—including physical therapy, exercise, psychosocial interventions, and attention to sleep and nutrition—is crucial for sustainable recovery and optimal performance (Hainline et al., 2018). Interventional techniques, including corticosteroid injections, play a significant role in both sports medicine and broader pain management contexts. For instance, ultrasoundguided injections for sacroiliac joint dysfunction or other joint-related pains, as noted by Wang (2018), offer comparable efficacy to fluoroscopy-guided approaches while minimizing radiation exposure. Similarly, Sandrasegaram et al. (2020) emphasize the value of conservative management approaches, such as physical therapy, ergonomic adaptations, and







86 of 131

non-invasive interventions like ganglion impair blocks, in providing long-lasting pain relief with fewer risks. Newer therapies, such as platelet-rich plasma (PRP) injections, show promise but require further evidence to confirm their efficacy in various conditions (Hainline et al., 2018). Together, these approaches highlight the importance of an individualized, multidisciplinary care plan in effectively addressing both acute and chronic pain (Hainline et al., 2018; Sandrasegaram et al., 2020; Wang, 2018).

1.3. Supportive pain relief therapy

Acupuncture therapy has gained significant recognition as an effective non-pharmacologic treatment for managing acute pain, including in patients with fractures such as sacral fractures. Research suggests that acupuncture can play a crucial role in reducing pain levels in patients experiencing fractures, offering a valuable alternative to opioid medications, which are associated with risks of addiction and adverse side effects. Acupuncture works by stimulating specific points in the body, which may influence the nervous system, reduce inflammation, and promote the release of natural pain-relieving substances like endorphins. This process can contribute to reduced reliance on opioids, thus lowering the risk of opioid-related complications, including addiction and overdose (Nielsen et al., 2022). Numerous studies and systematic reviews have demonstrated acupuncture's efficacy in improving pain management, reducing the need for pain medication, and enhancing overall patient satisfaction, particularly in fracture recovery (Schug et al., 2020; Nielsen et al., 2022). Acupuncture has also been shown to reduce pain intensity and shorten recovery time, making it a promising complementary therapy in acute pain management. Moreover, acupuncture is considered a low-risk treatment with minimal side effects when administered by trained practitioners, which further highlights its potential as a safe and effective adjunct in fracture care. Given its therapeutic benefits and minimal adverse effects, acupuncture presents a valuable option for improving the management of acute pain in fracture patients. Additionally, acupuncture's ability to manage acute pain may allow for reduced opioid use and prevent long-term complications associated with opioid treatment (Schug et al., 2020).

2. Case presentation

In preparation for the 2022 Winter Olympic Games, a professional snowboarder came to the Emergency Centre of the Slovenj Gradec General Hospital on 11 January 2022. On 7.1.2022, he fell on the track. While checking the training track, he was hit by another snowboarder, his board slipped off, whereupon he fell on his back with great force onto a flat surface. Shortly after the fall, he realized that he was not in severe pain at rest but had a specific pain on the movement of one of his turns, which made it completely impossible for him to compete. Physiotherapy was started the same day after the fall. They used TECAR, massage, vacuum therapy, and laser. After physiotherapy, the pain in most of his back subsided, but it persisted mainly in his lower back and prevented him from snowboarding competitively. A CT scan was performed, which was suspicious of a fracture at the level of S3 (**Figure 1**). An MRI scan was performed within 24 hours and, after consultation with the radiologist, showed sacral edema at the S3 level with a fine transverse fracture line, which was consistent with the anatomical location of the patient's problems (**Figure 2**).









Figure 1. CT scan shows suspected S3 vertebral fracture (circled): A – Coronal CT image, B – Transverse CT image, C – Saggital CT image.



Figure 2. MRI showed marked edema of the bony body and posterior elements of S3 with a fine probable fracture (circled): A – Coronal T2-weighted STIR MRI, B – Saggital T1-weighted MRI.

With a non-dislocated stable sacral fracture, surgical treatment was not considered. After open consultation with the patient and recognition of the possible drawbacks of potent pain treatment in the context of successful healing of the fracture, the symptomatic (pain management) treatment was decided upon. A consortium of a trauma surgeon, an interventional radiologist, and an anaesthesiologist (pain management specialist) was gathered. A CT-guided block (0,25 % Chirocaine 3 ml (7,5 mg) + 16 mg Dexamethasone) at the injury site was performed on 17.1.2022. The Slovenia Olympic Committee's consent for the corticosteroid application (therapeutic exception) was obtained beforehand. Further pain treatment (acupuncture) was provided. The patient successfully qualified for the Olympic Games, where, although he did not repeat his previous successes, according to his testimony, he completed the competitive runs completely pain-free. The competition occurred on 8.2.2022, 32 days after the injury, 28 days after the diagnostics, and 22 days after the application of the blockade.

The patient did not develop a pain sequela later over time. He could participate in further sports events with no limitations, leading the authors of this article to believe that cortico-steroid application in the setting of a fresh sacral injury did not detrimentally intervene with skeletal healing. No additional radiologic imaging was performed to confirm bony healing.

3. Discussion

Sacral fractures are rare and challenging to diagnose, often presenting with nonspecific symptoms that require advanced imaging for confirmation. Treatment typically involves non-operative approaches, though tailored strategies may be necessary for high-performing athletes (Barber et al., 2023; Shankar et al., 2024). Physiotherapists can contribute to the early diagnosis of sacral fractures by identifying specific patterns of pain and functional







88 of 131

limitations during biomechanical assessments and movement analysis. This can lead to timely referrals for imaging or further evaluation.

Sacral stress fractures are typically managed with conservative approaches, as seen in most reported cases. Treatment often includes rest, activity modification, physiotherapy to strengthen core muscles and improve flexibility, and nutritional supplementation to address any underlying deficiencies (Sandrasegaram et al., 2020; Silva et al., 2006; Vajapey et al., 2019). Silva et al. (2006) and Vajapey et al. (2019) describe instances where athletes, both amateur and professional, developed sacral stress fractures due to repetitive high-impact activities. These cases emphasize the success of non-operative treatments, which typically result in full recovery over several weeks through measures such as rest, cessation of high-impact activities, stretching exercises, and pain management with anti-inflammatory medications.

In managing sacral fractures, physiotherapy plays a significant role in reducing pain, improving functionality, and supporting recovery (Sandrasegaram et al., 2020). A comprehensive treatment plan, including active and passive ROM exercises, muscular strengthening, and various modalities like TECAR therapy, massage, vacuum therapy, and laser, can alleviate symptoms and promote gradual functional recovery. While physiotherapy helps alleviate pain and supports functional recovery, some cases may require advanced rehabilitation tools like antigravity treadmills and surgical interventions for severely displaced fractures. This integrated approach addresses both physical and psychological aspects, ensuring that athletes can return to their sport while minimizing long-term complications (Jaiswal et al., 2022).

In the notable case, a professional snowboarder with a sacral fracture received a CT-guided block and acupuncture, enabling him to compete pain-free in the Winter Olympics within 32 days of the injury. The reported case was a rare medical emergency where symptomatic improvement was attempted to establish a high functional requirement before the bone would physiologically heal completely. In doing so, the informed risk of the possible negative long-term health consequences of impaired healing of a sacral fracture was accepted. However, clinically, the patient remains without complaints to this day. The case underscores the need for a tailored, multidisciplinary, out-of-the-ordinary approach to managing fractures in high-performance athletes, where both the healing process and the urgency of returning to sport must be carefully balanced.

4. Conclusions

The successful pain management of pain related to a non-dislocated traumatic sacral fracture in a professional snowboarder highlights the importance of a multidisciplinary approach. This case underscores the value of individualized strategies tailored to the demands of high-performance athletes.

Conflicts of Interest: The authors declare no conflict of interest.

References

- 1. Barber LA, Katsuura Y, Qureshi S. Sacral Fractures: A Review. HSS J. 2023; 19:234-246. DOI:10.1177/15563316221129607
- 2. Camino-Willhuber G, Urrutia J. Classifications in Brief: The AOSpine Sacral Classification System. Clin Orthop Relat Res. 2022; 480:2182-2186. DOI:10.1097/CORR.0000000002319
- 3. Hainline B, Derman W, Vernec A, et al. International Olympic Committee consensus statement on pain management in elite athletes [published correction appears in Br J Sports Med. 2018;52:209. DOI: 10.1136/bjsports-2017-097884corr1]. *Br J Sports Med*. 2017;51(17):1245-1258. DOI:10.1136/bjsports-2017-097884
- 4. Jaiswal PR, Lakhwani MG, Phansopkar PA. Physiotherapeutic Rehabilitation of a Patient With a Comminuted Displaced Iliac Fracture and Superior and Inferior Pubic Rami Fractures: A Case Report. *Cureus*. 2022; 14:e28709. DOI:10.7759/cureus.28709







- Lambrechts MJ, Schroeder GD, Conaway W, et al. Management of C0 Sacral Fractures Based on the AO Spine Sacral Injury Classification: A Narrative Review. Clin Spine Surg. 2023; 36:43-53. DOI:10.1097/BSD.00000000001384
- Nielsen A, Dusek JA, Taylor-Swanson L, Tick H. Acupuncture Therapy as an Evidence-Based Nonpharmacologic Strategy for Comprehensive Acute Pain Care: The Academic Consortium Pain Task Force White Paper Update. Pain Med. 2022; 23:1582-1612. DOI:10.1093/pm/pnac056
- 7. Sandrasegaram N, Gupta R, Baloch M. Diagnosis and management of sacrococcygeal pain. BJA Educ. 2020; 20:74-79. DOI:10.1016/j.bjae.2019.11.004
- 8. Schug SA, Scott DA, Mott JF, Halliwell R, Palmer GM, Alcock M; APM:SE Working Group of the Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine (2020), Acute Pain Management: Scientific Evidence (5th edition), ANZCA & FPM, Melbourne. pp.921. Available at: https://www.anzca.edu.au/news/top-news/apsme5
- Shankar DS, Gillinov LA, Buldo-Licciardi M, Vargas L, Cardone DA. Clinical Presentation and Outcomes of Sacral Stress Fractures in Athletes: A Case Series of 13 Patients. Sports Health. 2024; 16:759-765. DOI:10.1177/19417381231190580
- 10. Silva RT, De Bortoli A, Laurino CF, Abdalla RJ, Cohen M. Sacral stress fracture: an unusual cause of low back pain in an amateur tennis player. Br J Sports Med. 2006; 40:460-461. DOI:10.1136/bjsm.2005.023473
- 11. Vajapey S, Matic G, Hartz C, Miller TL. Sacral Stress Fractures: A Rare but Curable Cause of Back Pain in Athletes. Sports Health. 2019; 11:446-452. DOI:10.1177/1941738119854763
- 12. Wagner D, Ossendorf C, Gruszka D, Hofmann A, Rommens PM. Fragility fractures of the sacrum: how to identify and when to treat surgically?. Eur J Trauma Emerg Surg. 2015; 41:349-362. DOI:10.1007/s00068-015-0530-z
- 13. Wang D. Image Guidance Technologies for Interventional Pain Procedures: Ultrasound, Fluoroscopy, and CT. Curr Pain Headache Rep. 2018; 22:6. DOI:10.1007/s11916-018-0660-1