

## Case Report

# Traumatic hallux sesamoid fracture: a case report

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## Abstract

The authors describe an extremely rare case of traumatic fracture of both hallux sesamoid bones, which was treated non-surgically, and the indications, contraindications, and unfavorable outcomes analyzed.

**Level of Evidence V; Therapeutic Studies; Expert Opinion.**

**Keywords:** Sesamoid bones; Fractures, bone; Hallux.

## Introduction

The sesamoid bones lie lateral and medial to the flexor hallucis longus, developing a similar function to the pulleys, allowing a better load distribution in the first ray, besides participating in the functionalities of flexor hallucis brevis tendons and the protection of flexor hallucis longus<sup>(1)</sup>. They are located on the plantar aspect, suffering the impact of the body weight against the ground, especially when jumping or during a race. There are two sesamoid bones, the tibial sesamoid is larger and more medial, and the fibular sesamoid is smaller and more rounded<sup>(1,2)</sup>.

Sesamoid bone fractures usually occur due to dorsiflexion trauma of the hallux and direct trauma in landing, for example<sup>(3)</sup>. Usually, tibial sesamoid fracture occurs because it is more fixed and larger, thus making it more susceptible to trauma. In addition, fractures generally present a more transverse feature, differing from pseudarthroses, which are more irregular and acute<sup>(4)</sup>.

Treatment options are conservative and surgical. Conservative treatment includes immobilization with a suropodalic cast or non-weight-bearing footwear for four to six weeks. On the other hand, the surgical treatment recommends implants such as screws or even sesamoid resection, that is, sesamoidectomy<sup>(1,2,5)</sup>, partially or totally, which has demonstrated in some studies an earlier return to sports activities in athletes<sup>(5)</sup>.

We emphasize that surgical treatment is contraindicated due to the patient's clinical or poor local skin conditions, and in fractures without deviation and without compromising the function of the plantar glenosesesamoid complex of the first metatarsophalangeal joint.

We report a case with a fracture in both sesamoids where conservative treatment was indicated because the patient did not meet the criteria for surgical treatment, which is an extremely rare with almost no publication in the literature.

## Case description

A 42-year-old female patient had a history of falling down the stairs with approximately 15 steps on 10/22/2021 with axial trauma to the foot in equinus and dorsiflexion in the first ray evolving with severe pain in the left forefoot, limitation to ambulation, and inability to support body weight. The patient attended the Emergency Department of the Hospital do Servidor Público do Estado de São Paulo on the same date.

Radiographs (Figure 1) were performed, demonstrating a transverse lateral sesamoid fracture and a transverse and comminuted medial sesamoid fracture, confirmed by computed tomography (Figure 2), revealing relative integrity of the plantar glenosesesamoid complex, and was opted for conservative treatment with cast and follow-up with serial radiographs every two weeks. The reasons to choose conservative treatment were: the tibial sesamoid fracture was comminuted.

Study performed at the Serviço de Ortopedia e Traumatologia do Hospital do Servidor Público Estadual (HSPE), São Paulo, SP, Brazil.

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ted, which would practically preclude the synthesis, and the fibular sesamoid fracture presented a transverse feature, that is, stable, showing good results in the non-surgical treatment.

The patient evolved with satisfactory results and consolidation after six weeks of cast immobilization (Figure 3) and was instructed to wear shoes with rigid soles for another four weeks. After that, the patient was referred to rehabilitation with good evolution, painless gait, weight-bearing capacity, daily activities without any limitation, and recovery of the range of motion, mainly from the first ray compared to the contralateral limb.

## Discussion

As discussed by Bichara et al.<sup>(6)</sup> and Tan et al.<sup>(3)</sup>, the hallux sesamoid bones play a crucial role in the first metatarsal joint, performing a pulley function and imparting most of the force to the first ray. Due to their location, they are subject to trauma or repetitive stress, presenting clinically with pain and limitation of physical activities since injuries to these bones,

especially fractures, often affect athletes. In addition, York et al.<sup>(7)</sup> also cite the high susceptibility of sesamoid bone fracture in athletes.

Sesamoid fractures can be classified as acute or stress fractures. In acute cases, they usually affect the tibial sesamoid because it is larger and more fixed, presenting a more transverse feature. In contrast, the fibular sesamoid tends to be less affected due to its high mobility and the ability to slide between the first and second rays in the first intermetatarsal space. It should be noted that fractures involving both sesamoids are extremely rare events.

As treatment options, Cohen<sup>(4)</sup> suggests conservative management with a cast for four to six weeks and another four to six weeks with an immobilizer boot. Surgical cases are reserved for deviated fractures or those that evolve with pseudoarthrosis or delayed consolidation. However, Stein et al.<sup>(2)</sup> and Robertson et al.<sup>(5)</sup> mention that high-performance athletes patients submitted to surgical treatment had an earlier return to activities, but the fracture time did not imply the result and/or fracture consolidation, as described by Robertson et al.<sup>(5)</sup>, that some athletes started with conservative treatment and after the poor evolution or worsening of symptoms underwent surgical treatment and returned to the same level of activity before fractures<sup>(2,5,8)</sup>.

## Conclusion

Conservative treatment proved efficient and allowed the return to daily activities, even with the rare fracture of the two sesamoids, according to the evolution of the case described in this study.



Figure 1. Radiographs from the day of the fracture (10/22/2021).

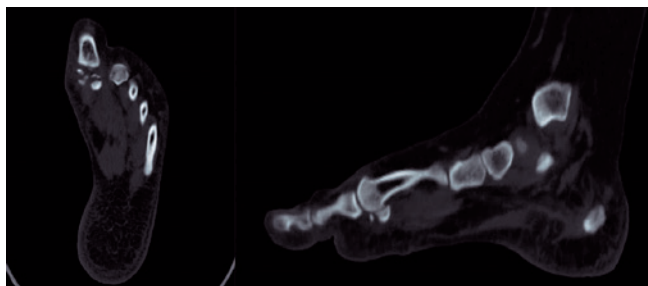



Figure 2. Computed tomography on 10/22/2021.



Figure 3. Radiographs after six weeks using a cast.

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**Authors' contributions:** Each author contributed individually and significantly to the development of this article: GDQM \*(<https://orcid.org/0000-0003-0296-4631>), and ESG \*(<https://orcid.org/0000-0001-9716-5431>), and WFM \*(<https://orcid.org/0000-0002-1007-9539>), GHO \*(<https://orcid.org/0000-0002-3386-381X>), and LVC \*(<https://orcid.org/0000-0002-0652-2390>) Conceived and planned the activities that led to the study, participated in the review process and approved the final version. All authors read and approved the final manuscript. \*ORCID (Open Researcher and Contributor ID) .

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