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## Avulsion fractures of the posterior tuberosity of the calcaneus (Case report and literature review)

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### Abstract

Avulsion fracture of the calcaneal tuberosity is a rare lesion. We describe the observation of an elderly and diabetic patient who presented this lesion. Surgical treatment was performed by screwing, completed by an immobilization with good anatomical and functional results.

**Keywords:** avulsion fracture, calcaneal tuberosity, screwing

### Introduction

Avulsion fractures of the calcaneal tuberosity is a very rare lesion <sup>[1]</sup>, which usually occur as a result of an indirect mechanism of forced dorsiflexion of the ankle or sudden contraction of the Achilles tendon.

Avulsion fractures of the calcaneal tuberosity could be promoted by osteoporosis, peripheral neuropathies as well as diabetes and patients on immunosuppressants <sup>[6]</sup>. Treatment is usually surgical <sup>[2]</sup>.

### Clinical case

Patient aged 58; diabetic on oral antidiabetic drugs and followed for hyperthyroidism under treatment.

She presents to the emergency room following a fall from the stairs with a reception on the right ankle stuck in a forced dorsiflexion position.

The patient had experienced severe pain with functional impotence. The examination had objectified an oedema and widening of the hind foot with phlyctene on the inner side of the ankle. (figure 1)



**Fig 1:** Clinical appearance with ecchymosis and phlyctene on the inner side.

Palpation found pain at the slightest mobilization of the ankle with a positive Thompson's sign. The radiological workup had shown an avulsion fracture of the calcaneal tuberosity type I according to the Breavis classification with rarefied bone trabeculae in the calcaneus. (Figure 2)



**Fig 2:** Profile radiograph of the right ankle showing the avulsion fracture of the calcaneal tuberosity Breavis 1

The patient was treated surgically, under local regional anesthesia with direct posterior approach. We proceeded to the reduction of the fragment held by 2 relatives who served as a guide for the cannulated screws. Osteosynthesis by cancellous screws under scopic control. (Fig. 3)

Breavis proposed a classification dividing avulsion fractures of the calcaneal tuberosity into 3 types [4] in which type 1 is the avulsion fracture of the tip of the calcaneal tuberosity, type 2 corresponds to a beak type fracture. Type 3 corresponds to infrabursal avulsion fractures propagating to the body of the calcaneus.

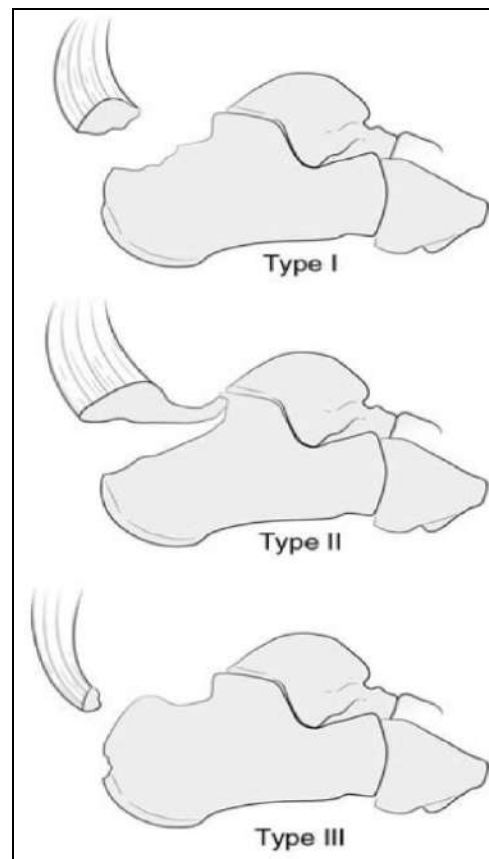


**Fig 3:** Osteosynthesis of the fracture with cancellous screws

An immobilization in plaster with a boot plastered with the ankle in 20° plantar flexion for 6 weeks. The postoperative after-effects were simple. Rehabilitation was started after the removal of the plaster in order to recover joint amplitudes with progressive loading of the lower limb.

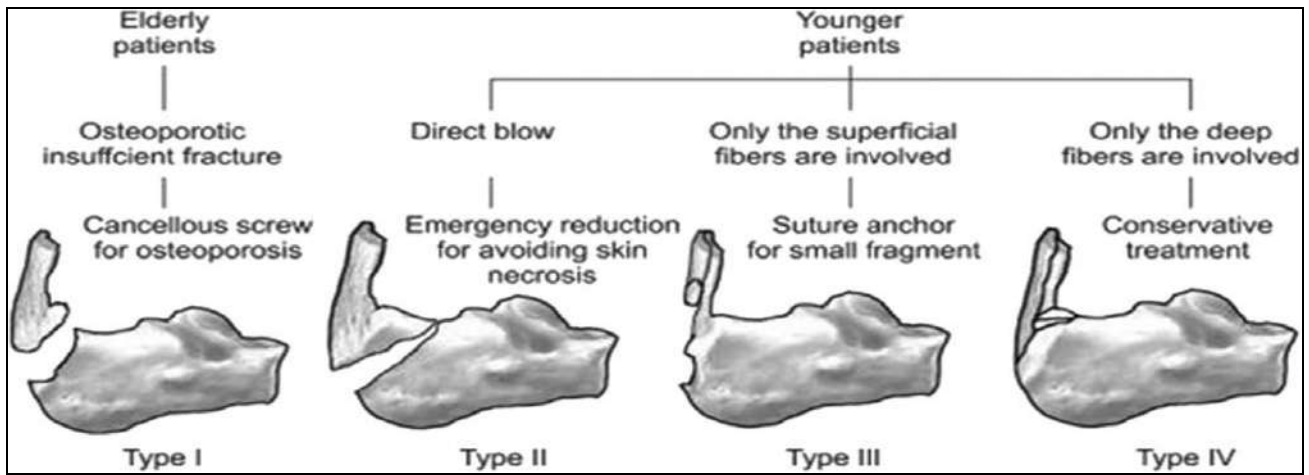
**Discussion**

Avulsion fractures of the calcaneal tuberosity represent only 1.3 to 2.7% of calcaneal fractures [1]. They generally occur as a result of an indirect mechanism: a strong concentric contraction of the twin-solar complex, with the knee in full extension associated with dorsiflexion of the foot [3].



**Fig 4:** classification of avulsion fractures of the calcaneal tuberosity according to Breavis

In 2012, Lee *et al* proposed a classification with therapeutic and prognostic value that takes into account age, bone condition and type of fracture [5]. (Figure 5)



**Fig 5:** Classification of avulsion fractures of the calcaneal tuberosity according to Lee *et al.*

The treatment of avulsion fractures of the calcaneal tuberosity is surgical, aiming at an anatomical reduction and at the restoration of the tension of the supraachilleoplantar complex. Screwing, especially the use of cannulated screws, is the method of choice. In fractures with small fragments the use of anchors has given better results than screwing [7]. The postoperative protocol depends on the fracture and the type of surgical treatment. Usually, immobilisation is undertaken with a boot in plaster for 6 weeks or placed with a removable splint to start early rehabilitation [3].

### Conclusion

Avulsion fractures of the calcaneal tuberosity are rare. They represent a therapeutic emergency to avoid complications, especially cutaneous ones. Functional recovery is satisfactory.

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