


CASE REPORT

Duckbill Calcaneum Fracture

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ABSTRACT

Introduction: The avulsion fractures of the calcaneal tuberosity represent a rare model of injury that is caused by a powerful tension force of the Achilles tendon associated or not to direct shock to the calcaneus. **Case report:** we report a case of direct trauma to the heel on the edge of the swimming pool at the sport stroke of swimming. Percutaneous reduction by bone reduction forceps under fluoroscopy with osteosynthesis by two percutaneous cannula screws on Kirchner wires. Equine cast immobilization after removal of the threads. Good clinical and functional radiological evolution. **Conclusion:** the percutaneous screw under fluoroscopy is the best technique with good results anatomical and functional and aesthetic.

KEYWORDS: Duckbill Fractures, Calcaneal Fracture, Percutaneous Screwing.

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INTRODUCTION

The tarsus is often exposed to severe trauma with high morbidity and disability associated with displaced intra-articular fractures. Calcaneal fractures constitute 60% of tarsal fractures. [1]. Avulsion fractures of the calcaneal tuberosity (extra-articular or beak fractures) are rare, accounting for 1% to 3% of all calcaneal fractures. [1–2]. Even more rare, but with a good prognosis, is a duckbill fracture of the posterior tuberosity, also called avulsion of the insertion of the Achilles tendon. These injuries are usually caused by a violent concentric contraction of the gastrocnemius muscle complex after loss of balance or a fall. [1–3] Proximal displacement of the avulsed fragment of the postero-superior part of the calcaneal tuberosity leads to functional incapacity of the gastrocnemius-soleus complex and may result in skin necrosis due to the pressure of the fragment on the skin above the heel. [4, 5] The fragments vary in size and usually include the complete insertion of the Achilles tendon [1]. They can extend into the subtalar joint and even present as open beak fractures. [2, 6] Calcaneal avulsion fractures are regularly seen in older people with osteoporotic bone. [1, 7] Post-traumatic fractures are possible even at low energy in younger patients. [8] Delayed clinical presentation with irregularly shaped fragments should suggest pathologic fracture in the presence of rheumatoid arthritis or diabetic neuropathy. [9, 10].

CASE REPORT

We report a clinical case of a 30-year-old young woman, without a notable pathological history, who presented

following a sports accident during a swimming training session with direct impact of the left heel on the edge of the swimming pool. The clinical picture on admission to the emergency room: heel pain with significant edema leading to deformity of the ankle with bruising, total functional impotence, with the inability to stand on the tip of the left foot and a Thompson's sign positive on the left. A standard radiological assessment of the left ankle revealed an extrathalamic fracture of the calcaneus involving the posterior tuberosity, in the shape of a duckbill. **Figure 1** The management consisted of a surgical intervention under spinal anesthesia during which a direct percutaneous screwing was performed by two cannulated screws of 3.5 mm on two guide pins, the reduction was obtained and maintained by a bone forceps reducer to overcome the tensile resistance of the Achilles tendon. **Figure 2** Postoperative immobilization is done with an anterior ankle splint until the wires are removed. **Figure 3** Then we completed with a plastered boot in plantar flexion for 04 weeks, without total gait support, under cover of a dose of prophylactic anticoagulation. Follow-up after the ablation of the sutures of a progressive functional rehabilitation with the use of silicone heel piece. The result with a follow-up of 6 months was satisfactory with a good clinical and radiological evolution. The resumption of sport is made after 6 months. The patient regained full range of motion and plantar flexion force, without any lameness or pain. The two screws are removed at 9 months later. The skin scar is 1 cm, the functional evaluation is very satisfactory after removal of the two screws. **Figure 4.**



Figure 1. Standard Lateral Ankle X-Ray Showing A Duckbill Calcaneal Fracture.

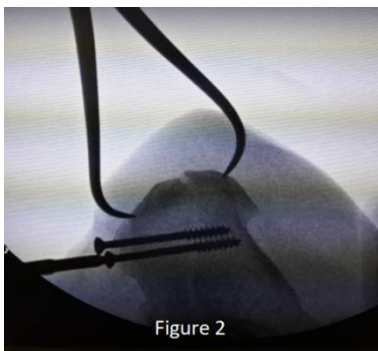


Figure 2. Percutaneous Screwing with Maintenance of the Reduction of the Fracture by a Percutaneous Bone Reduction Forceps.



Figure 3. Standard profile x-ray for postoperative control showing the plaster immobilization in plantar flexion.

DISCUSSION

Duckbill fractures of the calcaneus are rare but have a good prognosis. Avulsion fractures of the calcaneal tuberosity represent a rare injury pattern that is caused by a strong tensile force of the Achilles tendon and is usually seen after minor trauma, especially in elderly patients. Calcaneal tuberosity fractures usually result from low-energy trauma [1–6]. A powerful concentric contraction of the gastrocnemius-soleus complex coupled with forced ankle dorsiflexion or full knee extension has been implicated as a potential mechanism of injury [3]. Although extra-articular bone avulsions from the insertion of the Achilles tendon are usually present in osteoporotic patients, younger patients may present with more complex injuries, with a fracture of the medial process (the first

stage) that will develop. extend towards the posterior tuberosity of the calcaneus and which may affect the subtalar joint. [8] Surgical management of avulsion fractures of the calcaneal tuberosity is generally indicated for open fractures, severe skin involvement and displaced fractures [1–5].



Figure 4. Good Functional Development with Very Satisfactory Aesthetic Result.

Although percutaneous reduction seems ideal for these extra-articular fractures, anatomical reduction is often difficult due to soft tissue interposition and traction of the Achilles tendon. The proximal fragment of the calcaneal fracture moves under traction by the Achilles tendon. Interfragmentary compression is maintained with bone reduction forceps, and provisional fixation is achieved with two Kirchner wires inserted from the upper edge of the posterior tuberosity of the calcaneus. When the tuberosity fragment is large enough, at least two screws can be used to osteosynthesize the calcaneus. [3] Cephalic screw fixation is commonly used to treat avulsion fractures of the posterior calcaneal tuberosity, but this method may not provide reliable fixation. In addition, the use of suture anchors significantly improved the strength of screw fixation of avulsion fractures of the posterior calcaneal tuberosity. A biomechanical study conducted by Khazen et al. demonstrated that suture anchor fixation alone could withstand approximately 250 N of tensile forces and therefore may be too weak to resist Achilles tendon traction [11]. To reduce the failure rate, some authors have proposed screw fixation followed by immobilization with walking without support [3].

CONCLUSION

The best results suggest that cannulated screws represent a promising option for avulsing calcaneal tuberosity fractures. Surgical treatment involves restoring the height, width, length and alignment of the calcaneus to improve gait mechanics, shoe fit, and reduce post-traumatic subtalar arthritis.

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AUTHORS' CONTRIBUTIONS

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COMPETING INTERESTS

The authors declare no competing interests with this case.

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PATIENT'S CONSENT

Written informed consents were obtained from the patient for the publication of this case report.

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