

Complex Physeal Fracture of the Distal Tibia - Description of a New Fracture Pattern

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Abstract

Pediatric ankle fractures are the second most common physeal injuries. We report a singular case with a different fracture pattern. Although the surgical planning being not based only on the fracture pattern alone, it is mandatory to know the different fracture classifications and its mechanism influence on the treatment. This is the first time that this type of fracture has been described - an important warning about a new specific pattern, caused by a particular mechanism, with a new radiological translation and its own treatment requirements.

Keywords: Physeal Fracture; Ankle; Distal Tibia; Fracture Pattern; Salter-Harris; Ogden; Dias and Tachdjian

Introduction

Pediatric ankle fractures are the second most common physeal injuries, accounting for almost 40% of all physeal injuries and for 5% of all pediatric fractures.¹

High-energy suprasyndesmotoc fractures are associated with hard complications.²

Although the surgical planning being not based only on the fracture pattern alone, it is mandatory to know the different fracture classifications and its mechanism influence on the treatment.

Presentation

11-year-old boy admitted to the Emergency Department after being hit by a car with a subsequent trauma to his left ankle. He presented deformity, pain, swelling and limited active motion.

X-ray (Image 1) and CT (Image 2) showed a complex physeal fracture of the distal tibia, combining a Salter-Harris (SH) classification type 2 and 5 in the sagittal view - a type 5 crush injury to the physis anteriorly and a type 2 in the middle-posterior, forming a big and free Thurston-Holland fragment block composed of the



Image 1

posterior tibial metaphysis displaced posteriorly. There is no apparent involvement of the epiphysis in both ankle bones and the fracture it's barely visible in AP radiograph.

According to the fracture pattern, the mechanism seems to be an axial compression in a dorsiflexion position. This faith is also favored by the presence of a calcaneus posterior aspect fracture that is rare, especially by direct trauma [3].

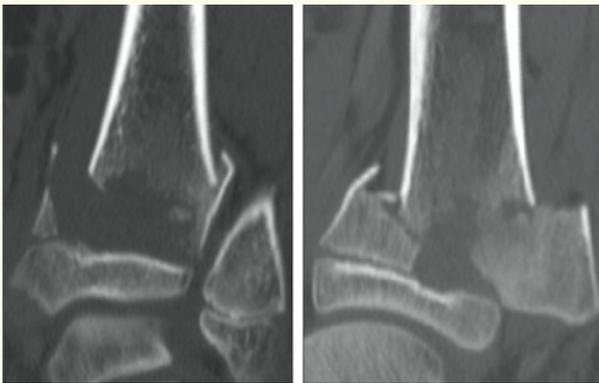


Image 2



Image 4

According to Dias and Tachdjian classification, the most similar mechanism already described is the supination-plantarflexion type. However, in this report-case there is also a transversal supra-syndesmotomic metaphyseal fibular fracture in the same level than tibial fracture [4].

According to Ogden classification, the most similar pattern described is the type 2A that involves propagation of the fracture forces on the tensile side to create a free metaphyseal fragment [5].

fibula (Image 3).

The patient was discharged with no weight bearing short leg cast for 3 weeks. Progressive weight bearing and rehabilitation were allowed afterwards and were gradually increased according to healing evolution (Image 4).

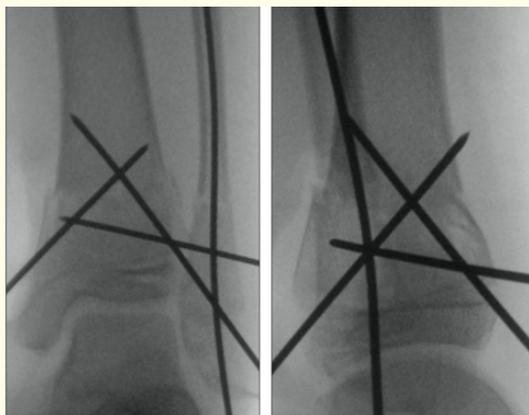


Image 3

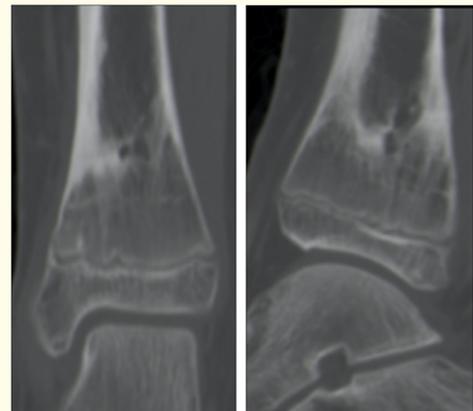


Image 5

At the 8th week he was doing total weight bearing and just after 3 months of physiotherapy, exhibited excellent range of motion and started performing sports without functional limitation. One-year post-operative CT-scan confirmed good joint alignment and fracture healing (Image 5).

Outcomes

Due to soft tissues condition, the fracture was reduced percutaneously with a ball spike and fixed using 4 Kirschner wires, 3 of them for metaphyseal fixation of the tibia and 1 for nailing of the

Discussion

Soft tissues are the most crucial factor in determining a successful outcome with minimal complications [6].

Fibula status is an important surgical consideration in the treatment of distal tibial fractures. Unlike rotational ankle injuries, tibial fractures caused by axial loading often demonstrate comminuted fibular fractures with a transverse orientation [7].

Conclusion

Regular follow-up should be maintained until skeletal maturity once high-energy and medial malleolus SH type 5 fractures have

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