

Bilateral calcaneal fracture in a child: case report

Fratura bilateral do calcâneo em criança: relato de caso

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ABSTRACT

Fractures of the calcaneus are rare in children. These fractures are usually caused by high-energy trauma, the fall from height is the main reason. Most of them are extra-articular fractures, do not require surgical treatment, and are often treated conservatively. Intra-articular fractures constitute a challenge for treatment in childhood, particularly for presenting joint depression and Böhler angle disruption. We report a case of a six-year-old patient with intra-articular left calcaneal fracture, and who had fallen from height. In addition to the intra-articular fracture, the patient had an extra-articular fracture of the right calcaneus and an undisplaced fracture of the right talus.

Keywords:

Fractures; Calcaneus/injuries; Calcaneus/surgery; Child; Case reports

INTRODUCTION

Calcaneal fracture in children is considered rare, with an incidence ranging from 1 to 5 per 100,000 fractures.⁽¹⁻³⁾ Bilateral calcaneal fractures in this age group are the exception, and few studies have been reported in the literature so far.^(2,4) Historically, fractures of the calcaneus in children have mostly been treated conservatively. There is a great potential for cartilaginous bone remodeling.^(2,4) Associated injuries of the lower limbs are more common in adults, but

RESUMO

As fraturas do calcâneo nas crianças são consideradas raras. Geralmente são causadas por trauma de alta energia, sendo a queda de altura o principal mecanismo. Em sua maioria são fraturas extra-articulares e não necessitam de tratamento cirúrgico, sendo tratadas de maneira conservadora. O desafio do tratamento da fratura do calcâneo na infância se encontra nas fraturas intra-articulares desviadas, que apresentam depressão da superfície articular e alteração no ângulo de Böhler. Apresentamos um caso de fratura intra-articular desviada do calcâneo esquerdo em uma paciente de 6 anos, vítima de queda de altura. Além da fratura cirúrgica intra-articular, a paciente apresentava fratura extra-articular do calcâneo direito e fratura do tálus direito.

Descritores:

Fraturas; Calcâneo/lesões; Calcâneo/cirurgia; Criança; Relatos de casos

associated injuries of the axial skeleton are more prevalent in skeletally mature individuals.⁽⁵⁾ Fall from a height is the main trauma mechanism in calcaneal fractures in children; in second place are traffic collisions.^(1,5) Unlike in adults, few of these fractures in children are deviated' this leads to later diagnosis or, sometimes, no initial diagnosis.^(1,4,5-9) In children younger than 14 years, extra-articular calcaneal fractures are predominant.⁽⁵⁾ We report a case of a child diagnosed with bilateral fracture of calcaneus.

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CASE REPORT

A 6-year-old girl was brought to the emergency service by her mother after falling from the second floor of her house, a height of approximately 2 meters. After the fall, the patient was unable to ambulate and reported bilateral calcaneal pain. Physical examination revealed pain on palpation, edema and local ecchymosis. The patient did not have other symptoms related to the musculoskeletal system and/or other systems. We requested bilateral radiographs of the ankles, feet and calcaneus and computed tomography of the ankles and feet. Both imaging tests showed a bilateral fracture of the calcaneus and right talar fracture (Figures 1 to 7).



R: right; L: left.

Figure 1 | Profile radiographs of hindfeet on the day of trauma.

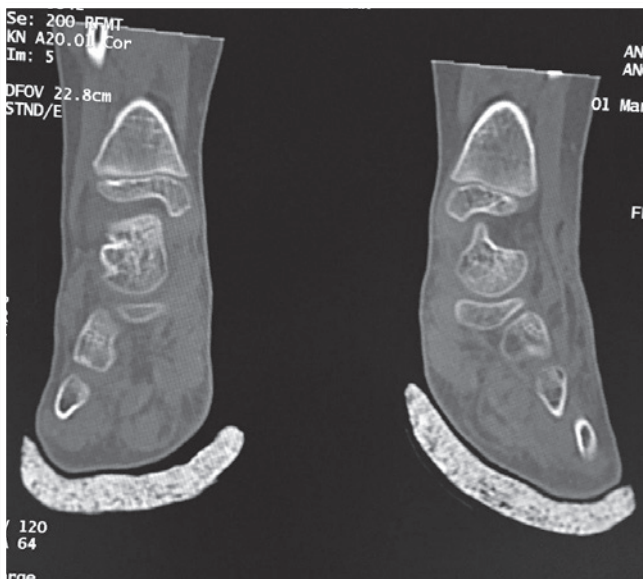


Figure 2 | Bilateral coronal slice computed axial (CT).

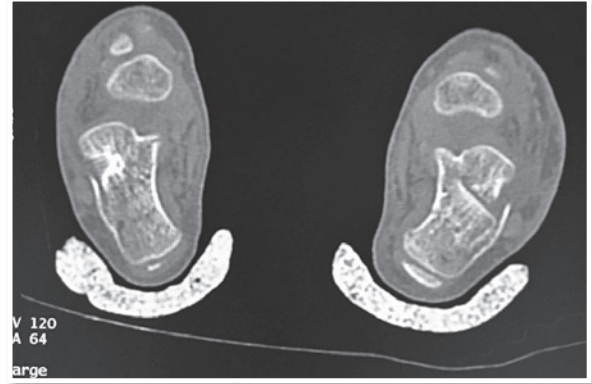


Figure 3 | Bilateral axial slice computed tomography (CT).



Figure 4 | Left sagittal slice computed tomography (CT).



Figure 5 | Right sagittal slice computed tomography (CT).

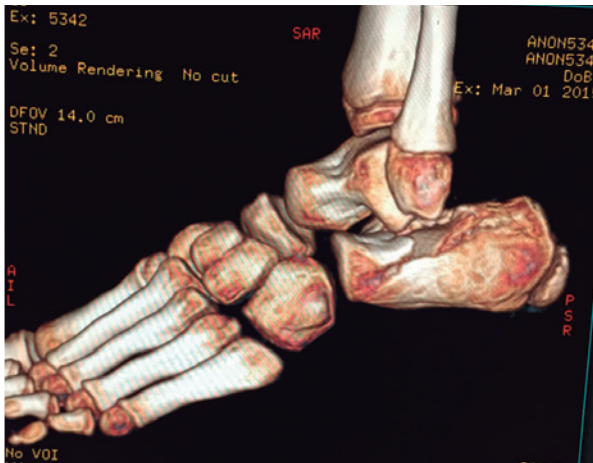


Figure 6 | Computed tomography – left reconstruction.

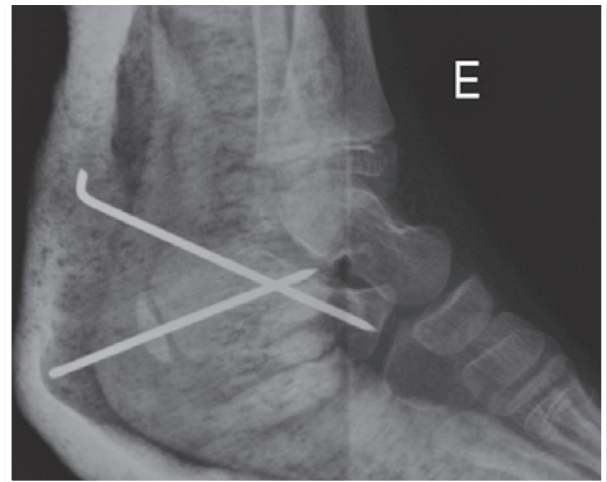


Figure 8 | Surgical treatment of the left calcaneal fracture using the Essex-Lopresti technique.

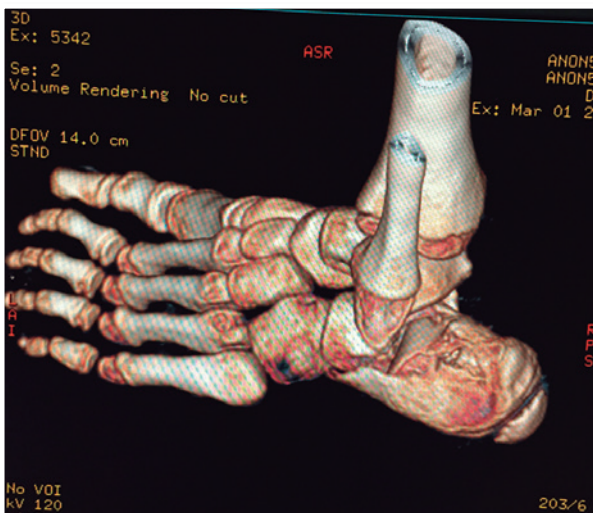


Figure 7 | Computed tomography left construction.

The left calcaneal fracture was classified as deviated intra-articular, and fracture of the right calcaneus was extra-articular without deviation. The associated fracture of the right talar neck was minimally deviated. After discussion of the case to determine the best method of treatment for the fractures, we opted for conservative treatment of the right fractures. Treatment for the right fracture consisted of a suropodalic plaster cast without weight bearing for 6 months. For fracture of the left calcaneus, we used a surgical approach. Because the patient was only 6 years old, with a high potential for growth and bone remodeling, we used the percutaneous technique proposed by Essex-Lopresti⁽¹⁰⁾ (Figure 8).

DISCUSSION

Calcaneus is the largest bone of the tarsus. It has a single anatomy and is an important bone in gait biomechanics because it is articular with the talus and cuboid. The trauma mechanism most commonly related to calcaneal fractures is axial compression of the lower limb in patients who experience a fall from a height.^(1, 5, 6)

Clinically, patients present with pain and edema in the hindfoot region, ecchymosis and, sometimes, compartment syndrome. A careful physical examination of the musculoskeletal system must be done in order to find associated injuries (ankle, lumbar spine, pelvis and wrist injuries).⁽⁵⁾

Calcaneal fractures are diagnosed by history, physical exam and imaging exam. Plain radiography of the calcaneus initially shows most deviated fractures of the calcaneus; however, small deviated fractures can be missed on radiography.^(7,9) Computed tomography enables better understanding of these fractures and shows lighter traits, fractures without deviations, degree of comminution and position of fragments. Until 10 years of age, the calcaneus of children has few similarities to that of adults because it presents a number of centers of ossification.⁽⁴⁾

Conservative treatment of fractures in children is always initially considered. For extra-articular fractures of the calcaneus that do not present deviations and/or functional impotency of Achilles tendon, conservative treatment by suropodalic cast immobilization is indicated.⁽⁴⁾ The big challenge for calcaneal fracture treatment in children is intra-articular and deviated trait. Despite the scarce litera-



Figure 9 | Axial radiographs of calcaneus 6 months after surgery.

ture, a number of methods of treatment for fractures with deviated articular surface have been proposed, ranging from conservative to percutaneous surgical techniques, minimally invasive and open reduction and internal fixation.^(4,6)

The child reported in this case had bilateral fracture of the calcaneus, comprising an extra-articular fracture without deviation to the right and intra-articular fracture deviated to the left. We opted for conservative treatment for the right and surgery, using the technique described by Essex-Lopresti,⁽¹⁰⁾ for the intra-articular fracture. We used closed reduction under support of fluoroscopy and two Kirschner wires, 1.5 mm, which were removed after 8 weeks.

Seven months after surgery, the child was asymptomatic. We noted reduction in amplification of subtalar movement on the side of the intra-articular fracture for which surgical treatment was used; however, the patient had no functional deficit.

Physical examination showed reduction in inversion and eversion of the subtalar to left. Control radiographs obtained 6 months after surgery showed signs of consolidation of fractures and differences in densities between the right and left sides (Figures 9 and 10).

COMMENTARY

Minimally invasive osteosynthesis (Essex-Lopresti technique),⁽¹⁰⁾ indicated for treatment of this fracture, has fa-

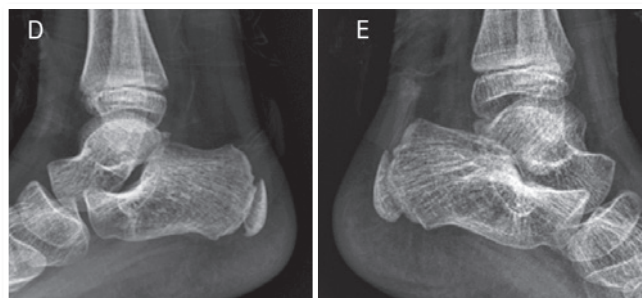


Figure 10 | Profile radiographs of hindfeet 6 months after surgery.

vorable long-term results. This technique was originally described for treatment of intra-articular tongue type fractures. Given the scarcity of data in the Brazilian national literature on the subject, this appears to be a rare case of bilateral fracture of the calcaneus in a child. This case has great relevance for trauma specialist and particularly for orthopaedic ankle and foot surgeons. We report our clinical management and the short-term results for this case.

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