

## Case Report

# Arthroscopically Assisted Reduction and Fixation of a Juvenile Tillaux Fracture

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**Abstract:** This is the first report of arthroscopically assisted reduction and fixation of a juvenile Tillaux fracture. Arthroscopic visualization assisted with the anatomic reduction of the articular fragment. This adds arthroscopy as a modality available to help obtain accurate reduction as well as understand the nature of the fracture pattern in juvenile Tillaux fractures along with its adult counterpart and other intra-articular fractures. **Key Words:** Tillaux fracture—Ankle arthroscopy—Ankle fracture.

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**J**uvenile Tillaux fracture is a relatively uncommon fracture. An injury mechanism of external rotation of the foot relative to the tibia has been described.<sup>1</sup> It is a Salter-Harris type III fracture of the distal tibial epiphysis.<sup>2</sup> Because of its location, it is an intra-articular fracture that demands the principles of anatomic reduction and internal fixation.<sup>3</sup> Arthroscopy has been applied to assist the anatomic reduction of various other fractures of the distal radius<sup>4,5</sup> and tibial plateau.<sup>6,7</sup> It has even been applied to assist reduction and fixation of adult Tillaux fracture of the ankle.<sup>8</sup> Whipple et al.<sup>9</sup> have described arthroscopic treatment of triplane fractures. To our knowledge, there are no reports of arthroscopically assisted reduction and fixation of juvenile Tillaux fracture. Thus, this is the first report of this technique.

## CASE REPORT

A 14-year-old freshman high school football player sustained a left ankle injury. Despite the patient's difficulty in determining the exact mechanism of injury, his description appeared consistent with an external rotation injury. His primary complaints were of ankle swelling, lateral ankle bruising, and anterolateral ankle pain. He denied any previous ankle fracture or injury.

Plain radiographs revealed a distal tibia fracture involving epiphysis, a Salter-Harris type III fracture (Fig 1). There was approximately 10 mm of widening at the fracture site shown on the anteroposterior radiograph and a question of 5-mm superior displacement of the fracture on the lateral radiograph. Concern for possible comminution of the epiphyseal fragment prompted a computed tomography (CT) examination. The CT clearly showed a single epiphyseal fracture fragment rotated externally with 10 mm of displacement on axial imaging (Fig 2). After discussion with the patient and his parents, surgical treatment was decided on, given the need for anatomic reduction of this intra-articular fracture.

Arthroscopy was carried out through standard anteromedial and anterolateral portals. The fracture site and fragment with its articular incongruity were readily visualized (Fig 3). The fracture hematoma

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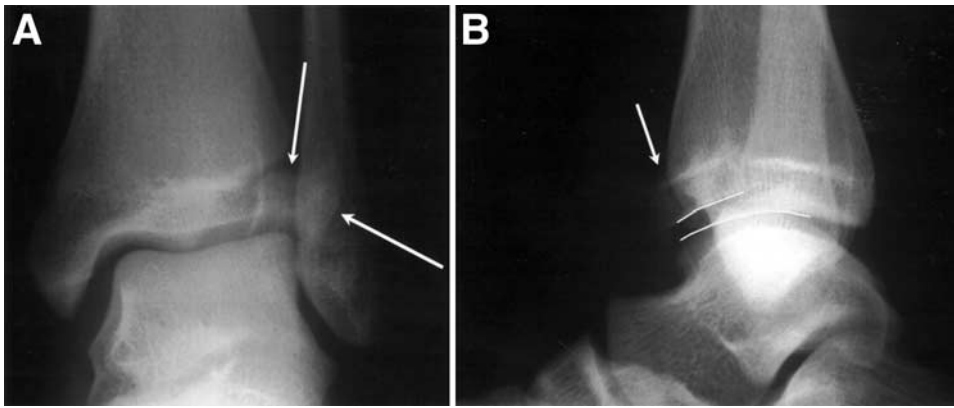


FIGURE 1. Juvenile Tillaux fracture with displacement.

was removed and reduction was arthroscopically attempted. The fracture not being amenable to arthroscopic reduction and percutaneous fixation, needle localization was used while visualizing arthroscopically to most accurately place an anterolateral ankle arthrotomy. The extra-articular margins of the fracture were identified and debrided. The fracture was reduced and provisionally fixed with subsequent fluoroscopy to confirm adequacy reduction. Two 4.0-mm cannulated partially threaded cancellous screws were used to fix the fracture (Fig 4). Arthroscopy was then used to confirm completely acceptable reduction of the articular surface after arthrotomy closure before the procedure was deemed complete. Postoperatively, the

patient was placed in a stirrup splint for 1 week and was non-weight bearing with crutches. He then had a Cam walker boot thereafter with strict non-weight bearing for 6 to 8 weeks and early motion exercises. His fracture healed successfully with closure of his distal tibial physis as expected.

#### DISCUSSION

With the advent of arthroscopy, the visualization of intra-articular pathology has become significantly better. The use of the arthroscope in visualizing reduction of articular surfaces with intra-ar-

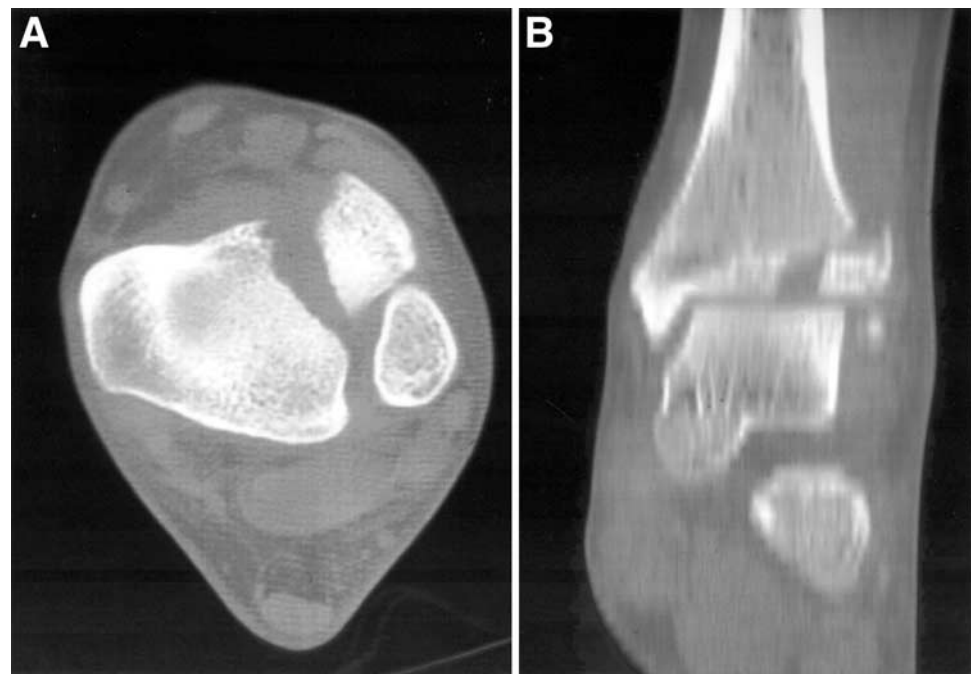


FIGURE 2. Axial and coronal CTs of juvenile Tillaux fracture.

ticular fractures of the knee and wrist has been a natural progression in the use of this powerful tool.<sup>3-6</sup> It seems reasonable that this diagnostic and therapeutic tool could be applied to other joints amenable to arthroscopy. In treating these juvenile Tillaux fractures with arthroscopically assisted reduction, we can obtain more precise reduction than that afforded by closed-reduction percutaneous fixation techniques under image intensification while avoiding the problems associated with large open-reduction internal fixation techniques. This allows patients and athletes a return to their activities with decreased risk of stiffness and the lowest possible risk of later osteoarthritic changes secondary to the reduction achieved under arthroscopic visualization.

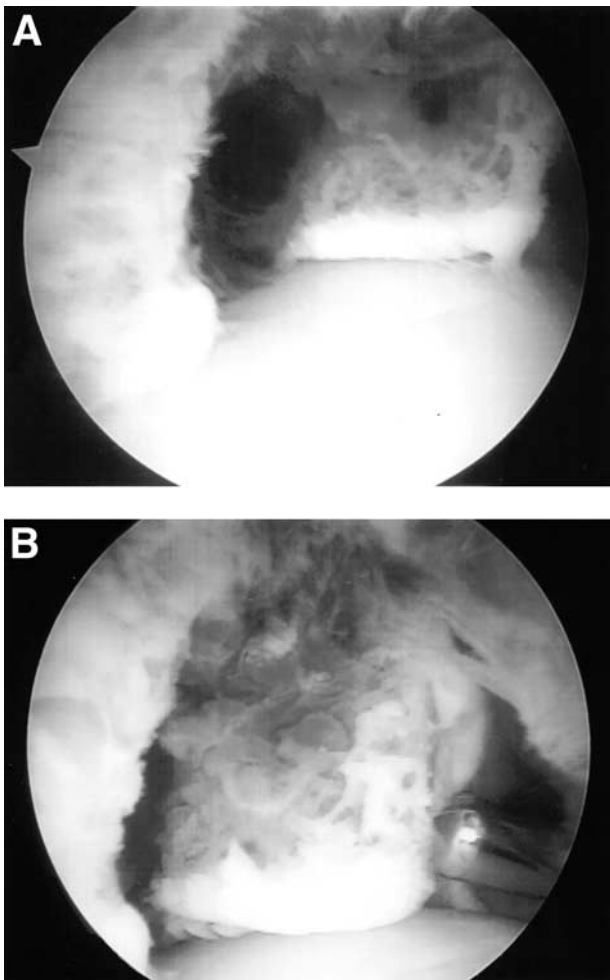


FIGURE 3. Arthroscopic images of juvenile Tillaux fracture.

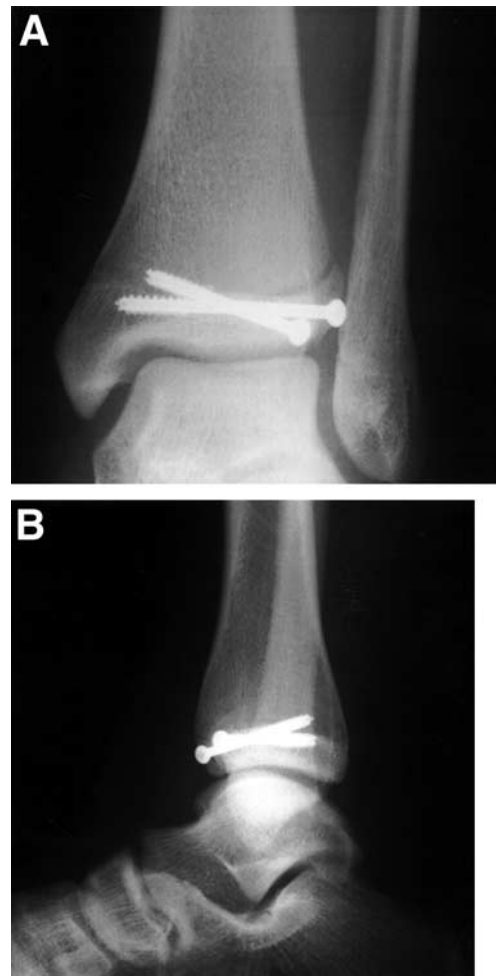


FIGURE 4. One week after fixation of juvenile Tillaux fracture.

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