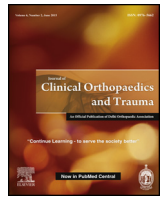




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Case report

Arthroscopically assisted surgical fixation of a juvenile Tillaux fracture and implant removal: A case report

Takahisa Ogawa*, Sadanori Shimizu

Tsuchiura Kyodo General Hospital Department of Orthopedics, Ibaraki, Japan

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ABSTRACT

Juvenile Tillaux fractures are Salter-Harris III fractures of the distal tibial epiphysis that occur only when the tibial epiphyses are closing. Theoretically, arthroscopically assisted reduction and fixation of a juvenile Tillaux fracture can facilitate the accurate reconstruction of the articular surface, using arthroscopic visualization. We treated a girl aged 14 years who had a juvenile Tillaux fracture by using arthroscopically assisted reduction and fixation. In order to obtain articular congruency, the screw was inserted under arthroscopic visualization. Although the screw was placed through the epiphysis, the patient had no symptoms of discomfort and the functional results were excellent. We performed a second operation to remove the implant 9 months later. During this procedure, arthroscopy indicated the healing of the fracture site and an intact articular surface. At the 1.5 year follow-up, the radiograph indicated that the epiphysis was closed normally and that the patient had no symptoms. The American Orthopaedic Foot and Ankle Society (AOFAS) score was 100, or excellent. Although screw insertion into the epiphysis should be avoided, reconstructing the congruency of the joint surface is of higher priority in repairing the epiphysis.

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1. Introduction

Juvenile Tillaux fracture is a relatively uncommon epiphyseal ankle fracture that accounts for 3% of all distal tibia epiphyseal injuries.¹ Juvenile Tillaux fracture occurs only during adolescence, during which time the distal tibial epiphysis undergoes closure until 16 years of age in boys and 14 years of age in girls.²

As an intraarticular epiphyseal fracture, treatment of a juvenile Tillaux fracture requires anatomic reduction to avoid early osteoarthritis of the ankle.³ With the advent of arthroscopy, which can visualize articular surfaces, arthroscopic surgery has been used to treat intraarticular fractures.

Arthroscopic assisted reduction and the fixation of juvenile Tillaux fractures have been previously reported.^{4,5} We report here a case of a juvenile Tillaux fracture in a patient who was treated using open reduction and internal fixation with arthroscopic assistance.

2. Case report

The patient was a girl aged 14 years who presented to our hospital with left ankle pain after a fall during hurdle practice at junior high school. She complained of left ankle swelling and anterolateral ankle pain. Radiography indicated distal tibial epiphyseal fracture with displacement (Fig. 1). The assessment was completed using a computed tomography (CT) scan, with up to 4-mm displacement of the anterolateral fragment. We diagnosed the fracture as a Salter-Harris III distal tibial epiphyseal fracture, which is termed a juvenile Tillaux fracture (Fig. 2).

We decided to perform arthroscopic assisted reduction and fixation to obtain anatomical reduction and to minimize invasion due to the patient's concern regarding cosmetic consequences.

Surgery was performed under general anesthesia in supine position. We first placed the anteromedial and anterolateral portals, which required incisions that were 5 mm in length, each. Then, we evacuated the hematoma from the fracture site, which would have otherwise interfered in the reduction of the fracture fragments. The anterolateral portal incision was extended proximally 10 mm, thereby facilitating access to the surface of the fracture fragment under the incision, while the medial incision was extended to 15 mm. A guidewire sleeve on the fracture fragment was placed toward the anterolateral tibia from where the fragment

* Corresponding author at: 4-1-1 Otsuno, Tsuchiura-shi, Ibaraki-ken 300-0028, Japan.

E-mail address: takahisa.o@gmail.com (T. Ogawa).

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Fig. 1. Preoperative standard radiograph of a distal tibial epiphyseal fracture.

was avulsed. Articular congruency was confirmed upon visual inspection of fragment positions, using arthroscopy. The guidewire was advanced through the sleeve into the tibia for temporary fixation. After verifying the guidewire direction with fluoroscopy, we drilled the cortex of the fragment and inserted the 4.0-mm cannulated cancellous screw to obtain rigid fixation. Although penetrating the epiphysis with the screw should be avoided, it was

inserted toward the epiphysis, so that it could be properly positioned. After fixation, we assessed reduction of the fragment by using both arthroscopy and fluoroscopy (Fig. 3). Eventually, the screw was placed through the epiphysis (Fig. 4).

Postoperatively, the patient was positioned so as to avoid weight bearing. At 5 weeks after the operation, we allowed the patient to gradually bear more weight on the site of the fracture. At



Fig. 2. Preoperative three dimensional CT scan image of a Salter - Harris III distal epiphyseal fracture, which is also called a juvenile Tillaux fracture.

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