BILATERAL FRACTURE OF THE TIBIAL SPINE

J. W. ANDERSEN, S. MEJDAHL

Fracture of the intercondylar eminence of the tibia in childhood is a relatively common injury, but to our knowledge a bilateral case has never been reported. A patient with bilateral fractures is presented and the literature is reviewed. An 8-year-old girl fell from a tree and sustained bilateral fractures of the tibial spine. According to Meyers' and McKeever's classification normal x rays revealed a type III fracture in the left knee and a type II fracture in the right knee. The left knee was treated by open reduction and internal fixation, and the right knee was treated conservatively. At one year follow-up the girl was fairly asymptomatic and clinically there were only few degrees' lack of extension on the left side.

Keywords : child ; knee ; fractures ; tibia ; tibial spine.
Mots-clés : enfant ; fracture ; genou ; tibia ; épine tibiale.

Avulsion of the anterior tibial spine in children is a relatively rare injury. It was first reported by Pringle in 1907 and Jones in 1913, and in 1959, Meyers and McKeever (8) presented a series of 45 patients, including 35 children, and described a classification relative to the treatment required. Since then a number of series (2, 3, 5, 9, 10, 11, 12) and case reports have been published.

In the present paper we report a bilateral case.

CASE HISTORY

An 8 years and 10 months-old girl fell nearly 5 meters from a tree and hit the ground with both knees, abdomen and face. She was immediately brought to the nearest hospital, where a wound on the chin was sutured, and 2 coronal dental fractures were treated by the dentist. It was observed that there was some tenderness of both knees and pain restricted the range of motion, but there was no hemarthrosis. No roentgenograms were taken. After 4 hours of observation she was discharged.

After 3 days of persisting disability in walking, the parents brought her to our clinic.

We found bilateral hemarthroses, and the range of motion was 30°-90° on the left side and 10-105° on the right side. Neither the drawer sign nor lateral instability were present. According to Meyer-McKeevers' classification roentgenograms revealed a type II fracture on the right side (fig. 1) and a type III fracture on the left side (fig. 2). The next day she underwent arthrotomy on the left side, and intraoperatively the fagment was found larger than revealed on the x rays due to masking by the wide plate of articular cartilage. The fragment was displaced above the anterior horn of the medial meniscus. It was replaced in correct position and retained by absorbable sutures through the edges of the fragment, the meniscus and the edges of the tibia. The hemarthrosis of the right knee was aspirated. Both legs were immobilized in high plaster casts in mild flexion. Postoperatively the patient was allowed to walk, and she was able to attend school without problems. The casts were removed after 6 weeks, and rehabilitation proceeded uneventfully.

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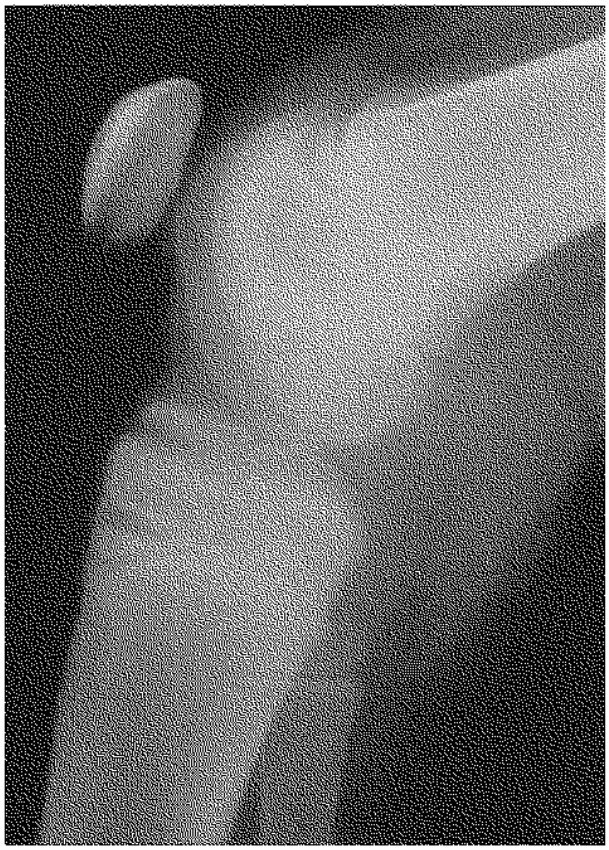

Fig. 1. — Right knee showing a type II lesion, best evident in the lateral view.

Fig. 2. — Left knee showing a type III fracture with avulsion of a large fragment.

At one year follow-up the girl complained of pain in both knees after exercise. Clinically, walking and running were normal. No swelling, no tenderness, no instability and no atrophy of the quadriceps were found. Bilateral range of motion was normal, apart from less than 5° lack of extension on the left side. X rays (fig. 3) showed anatomic healing of both avulsions.

DISCUSSION

Classification

According to Meyers and McKeevers (8, 9), fracture of the intercondylar eminence of the tibia occurs in children between the ages of 8 and 13 years, with an equal sex distribution. The mechanism of trauma is falling on the bent knee with simultaneous internal rotation of the tibia; this is often seen in bicycle accidents and in connection with athletics. In the adult, a similar injury would probably rupture the anterior cruciate ligament (ACL). However, in children, the incompletely ossified tibial spine is the weakest point when exposed to tensile stress. Thus, failure occurs through the cancellous bone beneath the subchondral plate, and the fragment is more or less displaced.

The classification relates to the degree of displacement. Type I is a minimal displacement of the fragment. Type II is displacement of the anterior third to one half of the fragment, which is still hinged posteriorly, best seen on a lateral xray. Type III is complete separation of the avulsed fragment from its bony bed, and sometimes the fragment is rotated.

Fig. 3. — At one year follow-up.

Diagnosis and treatment

The child usually presents a painful flexed knee and hemarthrosis. The knee is held in flexion, and both extension and flexion are restricted. It is usually an isolated injury, rarely accompanied by other ligamentous damage. A positive drawer sign is usually not present, and no lateral instability is demonstrable even in the anesthetized patient. Ordinary A-P and especially lateral xray examinations reveal the fracture and are the basis for classification. Minimally displaced fractures (Type I) may be visualized better on an A-P view paralleling the posterior tilt of the tibial surface. Computed tomographic (CT) scanning and magnetic resonance imaging (MRI) may give more detailed information about the size and relationships of the displaced fragment.

Type I and II can be treated conservatively by aspiration of the hemarthrosis if the joint is tense, and application of a well-fitted plaster cast from the groin to the base of the toes with approximately 20° flexion of the knee. This has been confirmed by anatomical studies of fiber tension in the ACL (3, 4, 5). Thus, immobilization in extension as recommended by some (1) should be abandoned. The cast is removed in 4 to 8 weeks (average 6 weeks) when there is roentgenographic evidence of fracture healing. Active exercises and load-carrying are allowed immediately after cast removal.

Type III fractures should be treated by open reduction and internal fixation. Meyers and Mc Kevers recommend fixation of the fragment by absorbable sutures to the anterior horn of the medial meniscus, followed by 6 weeks' immobil-

ization as described above. Fixation by Kirschner wires or a small screw not crosing the epiphyseal plate has also ben used with good results (3, 7). In 1982, a series of arthroscopically treated patients was published (7), and the advantages of this method have been confirmed by others (11, 12).

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SAMENVATTING

J. W. ANDERSEN, S. MEJDAHL. Bilaterale fraktuur van de spinae tibiae.

Unilaterale frakturen van de spinae tibiae komen vaak voor bij het kind, maar bilaterale letsels werden niet gerapporteerd. Beschrijving van één geval en overzicht van de literatuur. Ten gevolge van een val van een boom, liep een 8-jarig meisje een bilaterale fraktuur van de spinae tibiae op. Volgens de classificatie van Meyer en McKeever betrof het links een type III en rechts een type II. De li-knie werd heelkundig behandeld d.m.v. open repositie en osteosynthese ; rechts werd een conservatieve therapie ingesteld. Bij na-onderzoek na één jaar, was het kind asymptomatisch en er werd alleen een verlies van enige graden extensie van de linker knie genoteerd.

RÉSUMÉ

J. W. ANDERSEN, S. MEJDAHL. Fracture bilatérale des épines tibiales.

Si la fracture unilatérale du massif des épines tibiales est relativement fréquente chez l'enfant, aucun cas de bilatéralité n'a été à notre connaissance rapporté dans la littérature. Les auteurs en présentent une observation et passent la littérature en revue. Suite à une chute d'un arbre, une fille de 8 ans présenta une fracture bilatérale du massif des épines tibiales. Conformément à la classification de Meyer et de McKeever, la radiographie standard mettait en évidence une fracture du type III à gauche et du type II à droite. La fracture gauche fut traitée par réduction à ciel ouvert, suivie d'ostéosynthèse alors que pour le genou droit, un traitement orthopédique fut instauré. Avec un recul d'un an, l'enfant était asymptomatique et à l'examen, on ne notait qu'une perte de quelques degrés d'extension au genou gauche.