Clin Orthop Relat Res (2008) 466:2552–2554
DOI 10.1007/s11999-008-0400-7

CASE REPORT

Case Report

Bipartite Tibial Epiphysis

Radiologic and Arthroscopic Presentation

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Received: 24 December 2007 / Accepted: 2 July 2008 / Published online: 29 July 2008

Abstract We report the case of a bilateral bipartite ossification center of the proximal tibia in a 15-year-old boy with a history of knee injury. The presence of the duplicated ossific centers was an incidental finding on radiography and computed tomography performed after injury. Arthroscopy showed continuous hyaline cartilage between the two ossific centers confirming the diagnosis of a developmental abnormality; however, the articular surface was depressed in the region overlying the smaller ossific center. We presume the presence of an accessory center in the posteromedial aspect of the tibial plate could be a source of instability for the corresponding capsular and meniscal structures. This is, to our knowledge, the first report of tibial bipartite epiphysis.

Each author certifies that he or she has no commercial associations (eg, consultancies, stock ownership, equity interest, patent/licensing arrangements, etc) that might pose a conflict of interest in connection with the submitted article.
Each author certifies that his or her institution has approved the reporting of this case report, that all investigations were conducted in conformity with ethical principles of research, and that informed consent for participation in the study was obtained.

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Introduction

Several cases of bipartite bones have been reported [1–10, 12–20]. The most frequent is the bipartite patella, but several other bipartite bone and epiphyses are described in the literature such as hamate [4], lunate [1], sesamoid [12], parietal [2], atlas [7], and cuneiform [3]. Frequently, the bipartite bones are asymptomatic, but in some cases, they can cause pain or, more rarely, instability [3, 9, 13, 14, 19]. We report what we believe is the first case of a bilateral bipartite ossification center in the proximal tibial epiphysis.

Case Report

A 15-year-old boy presented with pain and a sensation of instability in the right knee of 2 months' duration after an injury during a soccer game. He reported no symptoms before the trauma. Physical examination revealed no swelling but positive Lachman and Apley tests. We suspected a torn meniscus and anterior cruciate ligament (ACL).

Radiographic examination showed a radiolucent oblique, well-defined, regular line in the medial aspect of the proximal tibial epiphysis bilaterally (Fig. 1). We then obtained a CT scan that showed a partial tear of the ACL partial lesion and posterior horn of a medial meniscal longitudinal lesion with meniscocapsular separation. Moreover, an ossific center, covered by hyaline cartilage and completely separated by the remaining bone structures, was seen in the posteromedial aspect of the tibial plate (Fig. 2).

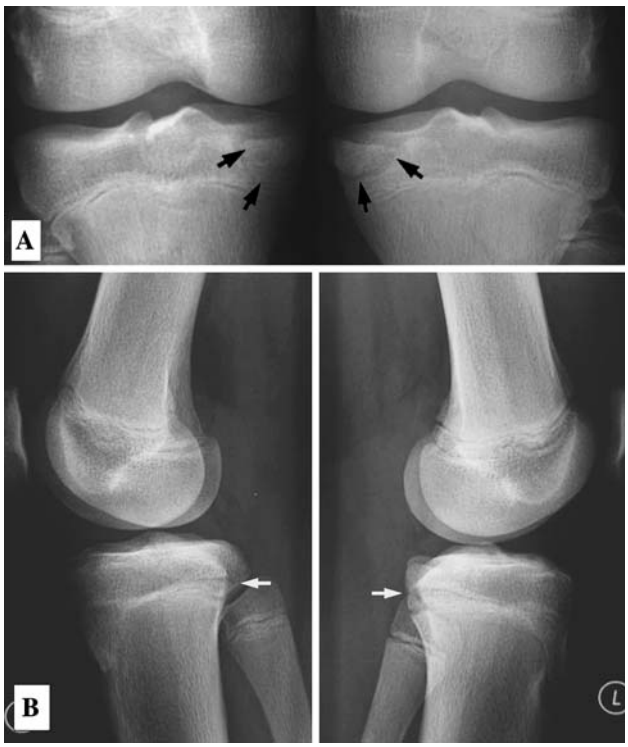

Fig. 1A–B (**A**) Anteroposterior and (**B**) lateral radiographs of both knees show an oblique and well-defined radiolucent line in the posteromedial aspect of the tibial plate (black arrows) bilaterally.

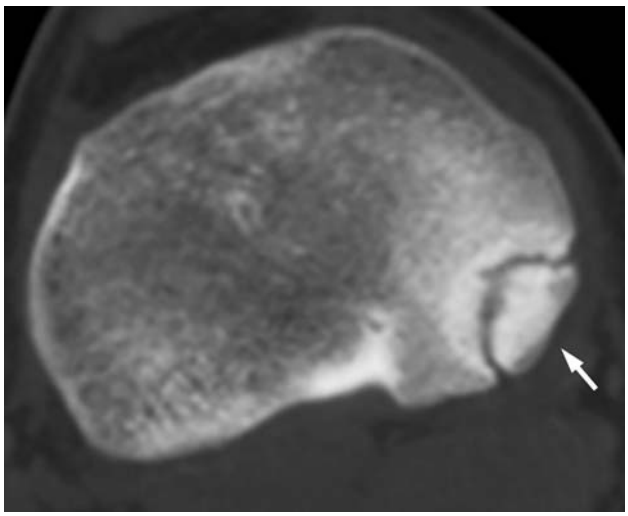

Fig. 2 An axial CT image of the right knee shows a separated bone center (arrow) with sclerotic margins of the tibial epiphysis.

Arthroscopic evaluation of the right knee confirmed the ACL and meniscal lesions. At arthroscopy, the site of the ossific center identified on CT corresponded with a depressed circular area of the medial tibial plate but with no chondral interruption (Fig. 3). On the basis of these findings, we confirmed a bipartite proximal tibial epiphysis.

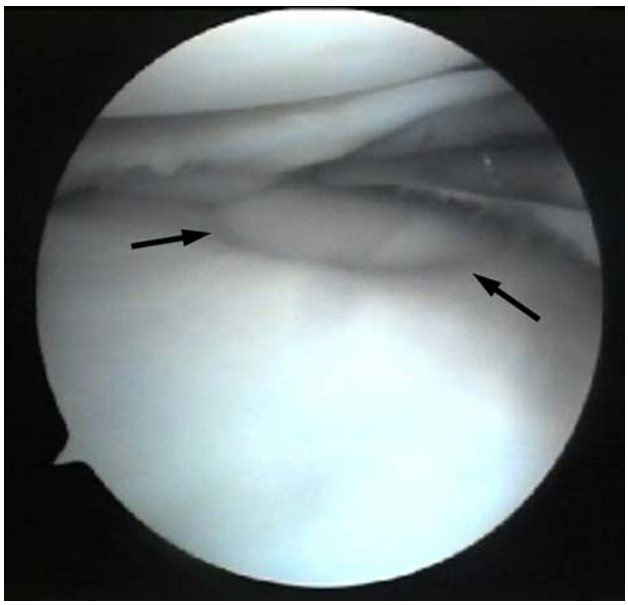

Fig. 3 An arthroscopic image of the medial aspect of the tibial plate shows accessory ossification center covered by cartilage (arrow); no chondral lesion is shown.

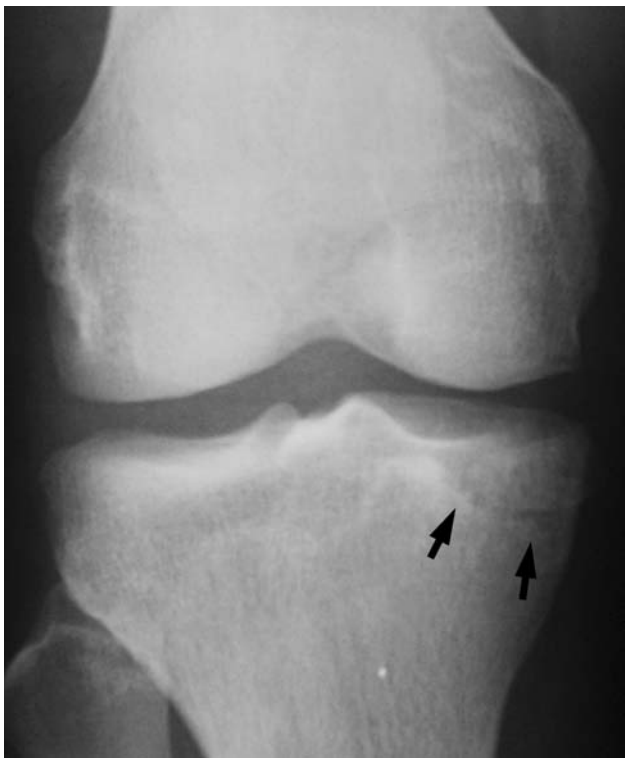

Fig. 4 An anteroposterior radiograph of the right knee of the 19-year-old patient performed 4 years after the first radiographic examination still shows the separation radiolucent line between the two ossification centers.

Arthroscopic meniscal in-out suturing was performed and the anteromedial bundle of the ACL tear was removed.

At 4 years clinical followup, the patient was pain-free and radiographic images still showed the duplicated ossific center of the tibial epiphysis (Fig. 4).

Discussion

Numerous cases of bipartite ossific centers have been described including those in the hamate, lunate, sesamoid, parietal, atlas, cuneiform and, most frequently the bipartite patella (0.2% to 6%) [1–10, 12–20]. Most bipartite bones represent incidental findings and are asymptomatic, but cases of painful bipartite ossification have been reported [3, 9, 13, 14, 19]. Moreover, some authors have studied the relationship of bipartite bones with some genetic mutations and diastrophic dysplasia [5, 11, 17].

Our patient presented after right knee injury with no history of symptoms; the left knee was normal on examination. The tibial bipartite epiphysis had apparently been asymptomatic. Arthroscopy and imaging methods showed this anatomic variant was not associated with other congenital or developmental abnormalities of the knee although we noted a depressed area in the articular surface above the ossific center. However, the posteromedial aspect of the tibial plate represents the bony anatomic support for the posterior horn of the medial meniscus and the bony attachment of the semimembranosus tendon and of the posterior oblique ligaments. Therefore, this area is an important site for knee stability.

Our patient presented with a history of trauma. An ACL lesion, medial meniscal lesion, and capsular-meniscal detachment of the right knee were found; the asymptomatic and stable left knee suggests the tears were caused by the trauma, but we cannot exclude the possibility of the bone abnormality being a predisposing factor for injury of the medial meniscus and posteromedial corner.

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