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CLINICAL REPORT

Meniscal ossicle in a professional soccer player

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KEYWORDS

Meniscal ossicle;
 Cartilage lesion;
 Intra-articular body

Summary Meniscal ossicles are an unusual finding and a rare cause for knee pain. They are often initially diagnosed as a loose body, chondrocalcinosis or meniscal calcification within the knee joint. Few cases have been reported in the literature. We present a case of a meniscal ossicle with an associated femoral cartilage lesion in a healthy 26-year-old male professional soccer player who presented with swelling and pain. The purpose of this article is to discuss the origins, radiological features, clinical symptoms and prognosis of meniscal ossicles.

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Case report

A 26-year-old male international professional soccer player presented to our center with a two-week history of swelling of the right knee. His only significant past medical history was a previous injury to his right knee seven years ago while playing soccer with full return to sport after one month.

Physical examination of the right knee demonstrated a moderately painful joint, an intra-articular effusion and limited flexion. Patellofemoral, meniscal and ligament tests were negative. The patient presented to our consultation with a Magnetic Resonance Imaging (MRI) (Fig. 1). A medial femoral condylar cartilage lesion was observed. There was no associated meniscal tear. A computerised tomography (CT) scan with contrast was performed showing a focal

chondral defect of 37 mm × 14 mm in the medial condyle, adjacent tibial cartilage thinning and intra-articular trabecular bone fragment embedded in the posterior horn of the medial meniscus (Fig. 2). Anteroposterior (AP) and lateral radiographs showed a small triangular bone fragment located at the posteromedial compartment of the knee (Fig. 3). These findings suggested the diagnosis of meniscal ossicle (MO).

Initial treatment was conservative. The patient returned to his normal sporting activities two weeks after. He developed mild swelling after most athletic activities and suffered progressive discomfort. Intra-articular corticosteroid and two visco-supplement injections were given without benefit. Arthroscopy was then proposed which revealed an ossicle in the posterior horn of the medial meniscus with no tear (Fig. 4). The posterior horn of the medial meniscus was stable with no signs of meniscal extrusion and not detached from the tibia except at the extremity of its root. The ossicle was embedded in this mobile root (Fig. 4A). It was resected under arthroscopy (Fig. 4 B and C).

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Figure 1 Magnetic Resonance Imaging of the knee with a medial femoral condyle chondral lesion. Appearance comparable with the posterior horn of the medial meniscus on sagittal view.

Grade IV changes were noted on the medial femoral condyle cartilage over the MO (kissing lesion of 15×6 mm) and grade II - III changes were noted distally with thinning of the medial tibial plateau. Debridement of the cartilage lesion and marrow stimulation of the grade IV lesion by microfracture was performed. Histological examination of the ossicle demonstrated cancellous bone and bone marrow surrounded by a fibrocartilage layer.

After arthroscopy, the patient continued physiotherapy and received another visco-supplement injection at three

weeks with progressive weight bearing. Six months later he returned to sport having made a full recovery. At nine months follow-up, the patient was able to play a full time soccer match with no symptoms or complaints.

Discussion

As described by Kato et al. [1], MO patients' ages were ranging from 12 to 76 years (average 26.3 years). Eighty-four per cent of cases occurred in males and 16% were in females. Based on a review of radiographs during a two-year period Schnarkowski et al. [2] estimated that the prevalence of MO in the general population was approximately 0.15%. The most frequent localization of the ossicle is the posterior horn of the medial meniscus probably because of its abundant vascularity [1]. Less frequently, ossicles have been reported in other portions of meniscus [3].

The origin of MO is still controversial. Traumatic, phylogenetic and mucoid degeneration theories were proposed in literature [3–8]. Areas adjacent to the ossicle often histologically show osteogenic activity, vascular and fibroblast proliferation suggestive of heterotopic ossification and reactive metaplasia [3]. The theory of trauma may explain the finding of the MO in this patient [9]. The MO may have been induced either due to the previous significant injury reported by the patient seven years ago, a probable avulsion of the medial meniscal root or due to repeated microtrauma from being a high-level athlete.

Clinical symptoms of a MO generally are not specific [10]. Locking of the knee joint is an expected symptom of the presence of an intra-articular body and must lead the clinician to suspect a torn meniscus, particularly if it involves a flap [11]. Sometimes patients are asymptomatic despite intra-articular pathology. It is not clear why such patients suddenly develop symptoms. One hypothesis is that the



Figure 2 Arthro Computerised Tomography scan of the knee with a bone fragment embedded in the posterior horn of the medial meniscus.

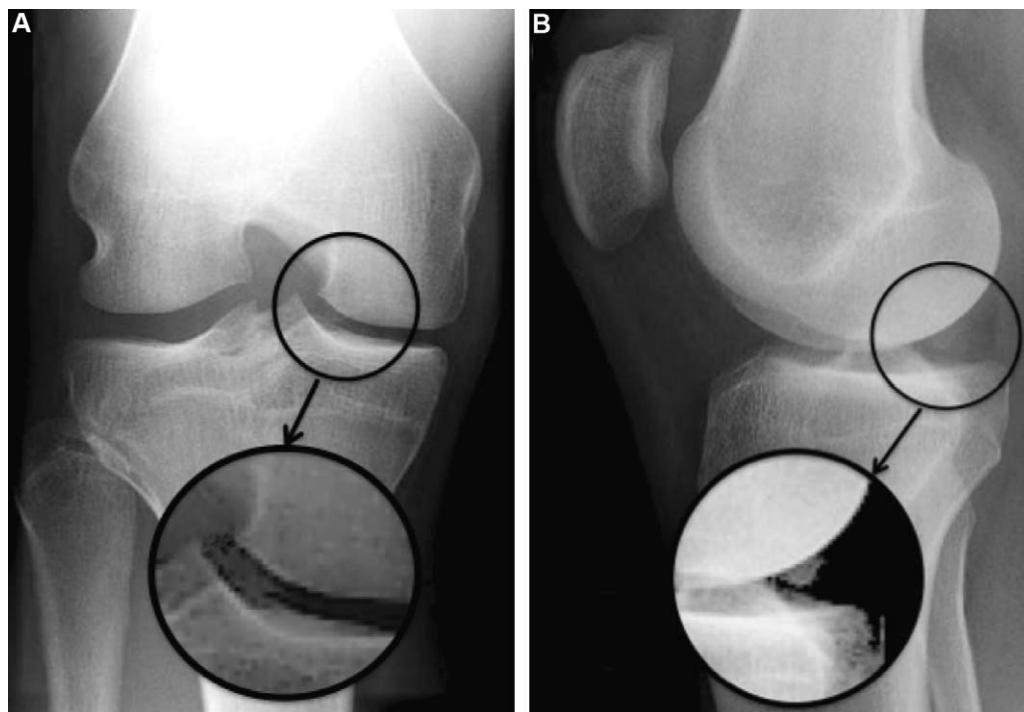


Figure 3 A and B: anteroposterior and lateral radiographs with a small bone fragment at the posteromedial aspect of the knee.

ossicle continues to increase in size and that the focally enlarging menisci can cause pain by affecting adjacent innervated structures [11]. Other authors suggest that MO can alter the contour of the meniscus, increasing the risk of a meniscal tear or degeneration [12].

Radiographically, MO appears as a calcified lesion, frequently in the posterior compartment of the knee with a triangular or rectangular shape [3]. The differential diagnoses include meniscal calcification, osteochondritis dissecans, chondrocalcinosis, loose body and avulsion of the semi-membranous or popliteous tendon [3,6,13]. The characteristic trabecular structure of cancellous bone, as seen in this case, enables us to differentiate it from meniscal calcification which is more dense and compact. Fluoroscopy or MRI is helpful in differentiating ossicles from loose bodies. In contrary to a loose body, an ossicle moves with the

tibial plateau remaining at the joint line [11,13]. A normal stable ossicle can be seen moving with the tibial plateau but remaining at the joint line [10,12]. Helical CT scanning produces reconstructed images of excellent quality in any desired plane of the cartilage and the meniscus [14]. In our patient, the helical contrast CT showed the fragment to have an intrameniscal location with an internal trabecular structure, which supports the diagnosis of MO. The contrast outlining the contours of the meniscus permitted exclusion of an accompanying meniscal tear. For these reasons, we believe that a contrast CT scan is an excellent imaging modality for a MO diagnosis, even though other authors choose MRI as the diagnostic tool [2,6,11,12,15–19].

In our patient, a focal articular cartilage lesion (groove-like scar) [16] on the femoral condyle in a weight-bearing portion of the knee in addition to the MO was found. To our

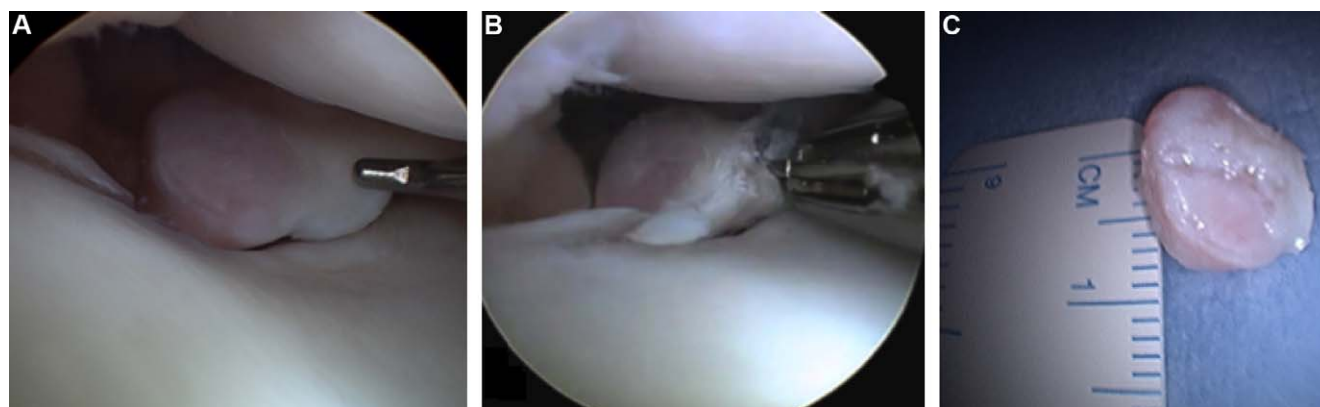


Figure 4 A. Arthroscopic aspect of the meniscal ossicle embedded in the posterior horn of the medial meniscus. B. Resection of the ossicle at the medial meniscus insertion. C. The resected ossicle.

knowledge, it is only the second case reported in the literature showing a MO associated with a cartilage lesion in a young patient [16]. The chondral lesion was probably the result of mechanical erosion by the firm bulging surface of the MO due to repetitive microtrauma [9]. Another theory described by Marzo [20] and confirmed by the biomechanical study of Allaire et al. [21] is that significant meniscal root pathology may cause functional incompetence of the meniscus with consequent early onset cartilage degeneration and osteoarthritis. The evolution of the clinical symptoms for our patient was slow appearing many years following the initial trauma. We believe that it is evident that a traumatic lesion of the medial femoral cartilage did not occur at that time.

Treatment of a MO is controversial. Many authors agree that the presence of a meniscal ossicle does not always necessitate surgical removal [3,6,22]. For asymptomatic patients, nonoperative management is the choice [1]. Arthroscopic resection of MO is generally done for symptomatic meniscal tears which do not respond to conservative treatment [1,3,13]. In our patient meniscal root has not been refixed because he was expected to go back to sports earlier on, but we recommend to refix the root in similar cases and this is our current practice. Contrarily to the innocuous reputation of asymptomatic MO [1,3,6,22], our case report showed that there is a relationship between MO and a cartilage lesion. In the case of an acute avulsion of the root of the meniscus or in a symptomatic knee, it is important to reattach the avulsed root or to remove the MO in order to avoid cartilage lesion evolution [7].

Conclusion

A meniscal ossicle is a rare lesion which is difficult to diagnose. An early diagnosis is crucial especially in high-level athletes to limit cartilage damage. A contrast CT scan is an excellent imaging modality to diagnose this lesion. Early arthroscopic reattachment of the meniscal root or resection of the MO in symptomatic knees should be performed to limit chondral injury.

Disclosure of interest

The authors declared that they have no conflicts of interest concerning this article.

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