Osteocartilaginous fracture of the patella in the immature knee. MRI and X-ray findings.
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Section: Paediatric radiology
Area of Interest: Musculoskeletal bone
Procedure: Diagnostic procedure
Imaging Technique: MR
Special Focus: Athletic injuries Case Type: Clinical Cases
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Patient: 7 years, male

Clinical History:
Patient with one week pain in the anterior region of the knee after sport practice. There was no history of direct trauma. He presented symptoms during maximal knee flexion.

Imaging Findings:
The inferior patellar pole showed acute osteocartilaginous avulsion fracture with osseous and soft tissue oedema. In association, the patellar tendon had inflammatory changes.

Discussion:
Osteocartilaginous fracture of the patella ("sleeve fracture") is a cartilage avulsion of the inferior patellar pole, frequently associated to a small fragment of detached bone [1]. It is a rare injury, but the most common type of patellar fracture in paediatric patients [2, 3]. It is caused by a powerful contraction of the quadriceps with the knee flexed, usually during sports practice [1, 3, 4]. In most cases, it compromises the inferior patellar pole, but the superior pole may also be affected [2]. Clinical manifestations of this fracture are: inability to fully extend the articulation, pain and tumefaction [1]. In severely displaced fractures, there is a palpable gap in the inferior patellar pole [3].

Lateral X-ray of knee often shows an avulsed fragment of bone, articular effusion and a high-riding patella. However, if the bone fragment is small it may not be observed on X-rays [1, 3]. Ultrasound can guide diagnosis [2]. However, MRI is recommended when there is a high suspicion [3], because it demonstrates the lesion and its complications with better resolution [1, 4, 5] such as the avascular necrosis of the proximal pole (blood supply of the immature patella comes from the anterior surface of the distal pole) [3]. Conservative treatment of nondisplaced fractures is preferred.

In cases of severely displaced fractures, early surgery may be effective [3].

Differential Diagnosis List: Osteocartilaginous fracture of the patella ("sleeve fracture"), Sinding-Larsen-Johansson syndrome, Patellar tendinitis, Hoffa’s syndrome, Patellar chondromalacia
**Final Diagnosis:** Osteocartilaginous fracture of the patella ("sleeve fracture")

**References:**


Figure 1

Description: T1-weighted MRI (A), and proton density-weighted MR imaging (B), showing osteocartilaginous avulsion fracture. The white arrows indicate the osseous injury, while the black arrows demonstrate the cartilaginous avulsion. Origin: Napoli A, MR Department, Fundación Científica del Sur, Diagnóstico por Imágenes Adrogué, Buenos Aires, Argentina.
Figure 2

Description: Schematic representation of a sleeve fracture (A), proton density-weighted MR imaging (B), and Lateral X-ray (C), where a cartilaginous and osseous avulsion is observed. Origin: Napoli A, MR Department, Fundación Cientifica del Sur, Diagnostico por Imágenes Adrogué, Buenos Aires, Argentina.
Description: Schematic representation of a sleeve fracture (A), proton density-weighted MR imaging (B), and Lateral X-ray (C), where a cartilaginous and osseous avulsion is observed. Origin: Napoli A, MR Department, Fundación Científica del Sur, Diagnóstico por Imágenes Adrogué, Buenos Aires, Argentina.
Description: Schematic representation of a sleeve fracture (A), proton density-weighted MR imaging (B), and Lateral X-ray (C), where a cartilaginous and osseous avulsion is observed. Origin: Napoli A, MR Department, Fundación Científica del Sur, Diagnóstico por Imágenes Adrogué, Buenos Aires, Argentina.
Description: Detached small bone fragment observed in the inferior patellar pole (arrowhead). Window level was adjusted for better visualisation of the osseous lesion. Origin: Napoli A, MR Department, Fundación Científica del Sur, Diagnóstico por Imágenes Adrogué, Buenos Aires, Argentina.
Description: Axial STIR (Short TI Inversion Recovery) sequence, showing the patellar tendon with inflammatory changes (arrowheads). Origin: Napoli A, MR Department, Fundación Científica del Sur, Diagnóstico por Imágenes Adrogué, Buenos Aires, Argentina.