ELSEVIER

RBO REVISTA BRASILEIRA DE ORTOPEDIA

www.rbo.org.br/

Original Article

Patellofemoral instability: evaluation by magnetic resonance imaging

Patrícia Martins e Souza,[1,*] *Marcelo Sadock de Sá Gabetto*,[2] *Marcelo Ganem Serrão*,[3] *Luiz Antônio Martins Vieira*,[4] *Diogo Cals de Oliveira*[5]

[1]*MD, MSc and PhD in Radiology from Instituto D'Or de Ensino e Pesquisa, and Radiologist in Grupo Fleury and Instituto Nacional de Traumatologia e Ortopedia, Rio de Janeiro, RJ, Brazil.*
[2]*Radiologist at Instituto D'Or de Ensino e Pesquisa, and Radiologist at Grupo Fleury, Rio de Janeiro, RJ, Brazil.*
[3]*Orthopedist with specialization in Sports Medicine and Knee Surgery from Hospital São Zacarias/Santa Casa de Misericórdia do Rio de Janeiro, Rio de Janeiro, RJ, Brazil.*
[4]*Orthopedist with specialization in Knee Surgery, Instituto Nacional de Traumatologia e Ortopedia, Rio de Janeiro, RJ, Brazil.*
[5]*Orthopedist with specialization in Knee Surgery, Instituto Nacional de Traumatologia e Ortopedia, Rio de Janeiro, RJ, Brazil.*
Work performed at Instituto D'Or de Ensino e Pesquisa, Rio de Janeiro, RJ, Brazil.

ARTICLE INFO

Article history:
Received on February 1, 2012
Approved on April 12, 2012

Keywords:
Joint Instability
Patellar Dislocation
Magnetic Resonance Imaging

A B S T R A C T

Objective: To determine the contribution of magnetic resonance imaging (MRI) in evaluating patelofemoral instability. *Methods:* 39 patients (45 knees) with patellar instability underwent knee magnetic resonance images between October 2009 and July 2011, at the Rede Lab's D'Or, in the city of Rio de Janeiro, State of Rio de Janeiro, were included. MRI were analyzed for the presence of bone, hyaline cartilage and soft-tissue abnormalities, as well as anatomic variants that may contribute to chronic patellar instability. *Results:* The authors found, of the 45 knees analysed, bone changes in 44%, cartilaginous injuries in 64%, disruption of the medial patellofemoral ligament (MPFL) in 29% and joint morphology abnormalities in 73% patients. Meniscal tears were also identified in 2 (4%) patients and fibular fracture in one (2%) patient. *Conclusion:* MRI allowed the detection of predisposing factors that may contribute to the development of patellofemoral instability and the diagnosis of bone, hyaline cartilage, ligamentous and meniscal abnormalities.

Corresponding author at: Rua Barão de São Francisco 287/403, Rio de Janeiro, RJ, Brasil, CEP: 20.560-031.
E-mail: pat_martins@ig.com.br

issn © 2013 Sociedade Brasileira de Ortopedia e Traumatologia. Published by Elsevier Editora Ltda. Este é um artigo Open Access sob a licença de CC BY-NC-ND
doi: 10.1016/j.rboe.2012.04.003

Introduction

Patellofemoral instability is still a challenge for orthopedists, not only because of the diversity and complexity of the causal factors but also because of the large number of therapeutic possibilities. Many authors have taken the view that, in the majority of cases, there is a predisposing anatomical factor that contributes towards the instability and that it is fundamental to recognize this in order to define the best approach. Moreover, displacement of the patella promotes occurrences of other lesions and greater risk of development of osteoarthritis, which also affects the choice of treatment and the prognosis.[1]

For many decades, simple radiographs (X-rays) and computed tomography (CT) were the only imaging methods used for evaluating these patients. However, over recent years, magnetic resonance imaging (MRI) has emerged as an auxiliary method for investigating patellofemoral instability, particularly for detecting osteochondral lesions and for evaluating the medial patellofemoral ligament (MPFL). Furthermore, many authors have perceived that MRI also makes it possible to detect predisposing factors and to make a variety of measurements with the same accuracy as CT scans, thus making this the preferred imaging method for evaluating patellofemoral instability in several centers.[2]

The aim of this study was to determine the contribution of MRI in evaluations on patients with a clinical condition of patellofemoral instability.

Material and methods

This study was approved by the ethics committee of our institution (Instituto D'Or de Ensino e Pesquisa). MRI scans on 45 consecutive knee cases were retrospectively analyzed. The patients were referred by orthopedists who are specialists in knee surgery, with a clinical condition of patellofemoral instability and a history of recurrent lateral dislocation of the patella. The MRI scans were produced between October 2009 and July 2011, in apparatus of 1.5 tesla, using specific coils for the knee joint. All the examinations included T2-weighted sequences with fat suppression in the axial plane, proton density (PD) weighted sequences with fat suppression in the coronal and sagittal planes, and T2-weighted sequences in the sagittal plane. Twenty-three examinations included additional sequences with T1 weighting in the axial and sagittal planes at flexion of around 20° to 30°.

Areas of bone edema typical of previous lateral dislocation of the patella were sought (Fig. 1). These were characterized by increased signal in the T2 and PD weightings with fat suppression, in the bone marrow of the medial portion of the patella and on the external face of the lateral femoral condyle,[2-5] other areas of bone edema unrelated to patellar dislocation, joint effusion and tendinous, ligamentous, meniscal or cartilaginous lesions. The presence of morphological or joint geometrical abnormalities that would predispose towards patellofemoral instability was also evaluated,[2,6] using the following criteria:

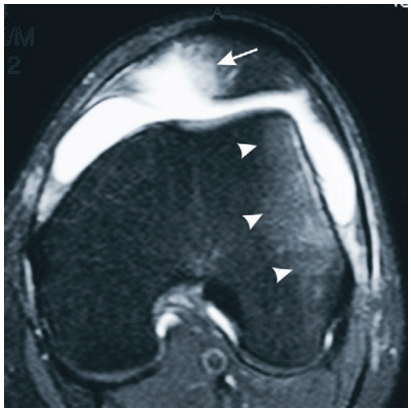

Fig. 1 - T2-weighted MRI with fat suppression in the axial plane, in which bone edema is observed in the medial portion of the patella (arrow) and on the periphery of the lateral femoral condyle, which is typical of a recent episode of transitory lateral dislocation of the patella. Also note the presence of joint effusion.

a) High patella: Caton-Deschamps index greater than 1.2 (Fig. 2).

b) Morphological abnormalities in the intercondylar fossa of the femur (trochlea dysplasia), based on the Dejours radiographic classification (Fig. 3):

Type A – trochlea with morphology preserved, but with a shallow trochlear sulcus (angle greater than 145°).

Type B – rectified trochlea.

Type C – asymmetrical trochlear facets, with hypoplasia of the medial facet and convexity of the lateral facet.

Type D – asymmetry of the trochlear facets, with presence of a supra-trochlear ventral prominence greater than or equal to 7 mm.

c) Lateral inclination of the patella: normally, the lateral facet of the patella forms an angle with the posterior bicondylar line that is open laterally and greater than 8° in flexion (lateral inclination angle). Patellae with a lateral inclination angle that opened laterally but was less than or equal to 8° on axial images obtained in flexion were considered to be inclined. If the only images available were axial, in extension, the patellae were considered to be inclined if their inclination angle opened medially or if the lateral facet of the patella was parallel to the posterior bicondylar line (Fig. 4).

d) Lateral displacement of the patella: this was only evaluated in the 23 cases in which images acquired in flexion in the axial plane were available, since lateralization of the patella in extension may be physiological. Patellae that did not fit into the trochlea in flexion and with the medial margin lateralized in relation to a line perpendicular to the bicondylar line, in the plane