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Original Article

Pellegrini–Stieda ossification can also involve the posterior attachment of the MPFL☆,☆☆

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ABSTRACT

Purpose: To evaluate for development of Pellegrini–Stieda (PS)-type ossification following injury to the posterior attachment of the medial patellofemoral ligament (MPFL).
Materials and methods: This retrospective study evaluated 27 patients with acute knee injury with initial radiographs, magnetic resonance imaging within 1 week of injury, and follow-up radiographs assessing for development of PS.
Results: Of the 27 patients who developed PS ossification, 7 patients (25.9%) had isolated MPFL injury with the ossification slightly more proximal than the traditional PS.
Conclusion: Isolated injury to the posterior MPFL also leads to PS ossification, which is slightly superior in location to the traditional PS.

1. Introduction

Ossification adjacent to the medial femoral condyle [Pellegrini–Stieda (PS) pathology] was initially described by Kohler in 1903 as a posttraumatic knee ossification associated particularly with sports activities [1]. Pellegrini (1905) and Stieda (1908) were the first to study and report its clinical significance [2–3]. The initial description did not define the exact anatomical location of the ossification. However, subsequent authors showed that the ossification was usually located in or adjacent to the proximal superficial medial collateral ligament (sMCL) medial to the distal medial femoral condyle (PS sign) [4]. The classic radiology teaching is that PS ossification is secondary to injury to the sMCL alone [5].

Mendes et al. suggested that PS ossification is not confined to the sMCL but may also involve the insertion of the ischiocondylar tendinous portion of the adductor magnus on the adductor tubercle [9] and proposed that PS disease should not be regarded as synonymous only with ossification of the sMCL. Most authors agree that soft tissue trauma is the common etiology. There is also evidence that it may also arise from periosteal stripping [2–3,5–8].

We demonstrate an additional location that has not been previously described in the radiology literature—the posterior attachment of the medial patellofemoral ligament (MPFL), located immediately superior to the proximal attachment of the sMCL at the distal medial femoral epicondyle. The more superior location of the PS-type ossification on anteroposterior (AP) radiographs of the knee is uncommon but is indicative of prior injury to this important static stabilizer of the patella. To our knowledge, this anatomic correlation with isolated MPFL injury and interval development of PS ossification has not been previously described in the literature.

2. Materials and methods

In this IRB-approved, HIPAA-compliant study, we retrospectively searched our radiology clinical database within a departmental mini-PACS for radiograph dictations including the term "Pellegrini Stieda" between January 1, 2004, and December 31, 2010. Radiographs at the time of acute knee injury, subsequent knee magnetic resonance imaging (MRI) evaluating injury to the posterior attachment of the MPFL and/or sMCL, and follow-up radiographs to assess for progressive interval development of PS-type ossification were reviewed. The study was performed at a tertiary care academic hospital with inpatient and outpatient facilities.

During the 7-year study period, 332 patients had the term "Pellegrini Stieda" dictated in knee radiograph reports. Of the patients with acute

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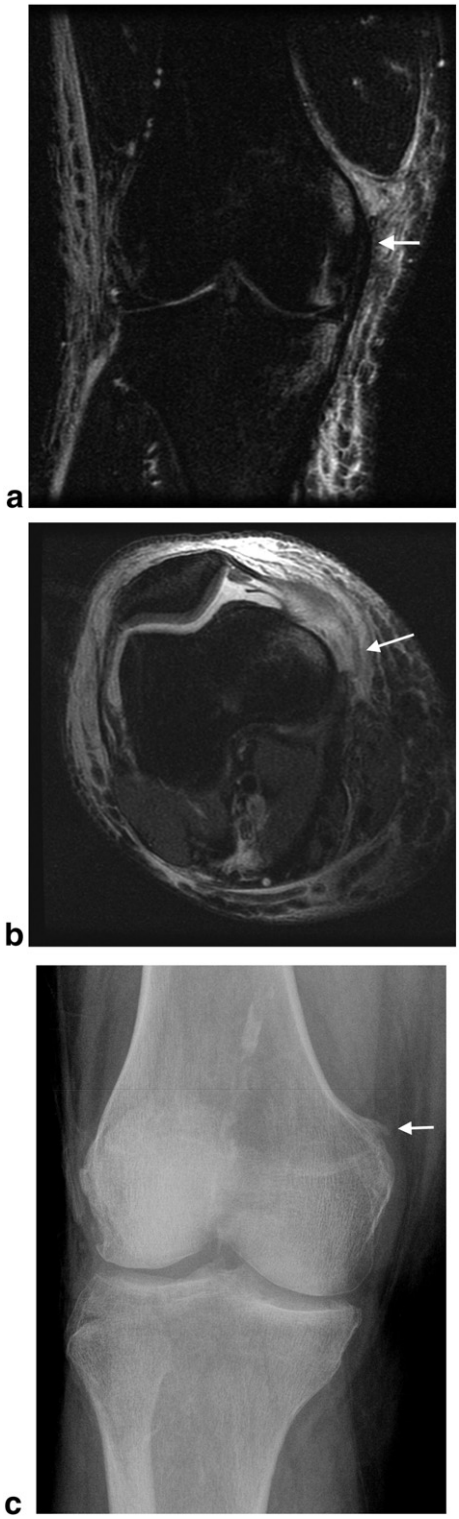

Fig. 1. (a) A 65-year-old woman with injury after motor vehicle collision. Coronal PD image of the right knee demonstrates an intact superficial MCL (arrow). (b) Axial PD image through the left knee at the level of the MPFL demonstrates disruption of its posterior attachment (arrow). (c) Follow-up radiograph of the right knee demonstrates interval development of PS-type ossification (arrow), which is "high" in location, relating to the posterior attachment of the MPFL.

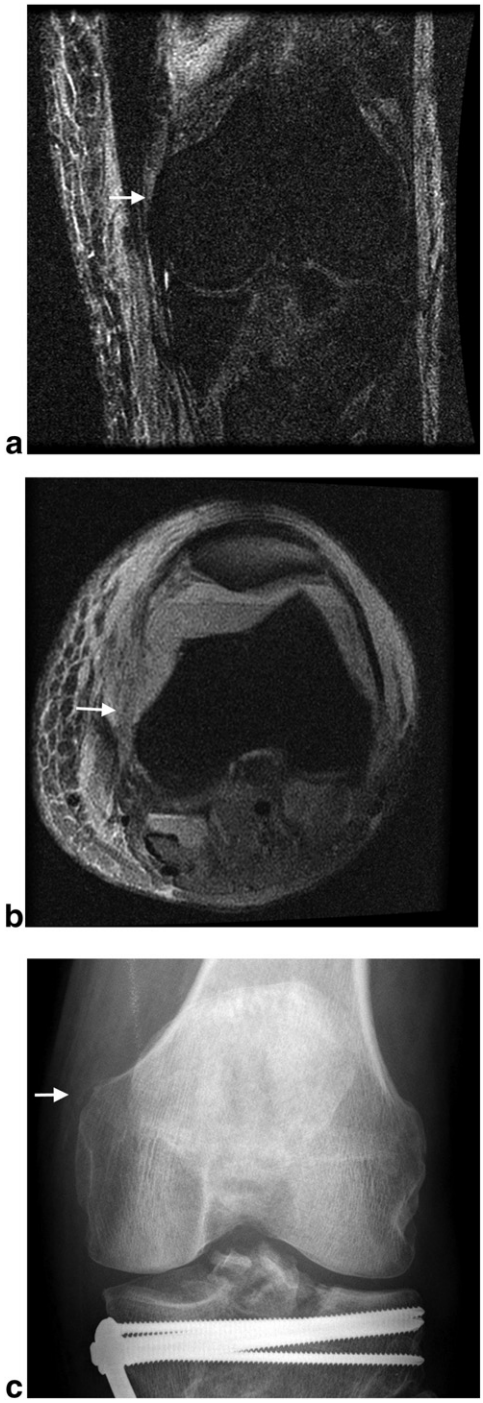

Fig. 2. (a) An 18-year-old man with comminuted, displaced tibial plateau fracture (Schatzker IV) after ATV accident. Coronal PD image through the left knee demonstrates an intact sMCL (arrow). (b) Axial PD image through the left knee demonstrates a complete tear of the posterior attachment of the MPFL (arrow) with slight lateral patellar subluxation and large lipohemarthrosis. (c) Follow-up radiograph of the left knee demonstrates interval development of subtle PS-type ossification (arrow).

injury who underwent knee radiographs, 271 patients (81.6%) had knee MRI of the affected knee. Only 27 of the total patients had knee radiographs at the time of initial injury, MRI performed within 1 week of injury to evaluate for internal derangement, and subsequent follow-up radiographs 3 months after initial injury to assess for interval development of PS-type ossification. The remainder of study patients with MRI exams (244) were excluded secondary to initial injury radiographs demonstrating preexisting PS-type ossification and/or MRI being performed greater than 1 week between the initial injury and MRI.

The MR images were reviewed by two board-certified, musculoskeletal fellowship-trained radiologists with 3 and 9 years experience, who evaluated the integrity of the posterior attachment of the MPFL and proximal sMCL in consensus. The radiologists were blinded to the