

ABSTRACT

COA Meeting 2017, Ottawa Convention Center

Surgical treatment for Recalcitrant Anterior Knee Pain by Release or Resection of the Infrapatellar Plica

Purpose

At the 2016 COA Annual Meeting, in the podium presentation entitled *The Gross and Microscopic Anatomy of the Infrapatellar Plica and Fat Pad, an Enthesis Organ whose Kinematics are Linked to Anterior Knee Pain*, we presented morphologic and kinematic data demonstrating a common trait linking anterior knee pain: the elimination of deformity and stretch of the ligamentum mucosum and fat pad, and their contained nerves through arthroscopic release or resection of the infrapatellar plica (IPP), de-tethering the fat pad. Our purpose is to present three clinical cases applying this approach in patients with AKP, a clinical condition currently considered not treatable surgically.

Clinical Cases

The following patients with adolescent AKP were successfully treated by release or resection of the IPP:

Case 1: 15-year-old male, both knees, 3 years' duration, insidious onset, history of inflammatory arthropathy.

Case 2: 14-year-old female, 3 years' duration, insidious onset, associated with overuse, exacerbated by lateral release.

Case 3: 16-year-old female, both knees, 4 years' duration, insidious onset, profound psychological effect.

Discussion

This approach recognizes AKP as a multifactorial symptom complex, not specifically linked to a specific diagnosis. Patients with this condition share a common trait, that links the pain to the structure and function of the non-isometric contents of the anterior compartment of the knee, the fat pad (FP) and IPP. Collectively this complex of innervated and sensate tissues acts as a unit, a hydraulic shock absorber, termed the IPP-FP complex, obligatorily stretching and deforming at the extremes of knee motion, tethered centrally by the IPP. These dynamic changes in shape are eliminated when the plica is released at the femoral attachment of the plica or if the plica is resected. This surgical treatment addresses the pain by de-tethering the fat pad, thus interrupting the physiology of the unit, removing mechanical pull on contained activated pain fibers or altering neural pathways. The pain is not directly related to inflammation, fibrosis or contracture of these structures, although such changes may be present. As the fat pad is innervated by every nerve in the region of the knee, the relief of AKP is thus physically linked with these central, pain-sensitive structures, whose deep location and widespread innervation, allows it to both mimic and

accompany other knee disorders. We introduce the term *IPP derangement syndrome* for AKP arising from this physiology.

In each of these cases, recalcitrant AKP created profound and prolonged interruption of the quality of life of these adolescents. In case one, treatment with multiple medications including steroids, and methotrexate implied risk of significant side-effects of the conservative treatment, and he was not improving. For case two, a competitive athlete, being treated at a world-renowned institution, the treating surgeon recommended realignment of her extensor apparatus after her symptoms had been exacerbated by lateral release. She returned to successful competition at the intercollegiate level after the IPP release and rehabilitation. Case three demonstrated crippling psychological effects in a susceptible adolescent, leading to prolonged institutionalization. While she has returned to a normal life, she will require careful follow-up, and possible second-look arthroscopy. The presence of patella alta and genu recurvatum may mandate reconstructive surgery but her disabling pain disappeared with IPP release/resection, without addressing these mechanical factors.

Our unpublished results for release/resection of the IPP in adolescent AKP, unresponsive to conservative management or lateral release, provided good to excellent results in 84% of 35 patients. Forty-nine knees (all with an IPP), were symptomatic for a mean 28 months, with an average post-operative follow-up of 63.9 months. This survey is scientifically weak because of retrospective bias, in that the data was not collected prospectively, and a single surgeon was involved. A prospective study is indicated to evaluate the role of this surgical approach in the management of patellofemoral disorders. Recognizing the obligatory time between organizing such study, and publication of the results, faced with the magnitude of the clinical problem and the demonstrated deleterious effects on the afflicted, we suggest that orthopaedists consider release/resection of the IPP as a first surgical step in the treatment of recalcitrant AKP.

Conclusion

The awareness that AKP, or IPP derangement syndrome, can be relieved in many by a reliable, safe operation, release or resection of the IPP, allows one to approach the patient who has failed conservative management with an altered mind set. This procedure de-tethers the deformable fat pad, allowing its free deformation as a space filler without the central constraint of the IPP, eliminating mechanical pull on activated pain fibers. AKP is complex and multi-factorial, but treatment in this way, as a *symptom complex*, with a specific anatomic link to the fat pad and IPP, allows pain relief for many.

