

# Medial release and lateral imbrication for intractable anterior knee pain: diagnostic process, technique, and results

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**Purpose:** To present two cases of intractable patellofemoral pain syndrome treated with a novel procedure, arthroscopic medial release, and lateral imbrication of the patellar retinaculum.

**Patients and methods:** This case series presents the treatment of three knees in two patients (one bilateral) in whom an all-inside arthroscopic medial release and lateral imbrication of the patellar retinaculum was performed. Subjective measurement of pain was the primary outcome measurement, and subjective patellofemoral instability was the secondary outcome measurement.

**Results:** Subjectively the two patients had full resolution of their pain, without any patellofemoral instability.

**Conclusion:** Medial release and lateral imbrication of the patellar retinaculum is a new surgical procedure that has been used in the treatment of intractable patellofemoral pain syndrome. This is the first report of its kind in the literature. While outcome measurements were less than ideal, the patients had positive outcomes, both functionally and in terms of pain.

**Keywords:** anterior knee pain syndrome, chondromalacia patellae, runners knee, patellar chondropathy, patellofemoral dysfunction, patellofemoral tracking disorder

## Introduction

Patellofemoral pain syndrome (PFPS) is the most commonly diagnosed condition in young individuals with knee complaints.<sup>1</sup> Previous research has shown surgical treatment of PFPS to be ineffective.<sup>2</sup> Two retrospective case reports (three surgical interventions) involving arthroscopic medial release and lateral imbrication of the patellar retinaculum (AMRLIPR) for intractable PFPS are presented in view of the novel nature of the procedure in the management of intractable PFPS. Intractable PFPS, for the purposes of this article, is defined as persistent (more than 6 months duration) PFPS that has failed to improve with conservative treatment. A comprehensive search of Google Scholar,<sup>3</sup> PubMed,<sup>4</sup> and Medline (OvidSP)<sup>5</sup> revealed no literature on medial release and lateral imbrication as a surgical procedure.

## Methods

Two young female patients with intractable PFPS underwent AMRLIPR. One of the cases had bilateral disease, resulting in the procedure being performed on both knees, in different operating room sittings. The primary outcome measure used was subjective pain level pre-op and post-op. Subjective instability pre-op and post-op was used as a secondary measure.

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Both patients underwent a protocol using two donut/sleeve-type knee braces to help guide surgical planning. One brace was used to provide a force to medialize the patella. Following a trial of brace 1, the second brace was used to lateralize the patella. Both patients wore each knee brace consistently for at least a week and reported back on whether they had relief or aggravation of their pain with the use of the braces. Pain relief with lateralization bracing, as well as aggravation with medialization, was used as evidence that the patient might benefit from a surgical procedure to lateralize tracking of the patella.

The procedure performed was technically very similar to an all-inside, lateral retinacular release with a medial patellar retinaculum reefing, as described by Halbrecht.<sup>6</sup> How this procedure differs from Halbrecht's is that the release was performed on the medial patellar retinaculum, and the reefing, or imbrication, was performed on the lateral retinaculum. A Spectrum<sup>®</sup> MVP Suture Passer (ConMed Linvatec, Spectrum MVP, Mississauga, ON, Canada) was also used rather than the epidural needle used in Halbrecht's<sup>6</sup> description.

The patient was placed supine on the operating room table, with standard inferomedial and inferolateral portals made for the scope. The medial and lateral compartments were inspected under visualization and palpation with a probe. The cruciates were inspected in the intracondylar notch, and the patellofemoral joint was inspected. There were no abnormal findings. Electrocautery was then used to perform a release on the medial retinaculum, exposing the muscular fibers of the quadriceps tendon. A rasp was then used to freshen up the tissue of the lateral retinaculum. A Spectrum MVP Suture Passer was then used to place either four or five mattress sutures (Hi-Fi Ultra High Molecular Weight Polyethylene Suture<sup>®</sup>, ConMed, Brossard, QC, Canada) into the lateral retinaculum to draw it together when arthroscopic knots were tied. The knee was then drained, infiltrated with bupivacaine, and placed in an adjustable locking hinged knee brace.

Patient 1 was placed in full extension for 4 weeks, with an increase in range of motion (ROM) of 30° every 4 weeks in the brace. With her second knee surgery, it was noted, while under anesthetic, that little stress was placed on the imbrication sutures up to 90°. The patient was again placed in a hinged brace, but this time was allowed 15° of movement to be increased by 30° every week. This hastened her recovery to full flexion as compared to her first surgery. Patient 2 underwent the latter protocol, including non-weight bearing on crutches for 2 weeks.

## Case 1

### Initial assessment

Patient 1 was a 22-year-old, active female with an 18-month history of bilaterally equal knee pain, consistent with PFPS on history. X-ray studies revealed no abnormalities. The patient reported no instability in either knee.

The patient complained of 8/10 pain in both knees. She had full ROM of both knees. The patient subsequently underwent 6 months of physiotherapy and strength training, with minimal relief of her symptoms. The patient was also instructed to wear a donut/sleeve-type knee brace to medialize her patella for a few weeks, followed by a similar-type knee brace to lateralize her patella for a further few weeks.

### Pre-op assessment

She was trialed for 4 weeks in the lateralizing knee braces, with subjective relief of her pain. She had bilateral recurrence of her pain while not using the braces and worsening of her pain with use of medializing braces. The patient was found to have full ROM of both knees.

It was thoroughly discussed that a medial patellar retinaculum release with a lateral patellar retinaculum imbrication could be attempted to lateralize her patella, mimicking the effects of the lateralization brace. The patient was informed of the alternative treatments, risks, benefits, and potential harms, both known and unknown, of this procedure. She was given ample opportunity to ask questions before she made a well-informed decision to proceed with an AMRLIPR.

Following her first operation, the patient requested to have the same procedure done to her other knee, which was completed 5 months following the first procedure.

### Post-op assessment

Postoperatively, at 10 months after right knee surgery and 5 months after left knee surgery, she was noted to have 140° and 145° of flexion, respectively, with full extension bilaterally. The patient reported, subjectively, full resolution of pain in both of her knees. It should be noted that recovery to full ROM was faster in her second knee following earlier mobilization in the postoperative period. The patient reported no episodes of instability in either knee following the procedure.

## Case 2

### Initial assessment

Patient 2 was referred by a fellow orthopedic surgeon following two failed arthroscopies for knee pain. Indication for initial arthroscopies was presumed meniscal pathology.

She subsequently developed symptoms consistent with PFPS following the first arthroscopy. Conservative treatment for her PFPS failed. The patient reported no instability in her knee. ROM was full. X-rays revealed no significant abnormalities, and a magnetic resonance imaging demonstrated only previous lateral-sided changes and no medial-sided pathology.

Owing to the presence of medial-sided joint tenderness, the patient received an injection of 40 mg methylprednisolone mixed with lidocaine. Two weeks later, she reported only partial relief with injection of her knee; so she was trialed in the lateralization knee brace, followed by the medialization knee brace.

### Pre-op assessment

The patient had significant relief while wearing the lateralization knee brace and aggravation of her pain with the medialization knee brace. As she was still having debilitating pain, the patient was offered an AMRLIPR. She was informed of the novel nature of the procedure, and following a thorough discussion of the risks, both known and unknown, she made a well-informed decision to proceed with surgery.

### Post-op assessment

Postoperatively, at 2 weeks, patient 2 was found to be 5° off full extension with 110° of active flexion. At 10 weeks post-op, she was found to have full flexion and extension, as well as full, subjective relief of her pain symptoms. She reported no episodes of instability.

## Discussion

It is generally accepted that surgical intervention in PFPS should be used only when conservative treatments have failed. Physiotherapy is the first-line option for beginning conservative treatment, and has been shown to be highly effective.<sup>2</sup> Unfortunately, in a small subset of patients, conservative management will fail, as it did in both of these patients. This leaves us with the predicament of what to do with the patient who has failed evidence-based, conservative treatment. While there have been procedures used for the treatment of PFPS, previous research has shown that surgical techniques have been ineffective.<sup>2</sup>

The surgeon responsible in these two cases was faced with two patients who had been suffering significant pain for a long time. These were both young patients who were limited in their activities by the pain, to the point that they were willing to go to great lengths for relief. They had both failed a reasonable course of conservative management. Knowing full well the lack of positive evidence for current

surgical techniques, the surgeon chose to attempt a procedure to lateralize the patella, as both patients had shown relief of their pain when tracking of the patella was lateralized through the use of orthotic knee braces. The technique chosen to lateralize the patella was very similar to the technique used to repair the medial patella retinaculum following lateral patellar dislocation.<sup>6</sup>

This report demonstrates the first use of AMRLIPR as a surgical technique for the treatment of intractable PFPS, but it also demonstrates the need for further research into the effectiveness of such a surgical intervention. Unsuccessful attempts were made to contact both patients, in order to obtain objective findings, for research purposes. Although this report lacks objective measures, such as the use of a visual analog pain scale, or the use of a functional inquiry as part of the objective measures, it does offer hope for future surgical techniques for intractable PFPS. Future research in the form of detailed case reports, or small clinical trials, would be beneficial to understanding the effectiveness of such a procedure. Despite the pitfalls of this report, the authors feel that AMRLIPR is an exciting new surgical technique that may be helpful for the treatment of intractable PFPS. It is important to identify a patient who may have symptomatic benefit from such a procedure, and this is where the authors feel that knee braces can be used to mimic results from the surgery.

The authors have entertained the possibility of other variables playing a role in the outcome of these two patients. It is possible that the nerves causing these patients' pain were disrupted during cauterization of the medial patellar retinaculum. The thought of placebo also needs to be entertained in both cases. As the patients were relatively immobile during the immediate post-op period, it is possible that this rest period led to the resolution of their pain.

The complications of such a procedure are yet to be identified, but may include very worrisome lateral patellar instability, persistent weakness or stiffness, quadriceps tendon rupture, along with the usual surgical complications such as bleeding or infection. The authors feel that it is very important to inform patients that this is a new procedure, with limited data and results. It is also important to inform patients of the known and unknown complications that could result from such a novel procedure.

Subjective pain relief following surgery was chosen as the main outcome measure, as we were unable to contact either patient to gather objective results. Subjective instability was used as the secondary outcome measure, as the procedure is thought to create the workings of a laterally

unstable patellofemoral joint, and patellofemoral instability was thought to be a serious complication.

## Conclusion

AMRLIPR is a new surgical procedure that has been used for the treatment of intractable PFPS. Although the outcome measurements in this study are less than ideal, one can conclude that the results of these two cases were positive, as both patients achieved relief of their pain following their procedures, without experiencing any major complications. Orthotic knee braces were utilized to select patients who may benefit from this procedure.

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## Disclosure

The authors report no conflicts of interest in this work.

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