

Osteopathic Approach for Lateral Knee Pain Caused by Iliotibial Band Friction Syndrome: A Case Report

Juilett Kostanjevec, DO, and Regina K. Fleming, DO

CASE REPORT

Abstract

Iliotibial band friction syndrome (ITBFS) is one of the most common causes of lateral knee pain in athletes.^{1,2} Conservative management has been with ice, modified activity, stretching, non-steroidal anti-inflammatories (NSAIDs), and/or corticosteroid injections.³⁻⁶ This treatment regimen has been effective in most, but not all.^{3,7}

This report describes a patient with chronic lateral knee pain caused by ITBFS unresolved with both conservative and surgical management. The patient presented with multiple lower extremity dysfunctions, and correcting these dysfunctions resolved the lateral knee pain. Therefore, osteopathic manipulative treatment applied to the lower extremity is a valid consideration for conservative management of lateral knee pain caused by ITBFS.

Introduction

Iliotibial band friction syndrome (ITBFS) is one of the most common causes of lateral knee pain in athletes, especially runners, with an estimated incidence of 8.4%.^{1,2} ITBFS is the result of repetitive friction between the iliotibial band (IT band) and the lateral femoral condyle that leads to inflammation and tightening of the IT band.^{2,8} It typically presents with diffuse lateral knee pain and tenderness just above the lateral joint line.⁹ In addition, tight IT bands have been implicated in patients with patellofemoral pain syndrome (PFPS) and maltracking patella.^{10,11} The generally accepted conservative management of ITBFS includes ice, modified activity, stretching, NSAIDs, and/or corticosteroid injections.³⁻⁶ While this therapy has been found effective in 94% of patients,³ other studies have found the results inconsistent.⁷ Multiple studies have found biomechanical treatments in addition to the conservative methods beneficial.^{2,11} The anatomical connections of the IT band and knee joint suggest that osteopathic manipulative treatment (OMT) of the entire lower extremity may provide additional relief to patients experiencing ITBFS and resulting lateral knee pain.

From the Philadelphia College of Osteopathic Medicine-Georgia (Kostanjevec and Fleming) and the New York Institute of Technology College of Osteopathic Medicine at Arkansas State (Fleming).

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Correspondence address:
Regina K. Fleming, DO
Department of OMM
New York Institute of Technology
College of Osteopathic Medicine at Arkansas State
PO Box 119
State University, AR 72467
(870) 680-8892

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Case Report

History of Chief Complaint

A 26-year-old white woman presented with right lateral knee pain. Current symptoms began 1.5 years previously after being treated surgically with a medial-patellofemoral reconstruction with allograft and tibial tubercle osteotomy to correct chronic patella subluxation. Physical therapy rehabilitation with proprioceptive therapy, stretching, and mild strengthening exercises was provided for 6 months. Following 6 months of postoperative physical therapy, an MRI was normal, showing a healed tibial ostomy with realignment of patellar tendon, and she was released from surgical care. Unfortunately, the patient continued to have constant lateral knee pain, self-rated as 2-3/10 on the pain scale.

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The pain does not radiate and is located on the right inferolateral patella. After running, the pain is sharper and slightly increased, and after prolonged sitting, the pain is a dull, throbbing sensation. The patient admits to numbness of right shin, which has been constant since the surgery. She denies muscle weakness, tingling, and low back pain. She has tried stretching before and after exercise, which seems to help a little. Her surgeon and physical therapists had no other suggestions besides NSAIDs, ice, and rest. She tried 800 mg ibuprofen as needed after exercise, which helped reduce the pain slightly.

History

The patient denies any current medical problems. Patient admits to a chronic history of knee subluxation since 8 years of age, which was treated surgically by medial-patellofemoral reconstruction with allograft and tibial tubercle osteotomy on the right knee in 2014.

The patient's mother had no known medical problems. The patient's father had cervical spinal fusion in his 40s.

The patient reported drinking one cup of coffee per day and drinking alcohol once per week. She denies smoking and illicit drug use.

The patient had no known drug allergies, and she was taking 800 mg of ibuprofen every 6 hours as required for knee pain.

Physical Exam

Patient was a 26-year-old woman in no acute distress (blood pressure: 118/68 mmHg; heart rate: 70 beats per minute; respiration rate: 16 breaths per minute; height: 5'4"; weight: 135 lbs). No abnormalities were noted upon examination of ear, nose and throat; cardiac; respiratory; or vascular systems.

The patient was alert and oriented to person, place, and time with pleasant affect. A neurologic exam reveals cranial nerves II-XII were grossly intact, and deep tendon reflexes were 2/4 in upper and lower extremities bilaterally. Muscle strength was 5/5 in upper and lower extremities bilaterally, negative straight leg raise bilaterally. No gait abnormalities were appreciated.

An osteopathic structural examination revealed right patellar counterstrain point at the 8 o'clock position, right posterior fibular head, right externally rotated tibia, and restriction of right first metatarsal. Patient had a left-on-left sacrum, right anterior innominate, and L2 flexed, rotated and sidebent left. Left psoas was tighter than the right psoas. There was a right quadratus lumborum counterstrain point and there was tightness of the right IT band noted. In addition, bilateral respiratory diaphragm restriction was noted.

The hamstring and quadricep muscle groups showed no restrictions or tightness.

Assessment

Lateral knee pain was secondary to IT band friction syndrome, and there were somatic dysfunctions of the rib, lumbar, sacrum, pelvis, and lower extremity.

Plan

Osteopathic manipulation treatment (OMT) was performed on the somatic dysfunctions. A percussion hammer was used to correct the sacral dysfunction. Muscle energy along with the percussion hammer was used on the L2 somatic dysfunction. Muscle energy was also used to correct the anterior innominate rotation and psoas hypertonicity. A combination of muscle energy and articular techniques was used for the right posterior fibula. Additional articular techniques were used for the metatarsal dysfunction. Myofascial release was used on both the IT band and bilateral diaphragm dysfunctions. Lastly, counterstrain was used on the quadratus lumborum and patellar tenderpoints.

A posttreatment exam demonstrated resolution of the somatic dysfunctions listed above. There was also immediate resolution of the patient's knee pain. The patient was instructed on how to perform counterstrain to address her patellar pain, should it reoccur. In addition, proper stretching of IT band and psoas muscle was taught. The patient was scheduled to follow up in 1 week, at which time the patient reported no reoccurrence of her knee pain. At a 2-year follow-up, the patient reported little to no reoccurrences of the lateral knee pain. She continued to stretch her IT band and psoas 4 to 5 times a week after exercise. She has also increased her physical activities to include water skiing, wakeboarding, and hiking.

Discussion

ITBFS is the result of repetitive friction between the IT band and lateral femoral condyle, which causes tightening of the IT band and diffuse lateral knee pain.^{2,8,9} The IT band originates from the iliac crests and subsequently divides into a central and anterior component.¹²⁻¹⁴ The central component, or iliotibial track, continues down the femur, passes over the greater trochanter and vastus lateralis, terminating at the infra-condylar tubercle of the tibia.^{12,14} The anterior component, known as the iliopatellar band, has been found to insert on the transverse and longitudinal retinaculum of the patella, contributing to the patella's stability.^{12,14} Consequently, the IT band has attachment sites at the femur, patella, and tibia.¹⁴

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A tight IT band can place additional lateral strain on the knee, producing diffuse lateral knee pain.

ITBFS is a common cause of lateral knee pain in athletes, especially in runners,^{1,2} which can be explained by the motion of the IT band itself. Repetitive flexion and extension of the knee causes the IT band to move anteriorly and posteriorly, respectively, at the lateral femoral condyle resulting in inflammation.^{2,8} This friction peaks at approximately 30° of knee flexion, which occurs just after foot strike in runners.^{2,8} Prolonged friction, such as excessive running or running downhill, has been thought to result in the development of ITBFS.^{2,8} A tight IT band increases friction at the lateral femoral condyle, leading to increased inflammation and lateral knee pain.

The IT band surrounds the tensor fascia lata (TFL) and assists in anchoring the TFL to the iliac crest.¹³ Contraction of the TFL tightens the IT band and contributes to hip flexion.¹⁵ Unbalanced contraction of the TFL and IT band can result in an anterior rotation of the innominate, as seen in this case.

Park et al¹¹ demonstrated that an externally rotated tibia pulls the patella laterally as the IT band load increases. Also, increased tension from the IT band has been known to cause external rotation of the tibia^{11,14} and lateral tilt of the patella,^{5,10} which can be explained by the anatomical attachments mentioned above. It has been previously recommended to treat the tibial rotation, to aid in IT band flexibility and patellar maltracking.¹¹ This patient had an externally rotated tibia and a tight IT band, which was treated and aided in the resolution of her lateral knee pain. This lends support to Park et al's recommendation of treating the tibial rotation in addition to IT band stretching.

The patient in this case had a posterior fibular head and a lateral patellar tenderpoint. The popliteofibular ligament originates from the musculotendinous junction of the patellar tendon and inserts on the fibular styloid process¹⁶; therefore, it is reasonable to conclude that a posterior fibular head can place additional lateral strain on the patellar tendon. Consequently, fibular dysfunctions, in addition to an externally rotated tibia and tight IT band, can result in an increased lateral pull on the connecting patellar fascia, resulting in the formation of a patellar tenderpoint and potential maltracking, as demonstrated in this case. ITBFS is known to cause lateral knee pain, patellar maltracking, and patellofemoral pain syndrome.^{2,9,10,14} This patient was noted to have a history of both lateral knee pain and patellar maltracking. Using OMT to correct these dysfunctions significantly reduced the lateral pull on the patellar fascia, resolving the lateral knee pain.

Conclusion

Future patients with a history of lateral knee pain caused by ITBFS could benefit from OMT. This recommendation is based on the anatomical connections described above. Using osteopathic manipulative medicine (OMM) to treat the lower extremity dysfunctions in this patient reduced the lateral tension on the patella, resolving the lateral knee pain. Proper stretching of the IT band can be easily taught to patients, who can then perform the exercises at home as needed. This stretching in combination with OMT can be used as adjunctive therapy in the management of lateral knee pain caused by ITBFS.

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