Persistent Postoperative Swelling Following Arthroscopic Meniscectomy: A Case Report

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CASE REPORT

Abstract

After arthroscopic meniscectomy, it is important to ensure each patient regains as much of the original function of the knee as possible. The inherent structural and functional relationships among the bones, muscles, fascias, and lymphatics are vital. Each element should be a focus of treatment to reap maximum benefits and reduce long-term dysfunction. While increased range of motion and strengthening exercises are the current focus of postoperative rehabilitation, a more direct approach to the fascial and lymphatic systems should be instituted for those patients reporting swelling as a long-term sequela. In this case report, osteopathic manipulative treatment reduced recovery time for a 65-year-old woman following arthroscopic meniscectomy.

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Introduction

The risk of complication during an arthroscopic procedure is a concern to patients. Therefore, reduction and treatment of these complications should be an area of focus postoperatively. There have been several studies that mention the immediate and long-term complications of meniscectomy procedures in the older population. Hame et al[1] reported complication rates of 0.4% for pyogenic arthritis, 0.8% for deep vein thrombosis, and 0.3% for pulmonary embolus after arthroscopic meniscectomy in a population over 65 years of age.

A study of patient expectations following meniscus surgery shows those patients older than 55 years have higher expectations of a shorter recovery time than patients younger than 35 years (P = 0.008).[2] Many of these patients' recoveries do not hold up to their high expectations prior to surgery. This discrepancy may in part be due to the lack of standard protocol for knee rehabilitation after an arthroscopic procedure.[3]

Jeong et al[3] provides us with a general progression of phasic rehabilitation programs over the first 6 postoperative weeks. Prior to discharge, patients are given instructions on managing pain and swelling of the knee with ice, elevation, and rest. Following this immediate period, the first phase includes maximum protection of the joint followed by a steady decrease of protection and increase in weight-bearing and range of motion exercises as tolerated. The final phase incorporates a return to daily living activities and sports.[3] Most rehabilitation programs that follow this phasic approach focus on restoring range of motion and muscle function.[3] They do not focus on reduction of swelling specifically. Initial swelling and effusion are common but are not expected to persist beyond 1 to 2 weeks postoperatively.[4]

Reports of long-term swelling have been documented in immediate and long-term follow-up studies. Reigstad et al[5] conducted a study of 876 patients who underwent any simple arthroscopic procedure in which 43 patients reported swelling of the knee or calf during a follow-up survey 2.12 to 5.08 years later. Similarly, Chatain et al[6] reported that 6% of patients (n=214) reported significant to severe swelling on an International Knee Documentation Committee subjective evaluation form at 10 years follow-up after medial meniscectomy. Treatment options directed specifically towards swelling as a

(continued on page 25)

(continued from page 24)

long-term sequela fall back on maintenance of range of motion and function, not reduction of the swelling itself.

Case Report

History of Chief Complaint

A 65-year-old woman presented to the Osteopathic Manipulative Medicine (OMM) Clinic complaining of significant swelling, pain, and stiffness in the right knee. Her pain began about 14 months prior to her visit, at which time she sustained a medial meniscus tear to the right knee diagnosed by an orthopedic surgeon via an MRI of the knee. The surgeon performed a medial meniscectomy approximately 6 weeks prior to her visit to the OMM clinic. There were no immediate postoperative complications. The patient stated that after surgery, there was significant swelling in the right lower extremity, including the knee. The swelling had not decreased. The swelling was worse at the end of the day. If she did not wear the compression hose and elevate the leg regularly, then the swelling got worse. She rated her pain as a 3/10 on the pain scale, and she denied numbness, tingling, radiation, and weakness of the extremities. She stated that exercising on the recumbent bicycle with no tension helped decrease the pain and stiffness, but it had no effect on the swelling. She had been compliant with all postoperative recommendations for rehabilitation and had been continuing with physical therapy due to the swelling and stiffness in the knee.

Medical and Surgical History

Patient has hypertension (lisinopril 20 mg PO qd) and had a medial meniscectomy performed 6 weeks ago to the right knee.

Social History

Patient denies any tobacco, alcohol, and illicit drug use. She reported taking approximately 1 cup of caffeinated coffee per day.

Physical Exam

Patient was a 65-year-old white woman in no acute distress. On examination the patient's blood pressure was 110/76 mm Hg, heart rate was 68 beats per minute, respiratory rate was 12 breaths per minute, height was 5 feet, 4 inches, and weight was 190 lbs. She was awake, alert, and oriented to person, place, and time with pleasant affect. No abnormalities were noted upon examination of the head, eyes, ears, nose, throat, cardiac, or respiratory systems. Cranial nerves II-IX were grossly intact. Deep tendon reflexes were +2/4 in upper and lower extremities bilaterally. The incision site on the right knee was well healed with no erythema or drainage. Significant swelling was noted with 2+ pitting edema on the entire right lower extremity. The swelling stopped about 1 inch above the patella. Pulses were strong and equal bilaterally in the lower extremities.

Osteopathic structural examination revealed a right posterior fibular head, a right externally rotated tibia, a left-on-left sacrum, an anteriorly rotated innominate on the right, restrictions of the Achilles, popliteal, and inguinal fascia on the right, an interosseous membrane strain in the right lower extremity, and the thoracic inlet was flexed, rotated left and sidebent left. Respiratory diaphragm was restricted bilaterally.

Assessment

1. Right knee pain s/p medial meniscectomy
2. Pedal edema on the right
3. Somatic dysfunction of the thoracic, lower extremity, sacrum, pelvis, and rib regions

Treatment Approach

Based on the physical exam, osteopathic manipulative treatment (OMT) was performed to the above mentioned somatic dysfunctions. The tibia, fibula, and rotated innominate were treated with muscle energy. Myofascial release was performed on the regions of fascial restriction: Achilles, popliteal, inguinal, respiratory diaphragm, and thoracic inlet. The interosseous membrane strain and sacrum were treated with the Fulford percussion hammer.

The patient tolerated treatment well and all somatic dysfunctions resolved with treatment. A follow-up examination was scheduled for the following week.

At her 1-week follow-up, the patient stated that the swelling was significantly decreased since the treatment. She had no pain or stiffness. She said she woke up the morning after her treatment and the swelling was "almost all gone." She stated that her range of motion was better and it was easier for her to walk. On physical exam, she had trace pedal edema. No somatic dysfunctions of the knee were noted and regional range of motion and ambulation were markedly improved on physical exam. A second follow-up was scheduled for 1 month after the initial visit.

At her 1-month follow-up from initial visit, the patient stated the swelling in her knee and calf had not returned after her first treatment and that she had not needed to continue physical therapy past the date of her treatment because she was doing "so much better." She stated her knee range of motion was greatly improved and ambulation at that time was normal.

(continued on page 26)

(continued from page 25)

Discussion

Healthy fascial layers stretch and distort easily, allowing the neurovascular bundles to course through freely. These layers can become dysfunctional through trauma, somatic dysfunction of the immediate area, or sympathicotonia from a dysfunction in sympathetic innervation.[7] The key function of the lymphatic system includes removal of interstitial fluid and plasma proteins that build up from cellular metabolism, infection, inflammation, trauma, or system dysfunction.[8] Lymphatic vessels course through the entire body following the neurovasculature. Extracellular fluid is moved into lymphatic vessels through inherent movement of the surrounding muscles against an uphill gradient created by the lack of hydrostatic and osmotic gradients beyond the edge of the vessel.[8] This means that as dysfunction occurs, the inherent movement relied upon to move fluid into the lymphatic system is lost, which can create excess extracellular fluid, or edema.

The fascia is intimately connected to the lymphatic system as the lymphatic vessels course through the superficial fascia along with fat and other vascular structures.[9] Fascia also acts as the primary transmitter of inherent motion used by the lymphatics to pump lymph fluid against gravity towards the lymphatic ducts. The inherently loose connective tissue structure of the superficial fascia provides a potential space for any excess extracellular fluid to accumulate, creating many of the palpatory soft tissue texture changes noted during dysfunction.[7] With mechanical stress, fibroblasts within the fascia remodel the surrounding cytoskeleton either by short-term rearrangement or by long-term increases in synthesis, which can lead to dense, fibrotic changes.[7]

According to Kuchera,[8] Zink brought the fascial and lymphatic systems together by defining regions of terminal lymphatic drainage where lymphatic homeostasis is most likely compromised. These regions include the thoracic inlet, the respiratory diaphragm, the inguinal region, the popliteal space, and the Achilles region. A fascial approach to terminal lymphatic drainage regions encourages lymphatic flow by realigning fascial planes and restoring inherent movement of the musculature.[9] In this case, trauma and a subsequent surgical procedure led to a distortion and rearrangement of the fascial layers of the knee, causing pain, stiffness, and edema. OMT can help realign the fascial layers, thus increasing the lymphatic drainage and thus leading to resolution of swelling, pain, and stiffness in the affected joint.

Conclusion

Joint swelling is a common complaint during rehabilitation following knee surgery, but it is not expected to persist beyond 1 to 2 weeks postoperatively.[4] Joint swelling can have a negative effect on joint mobility and quality of life for patients. As demonstrated in this case, the addition of OMT to standard medical care allowed complete resolution of the patient's persistent swelling and restoration of range of motion of the knee and a return to normal ambulation. All aspects of joint mobility including somatic dysfunction of bone, muscle, fascia, and lymphatics should be addressed. This comprehensive approach will help ensure optimal recovery of joint function and improve quality of life for patients.

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