

Chronic knee pain from a ganglion cyst compressing the superomedial genicular nerve

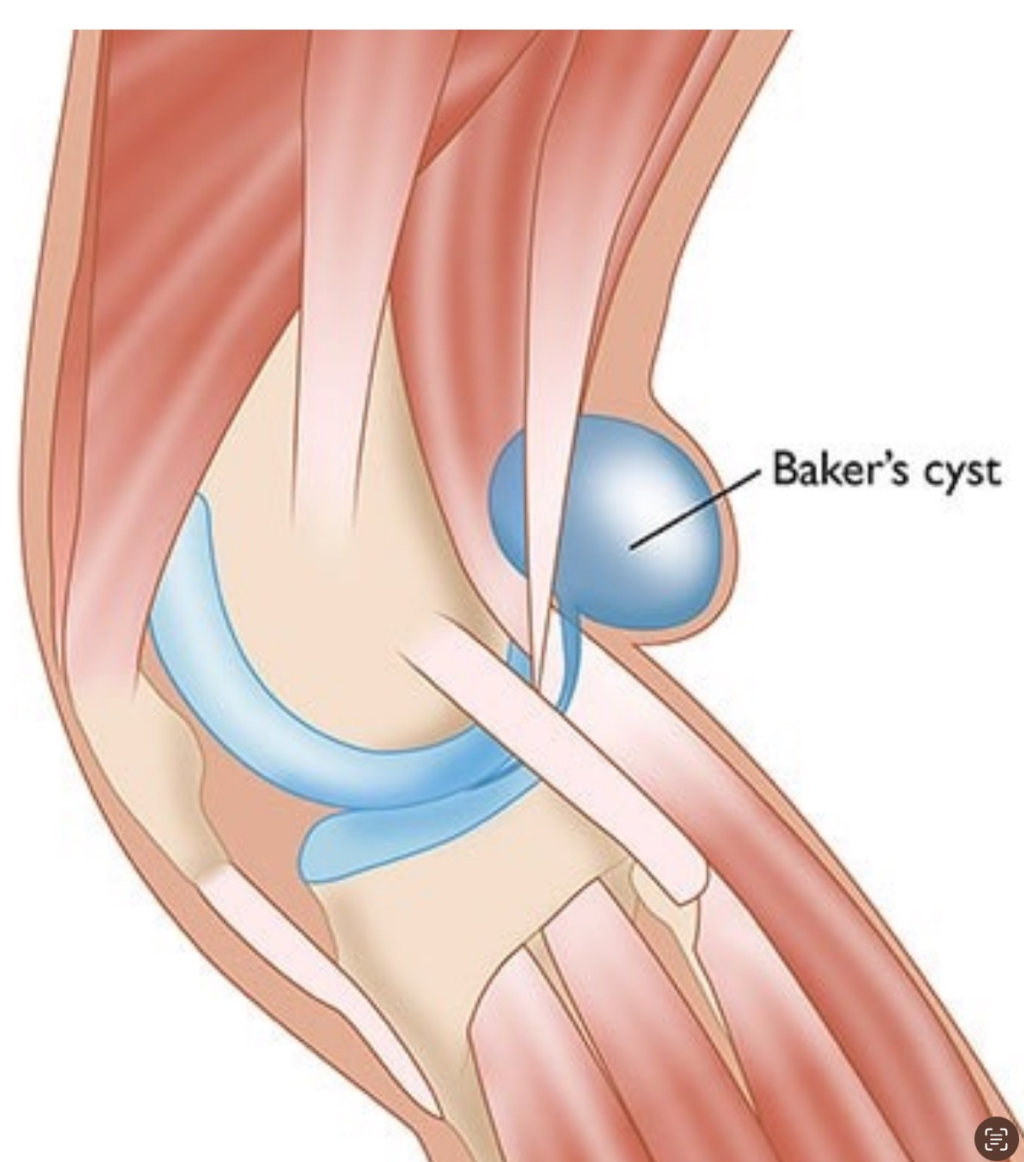


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Introduction

- Approximately 25 percent of adults experience persistent knee discomfort, with osteoarthritis being the primary cause in individuals aged 50 and older.
- Sources of medial knee pain include but are not limited to:
 - Damage to the medial meniscus
 - Saphenous nerve entrapment
 - Pes anserine bursitis
 - Compression of genicular nerves
- MRI may not be able to identify the course of the genicular nerves
- Importance of point of care ultrasound in the evaluation and treatment of musculoskeletal disorders.
- Formation of popliteal cyst (Baker's cyst):
 - Increased production of synovial fluid in response to trauma or joint disease.
 - Valve-like mechanism between the knee joint space and the cyst
 - Knee flexion → increased articular pressure forces synovial fluid into the gastrocnemius-semimembranosus bursa.
 - Knee extension → gastrocnemius-semimembranosus muscle closes the pathway between the articular space and the popliteal fossa
 - One-way flow of synovial fluid & repeated knee flexion/extension increases bursal pressure → dilates the connection between the gastrocnemius-semimembranosus bursa and the knee joint space → formation of a popliteal cyst.
- Popliteal cysts can expand, dissect, or rupture, potentially compressing nearby structures. Complications such as tibial nerve entrapment or popliteal artery occlusion.
- Four genicular nerves commonly associated with chronic knee pain:
 - Superolateral genicular nerve (SLGN)
 - Superomedial genicular nerve (SMGN)
 - Inferolateral genicular nerve (ILGN)
 - Inferomedial genicular nerve (IMGN)



<https://orthoinfo.aaos.org>

Case Description

- “45-year-old female with chronic left knee pain.”
- June 2022 – Urgent Care
 - Presents with 4 days of left medial knee pain described as constant and worse with ambulation.
 - Xray Left Knee – no osseus abnormalities.
 - NSAIDs and ice/heat therapy and instructions to follow up with her primary care provider for further management.
 - June 2022– September 2022 – Urgent Care
 - Pain persists despite NSAID and ice/heat therapy.
 - Referral to orthopedic surgery.
 - October 2022 – Orthopedics
 - Swelling to the medial distal thigh musculature noted.
 - Referral to physical therapy.
 - December 2022 – Physical Therapy
 - Pain exacerbated with physical therapy, prompts an MRI of the left knee.
 - MRI Left Knee – tendinosis of the adductor magnus with adjacent moderate-sized ganglion cysts along with mild degenerative changes of the knee.
 - Referral to general surgery
 - General surgery recommends another orthopedic consultation.
 - October 2023 – Physical Medicine & Rehabilitation
 - Referral to Physical Medicine & Rehabilitation clinic by orthopedics.
 - US Left Knee - 2-cm complex ganglion cyst over the posteromedial femoral condyle.
 - US-guided aspiration of ganglion cysts performed in clinic.
 - Injection of 2-cc solution of 1% lidocaine and 1-cc of 40mg/mL of Kenalog with immediate and complete resolution of pain.

Physical Exam

- Point tenderness at the distal anteromedial thigh.
- Pain on resisted extension of the knee.
- No weakness or sensory disturbances appreciated.
- US Left Knee – 2-cm complex ganglion cyst over the posteromedial femoral condyle.

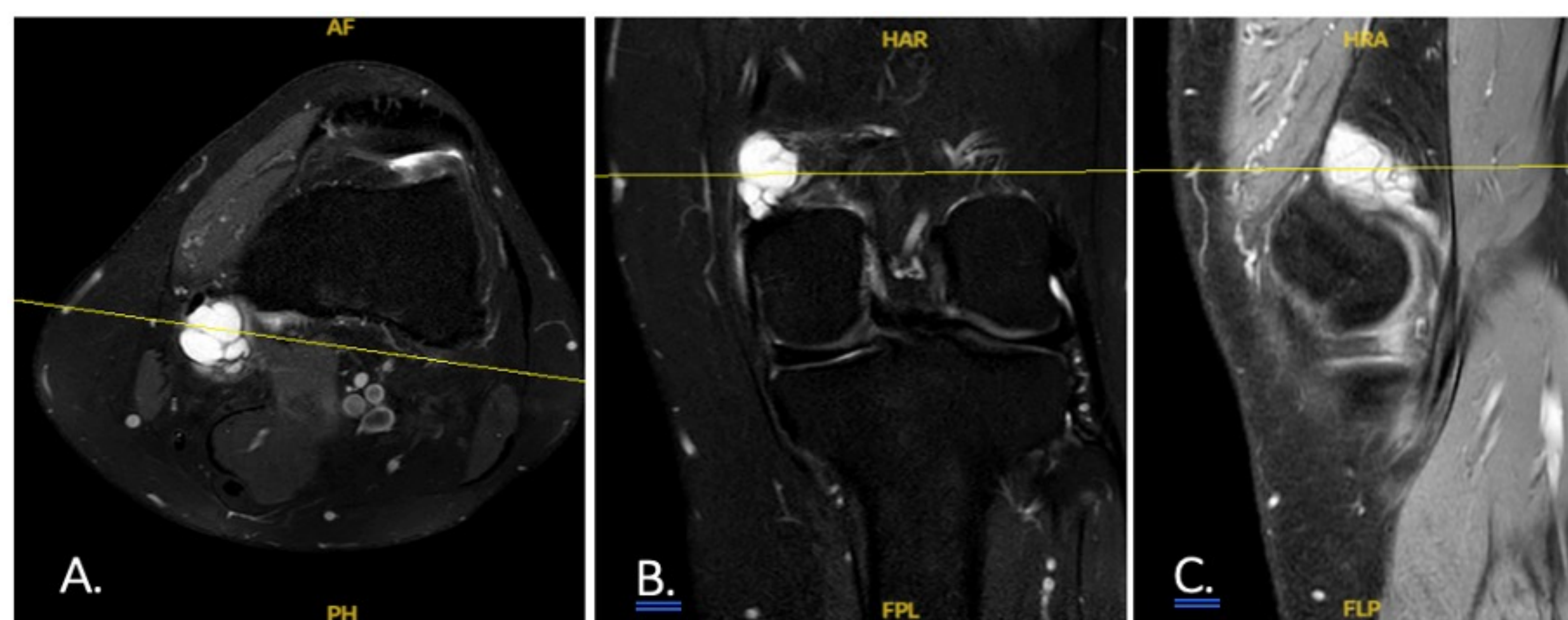


Figure 1. MRI of the left knee with a 2.3x2.0x1.4 cm ganglion cyst with multiple thin septations adjacent to the adductor magnus tibial insertion. A. Axial view of the knee demonstrating the ganglion cyst adjacent to the adductor magnus tibial insertion. B. Coronal view of the ganglion cyst. C. Sagittal view of the ganglion cyst.

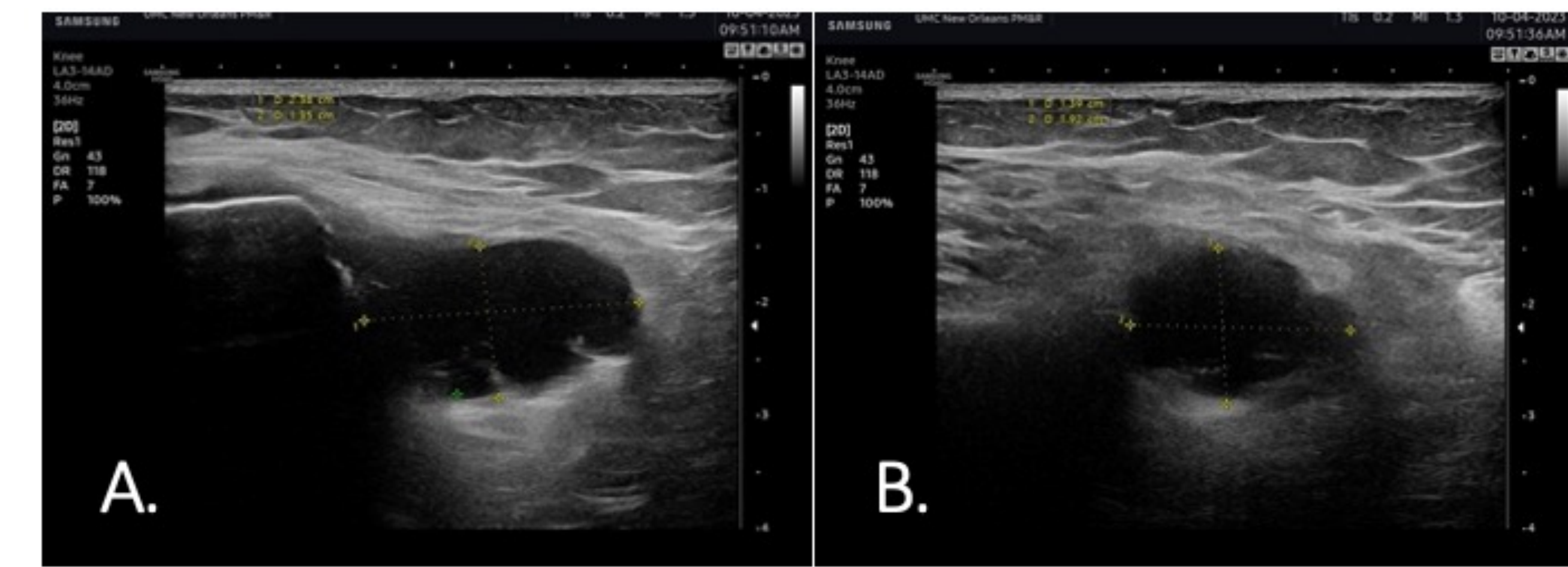


Figure 2. Ultrasound of the left knee demonstrating the ganglion and its close proximity to the femoral condyle. A. Long axis view of the ganglion cyst measuring 2.38x1.35 cm. B. Short axis view of the ganglion cyst measuring 1.39x1.92 cm."

Discussion

- In a study involving 399 patients with knee pain:
 - 293 patients (73.4 percent) displayed sonographic signs consistent with osteoarthritis.
 - 251 patients (62.9 percent) exhibited evidence of joint effusion.
 - 102 (25.8 percent) had evidence of a popliteal cyst in addition to the sonographic features of osteoarthritis and joint effusion.
- Popliteal cysts tend to be more common in adults between the ages of 35 and 70, prevalence increases with age.
 - Higher occurrence of knee and bursal connections as individuals age hypothesized.
- The knee joint receives its sensory innervation from the articular branches of various nerves, including the femoral, common peroneal, saphenous, tibial, and obturator nerves.
 - These terminal branches are responsible for transmitting knee pain signals from an arthritic joint to the central nervous system and are collectively called the genicular nerves.
- Innervation of anterior aspect of the knee joint & capsule:
 - Four branches of the femoral nerve –
 - Saphenous nerve and the articular branches of the nerves that serve the three Vasti muscles.
 - Branches stemming from the sciatic nerve.
- Innervation of posterior aspect of the knee:
 - Popliteal plexus, which originates from the tibial and obturator nerves.

Conclusion

- Compression of the genicular nerves should be considered in the differential diagnosis of patients with long standing knee pain.
- MRI may not be able to identify the course of the genicular nerves and emphasizes the importance of point of care ultrasound in the evaluation and treatment of musculoskeletal disorders.