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Beyond the Joint Line: Pes Anserine Bursitis as a Lesser-Known Pain Generator

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Abstract

Background: Pes anserine bursitis is an inflammatory condition of the pes anserine bursa located between the conjoined tendons of the sartorius, gracilis, and semitendinosus muscles and the medial aspect of the proximal tibia. It is an important but frequently under-recognized extra-articular cause of medial knee pain and is often misdiagnosed as intra-articular pathology.

Aim: To describe the clinical presentation, anatomical considerations, and magnetic resonance imaging (MRI) features of pes anserine bursitis, highlighting its role as a treatable cause of chronic medial knee pain.

Materials and Methods: This single-institution observational study included 15 patients presenting with chronic medial knee pain, with clinically excluded anterior cruciate ligament and medial collateral ligament injuries. All patients underwent MRI of the knee using a 1.5-Tesla scanner. Imaging findings were analyzed with emphasis on the location, extent, and signal characteristics of pes anserine bursal inflammation and associated soft-tissue changes.

Results: MRI demonstrated fluid distension and inflammatory signal intensity deep to the pes anserinus tendons and superficial to the medial collateral ligament, most commonly near the tibial insertion of the pes anserinus. Imaging aided in differentiating pes anserine bursitis from meniscal, ligamentous, and degenerative causes of medial knee pain.

Conclusion: Pes anserine bursitis is a common yet overlooked cause of medial knee pain. MRI plays a crucial role in confirming the diagnosis and excluding associated intra-articular pathology. Early recognition facilitates appropriate conservative or image-guided treatment, leading to excellent clinical outcomes.

Keywords: Pes anserine bursitis; Medial knee pain; Pes anserinus; Knee bursitis; Extra-articular pathology; Chronic knee pain

Introduction

Medial knee pain is a common musculoskeletal complaint encountered in orthopedic, rheumatologic, sports medicine, and radiology practice. While intra-articular abnormalities such as meniscal tears, osteoarthritis, and ligamentous injuries are frequently considered, extra-articular causes are often overlooked. Among these, pes anserine bursitis is an important yet under-recognized cause of chronic medial knee pain that may significantly affect patient mobility and quality of life. The condition results from inflammation of the pes anserine bursa, a synovial-lined structure located between the conjoined tendons of the sartorius, gracilis, and semitendinosus muscles and the medial aspect of the proximal tibia.1,2

The term pes anserinus, meaning “goose’s foot,” describes the characteristic configuration formed by the conjoined tendinous insertions of the sartorius,

gracilis, and semitendinosus muscles on the anteromedial proximal tibia. The pes anserine bursa functions to reduce friction between these tendons and the underlying medial collateral ligament (MCL) and tibial cortex. Repetitive stress, overuse, obesity, osteoarthritis, malalignment, and trauma may lead to irritation and inflammation of the bursa, resulting in pain and localized tenderness over the medial aspect of the knee.2,3

Pes anserine bursitis commonly affects middle-aged and elderly individuals, particularly women, and is frequently associated with degenerative knee disease and obesity. Athletes involved in repetitive running, jumping, or climbing activities are also at increased risk. Despite its clinical relevance, the condition is often misdiagnosed as medial meniscal pathology, medial collateral ligament injury, or other intra-articular disorders because of overlapping symptoms and nonspecific clinical findings.3,4 Consequently, delayed diagnosis may result in prolonged symptoms and unnecessary investigations or interventions.

Magnetic resonance imaging (MRI) plays a crucial role in the evaluation of patients with persistent medial knee pain. MRI provides excellent soft-tissue contrast and enables direct visualization of the pes anserine bursa, adjacent tendons, medial collateral ligament, and associated intra-articular structures. Typical MRI findings include fluid distension of the bursa with increased T2-weighted signal intensity located deep to the pes anserinus tendons and superficial to the medial collateral ligament. Furthermore, MRI assists in differentiating pes anserine bursitis from meniscal cysts, Baker's cysts, ligamentous injuries, stress fractures, and degenerative joint disease.5,6

Given the potential for clinical misdiagnosis and the availability of effective conservative and image-guided therapeutic options, early recognition of pes anserine bursitis is essential. The present study aims to describe the clinical presentation, anatomical considerations, and MRI features of pes anserine bursitis in patients presenting with chronic medial knee pain and to emphasize the importance of MRI in establishing the diagnosis and excluding associated pathology.

Aim: To describe the clinical presentation, anatomical considerations, and magnetic resonance imaging (MRI) features of pes anserine bursitis, highlighting its role as a treatable cause of chronic medial knee pain.

Materials And Methods

This single-institution observational study enrolled 15 patients presenting with chronic medial knee pain, with anterior cruciate ligament (ACL) and medial collateral ligament (MCL) injuries excluded clinically, who underwent MRI evaluation at J.J.M. Medical College, Davanagere, Karnataka.The study protocol was approved by the institutional Ethics Review Committee.

All MRI scans were performed on a Philips Achieva dStream 1.5 Tesla scanner using a SENSE body coil. The imaging protocol included:

1. T1-weighted turbo spin echo sagittal
2. Fat-suppressed proton-density sagittal and axial (PDFS SAG and AXIAL)
3. T2-weighted axial, coronal, and sagittal sequences
4. Gradient-echo fast-field echo coronal sequences

Additional sequences were obtained as and when required.

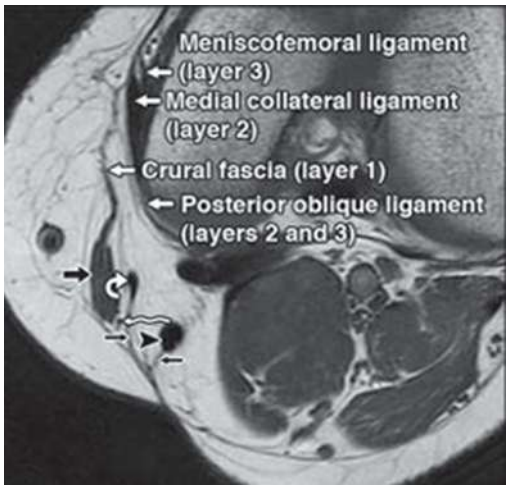
Discussion

Anatomy:

Anatomy at medial knee can be divided into 3 layers. Layer 1 represents the most superficial layer and is composed of the medial portion of the thin crural fascia. This layer forms a circumferential fascial envelope around the knee and contributes to the medial patellar retinaculum, the popliteal fascia, and the fascia lata. Layer 2 is composed primarily of the superficial medial collateral ligament (MCL), whose fibers blend with the posterior oblique ligament and subsequently merge with Layer 3, the deepest layer. Layer 3 comprises the joint capsule and includes the meniscotibial and meniscofemoral components of the deep medial collateral ligament (MCL).

Pes Anserine Muscle

Volume 9, Issue 3; May-June 2026; Page No 397-404



The sartorius muscle—derived from the Latin term for "tailor," in reference to the cross-legged sitting posture traditionally associated with garment makers—is a long, strap-like muscle innervated by the femoral nerve. It originates from the anterior superior iliac spine and descends obliquely across the anterior compartment of the thigh from lateral to medial before inserting onto the proximal medial tibia. Although it is the longest muscle in the human body, it is functionally weak and primarily serves as a synergistic stabilizer in combined movements.

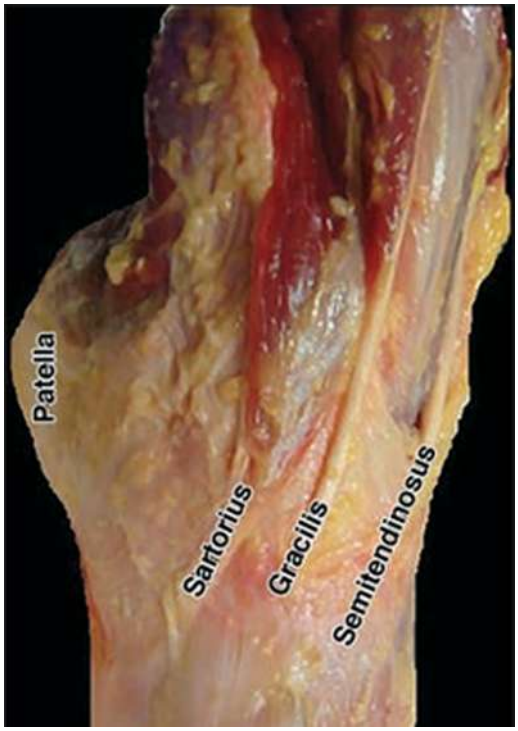
The gracilis muscle, whose name derives from the Latin word meaning "slender," is a thin, strap-like muscle innervated by the obturator nerve. It arises from the ischiopubic ramus and descends within the medial compartment of the thigh toward the knee, where it courses posterior to the sartorius muscle and tendon and inserts along the proximomedial tibia.

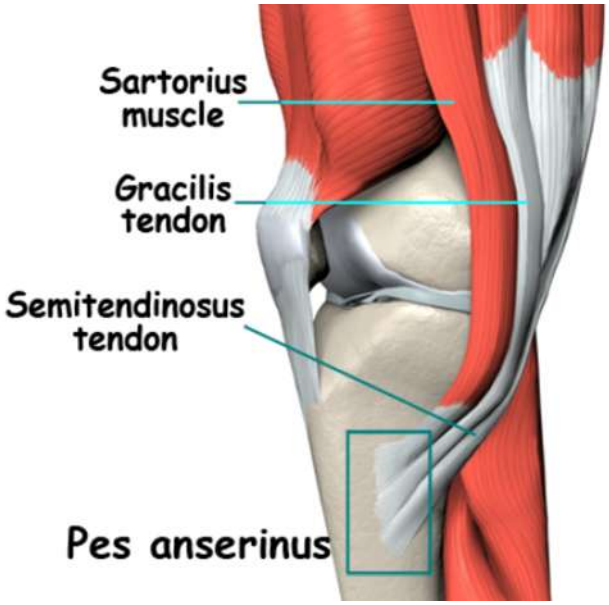
The semitendinosus muscle, so named for its characteristic long insertional tendon that develops in the mid-thigh, is a fusiform pennate muscle innervated by the sciatic nerve. It originates from the ischial tuberosity as part of a conjoined tendon shared with the long head of the biceps femoris and descends within the posterior compartment of the thigh, coursing posterior to the semimembranosus muscle toward the knee, where it inserts posterior to the gracilis tendon.

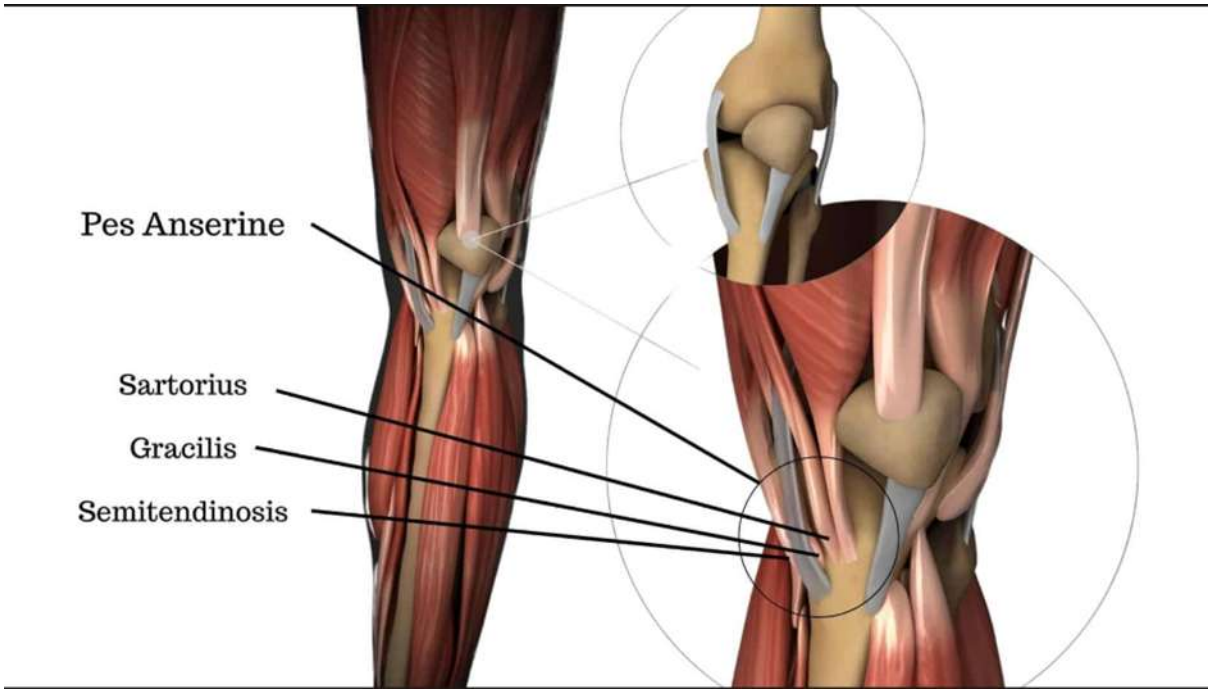
Pes Anserine Tendon

The anatomy of the pes anserinus is complex. The sartorius tendon maintains a close association with the crural fascia (Layer 1), whereas the gracilis and semitendinosus tendons lie deep to this superficial fascial layer over the medial aspect of the tibia. Importantly, the pes anserinus is positioned superficial to, and inserts proximal and anterior to, the superficial medial collateral ligament (Layer 2) . The tendon complex consistently inserts onto the proximal medial tibia at a point approximately 42 ± 7 mm inferior to the tibial plateau, medial and distal to the tibial tuberosity. The three tendons attach in an almost linear configuration—beginning with the sartorius proximally, followed by the gracilis and then the semitendinosus (with mean tendon widths of 8.0, 8.4, and 11.3 mm, respectively)—along the lateral margin of the pes anserinus bursa. Although each tendon may have a distinct insertion, accessory tendons and fascial bands are frequently present and may demonstrate separate osseous or soft-tissue attachments. Among the three, the semitendinosus tendon exhibits the greatest morphologic variability and may present with multiple tendinous insertions—up to three in some cases—as well as several soft-tissue extensions, including a constant fascial slip inserting onto the gastrocnemius fascia.

Volume 9, Issue 3; May-June 2026; Page No 397-404





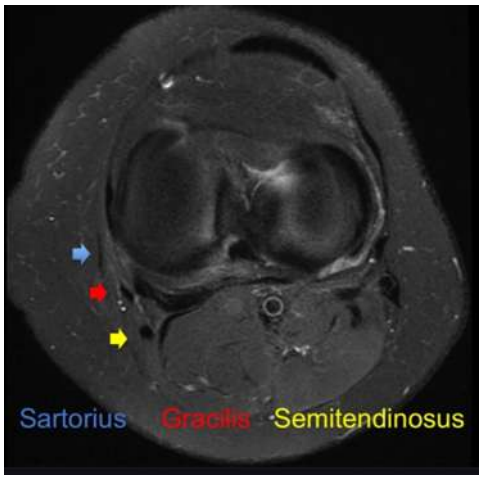


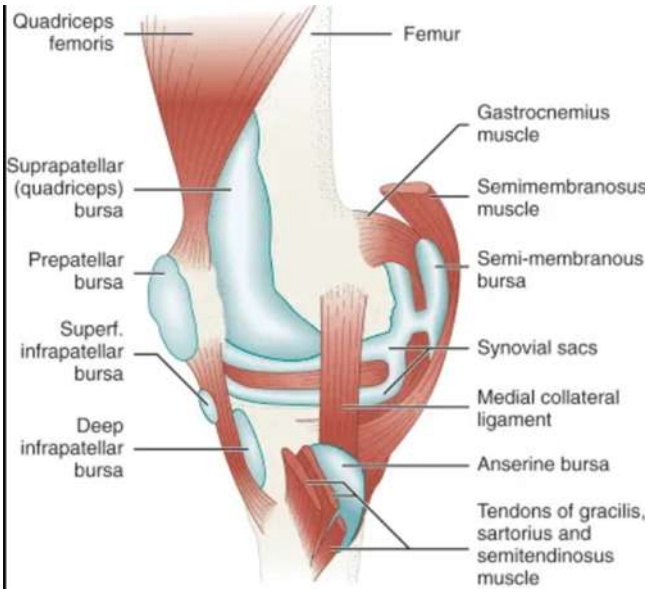
Pes Anserine Bursa

The pes anserinus bursa is a synovium-lined structure that is consistently present and located between the pes anserinus tendons and the distal portion of the superficial medial collateral ligament. In contrast to the popliteal bursa situated posteriorly, the pes anserinus bursa does not communicate with the knee joint cavity. It has an irregularly circular configuration and follows the course of the sartorius muscle and tendon. Cadaveric studies demonstrate that the bursa typically extends proximally to the level of the joint line (corresponding to the proximal

Volume 9, Issue 3; May-June 2026; Page No 397-404

articular surfaces of the medial and lateral tibial condyles), although in approximately 24% of specimens it may extend up to 20 mm above this level. Additional bursae located along the medial aspect of the knee include the semimembranosus and medial collateral ligament bursae. The semimembranosus bursa lies posterior and superior to the pes anserinus bursa, whereas the MCL bursa is situated between the deep and superficial fibers of the ligament at the mid-portion of the knee. Although bursitis in these bursae may coexist with pes anserinus bursal fluid, they are not known to communicate with one another.





Materials and Methods

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Additional sequences were obtained as and when required.

Etiology Of Pes Anserinus Bursitis

Pes anserinus bursitis results from irritation and inflammation of the pes anserine bursa due to a combination of mechanical, biomechanical, and systemic factors. Repetitive friction between the pes anserinus tendons and the proximal medial tibia is the most common underlying mechanism, particularly in activities involving frequent knee flexion and valgus stress, such as running, climbing stairs, and prolonged kneeling.

Overuse-related microtrauma is frequently observed in athletes and physically active individuals, whereas degenerative and metabolic influences are more common in older or sedentary populations. Altered lower-limb biomechanics — including genu valgum, pes planus, tibial external rotation, and hamstring tightness — increase tendon traction forces and predispose to bursal irritation.

Several intrinsic and systemic risk factors have been implicated, including obesity, osteoarthritis of the knee, diabetes mellitus, rheumatoid arthritis, and prior trauma or surgery around the medial knee. Local mechanical irritation may also arise from osteophytes, exostoses, or graft-harvesting procedures involving the gracilis or semitendinosus tendons.

Overall, pes anserinus bursitis is considered a multifactorial condition in which repetitive stress, abnormal tendon loading, and systemic inflammatory

Volume 9, Issue 3; May-June 2026; Page No 397-404

or metabolic influences act synergistically to produce bursal inflammation and medial knee pain.

Clinical Features

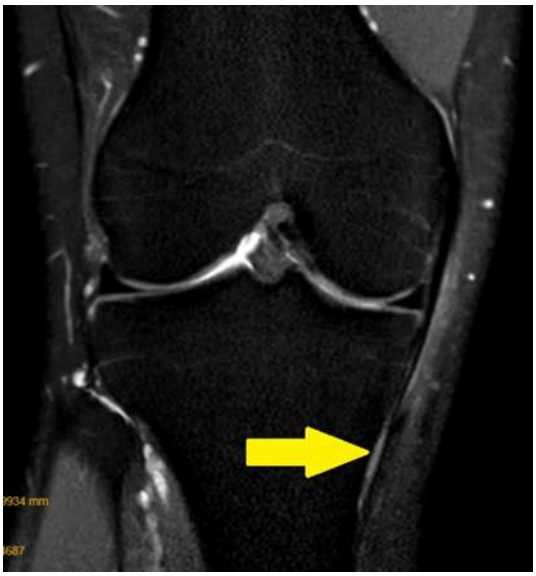
Pes anserinus bursitis typically presents with localized medial knee pain situated over the proximal medial tibia. The pain is classically located 4–5 cm below the medial joint line and is often well localized on palpation. Patients commonly report pain that is exacerbated by activities involving knee flexion and valgus stress, such as stair climbing, squatting, prolonged walking, or rising from a seated position. Night pain and discomfort while lying on the affected side may also be reported.

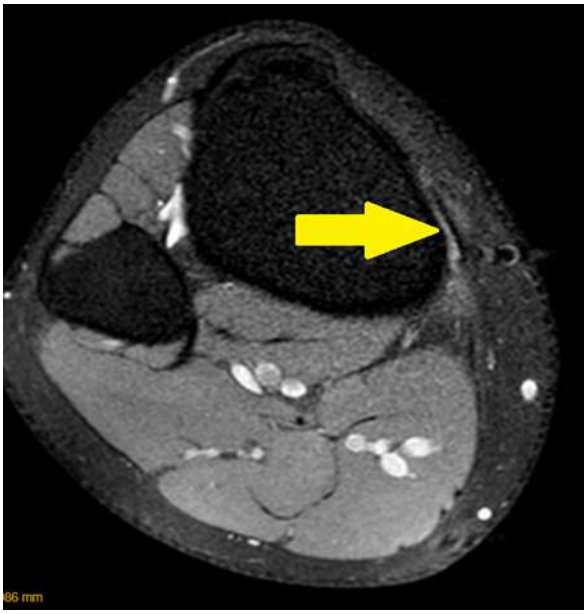
On physical examination, there is point tenderness at the pes anserinus insertion, occasionally accompanied by localized swelling or warmth. Pain may be reproduced with resisted knee flexion or combined flexion and internal rotation, reflecting traction of the conjoined tendons on the inflamed bursa. Range of motion of the knee is usually preserved, and joint effusion is typically absent, helping to distinguish the condition from intra-articular pathology.

Symptoms may mimic those of medial meniscus injury, medial collateral ligament pathology, or medial compartment osteoarthritis; however, the inferior site of tenderness relative to the joint line is a key distinguishing feature. In some patients, symptoms coexist with osteoarthritis or valgus deformity, which may obscure clinical diagnosis and necessitate imaging evaluation.

Imaging

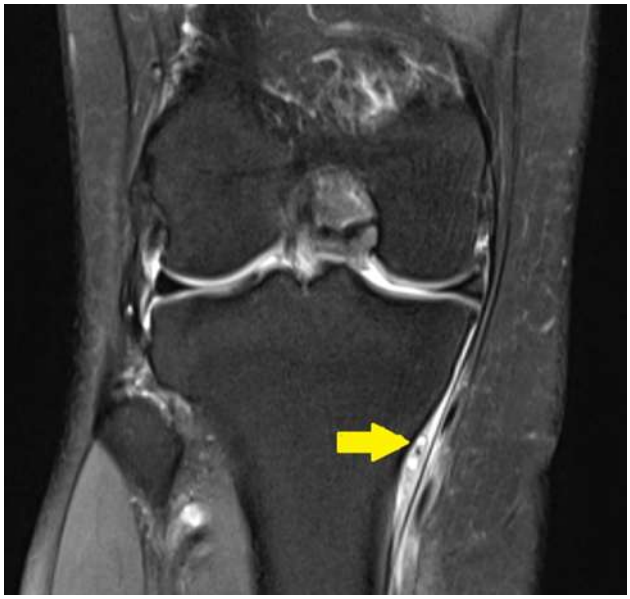
Ultrasonography demonstrates that the pes anserinus bursa is typically located between the pes tendons and the tibia in approximately 67% of asymptomatic individuals. In 21% of cases, it lies between the pes tendons and the medial collateral ligament (MCL), and in 8% it is situated between the individual constituents of the pes anserinus. On magnetic resonance imaging (MRI), fluid within the bursa is visualized deep to the pes anserinus tendons and superficial to the superficial MCL. Bursal distention most commonly occurs near the insertion of the pes anserinus, distal and medial to the tibial tuberosity, and fluid may extend deep to the superficial MCL. In some instances, the pes anserinus bursa may also extend proximally above the joint line.

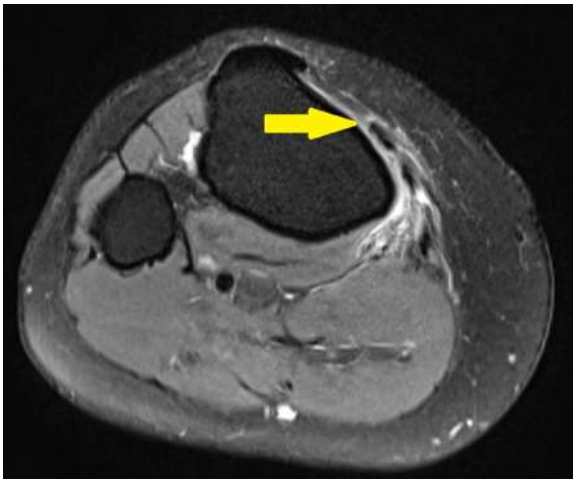




Volume 9, Issue 3; May-June 2026; Page No 397-404

A 32-year old male complains of pain in the medial aspect of right knee since past 4months.





Treatment

Conservative Management:

The initial approach to pes anserinus bursitis is predominantly conservative. Key measures include rest, activity modification to reduce repetitive knee flexion and valgus stress, and the use of nonsteroidal anti-inflammatory drugs (NSAIDs) to control pain and inflammation. Physiotherapy focusing on hamstring and adductor stretching, quadriceps strengthening, and correction of biomechanical abnormalities (e.g., valgus alignment or pes planus) is recommended to reduce tendon traction and prevent recurrence. Weight reduction is advised in overweight or obese patients.

Interventional Therapy:

For patients with persistent symptoms despite conservative management, ultrasound-guided aspiration of the bursa followed by local corticosteroid or anesthetic injection may be performed. Knowledge of local anatomy is crucial, as the infrapatellar branch of the saphenous nerve lies adjacent to the proximal bursa, and the sartorial branch courses posteriorly. The distal and anterior aspect of the bursa—approximately 2 cm medial and 1.2 cm superior to the inferomedial tibial tuberosity—is considered a relatively safe site for intervention.

Surgical Management:

Surgical intervention, including bursectomy, is rarely required and is reserved for refractory cases or when conservative and interventional therapies fail to provide relief.

Prognosis:

With appropriate management, the prognosis for pes anserinus bursitis is excellent, and most patients achieve complete symptom resolution without long-term functional impairment.

Conclusion

Pes anserinus bursitis is an often under-recognized but treatable cause of medial knee pain. It results from a combination of mechanical overuse, biomechanical abnormalities, and systemic risk factors such as obesity, diabetes, and inflammatory arthropathies. Clinical diagnosis is usually straightforward, based on localized pain over the proximal medial tibia, but imaging with ultrasound or MRI can be valuable in atypical cases or when coexisting pathology is suspected. Conservative management—including activity modification, physiotherapy, and anti-inflammatory medication—is effective in most patients, while image-guided aspiration or corticosteroid injection may be required in refractory cases. Awareness of the precise anatomy, tendon relationships, and safe access points is essential for accurate diagnosis and effective intervention, ultimately improving patient outcomes.

Volume 9, Issue 3; May-June 2026; Page No 397-404

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Volume 9, Issue 3; May-June 2026; Page No 397-404