

Lateral Hip Pain: Relation to Greater Trochanteric Pain Syndrome

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Abstract

The purpose of this article is to provide a synopsis of the current medical understanding of lateral hip pain, highlighting greater trochanteric pain syndrome (GTPS) and its relation to lateral hip pain. Common causes of lateral hip pain, GTPS as a cause of lateral hip pain, prevalence of GTPS, clinical presentation of GTPS, associated risk factors, history and physical examination, laboratory testing, diagnostic imaging, and treatment options are described. A quiz serves to assist readers in their understanding of the presented material.

Introduction

The article begins with the following Advance Organizer Quiz to Retrieve, Use, and Organize the materials presented in this paper.

Advance organizer: please answer true or false to the following statements. The answer key is located on the last page of the article.

1. Hip pain can be classified by identifying its site of origin and location about the joint.
2. Lateral hip pain is generally localized to the region immediately superior to the greater trochanter.
3. Greater trochanteric pain syndrome (GTPS) is a common cause of lateral hip pain in adults affecting bursa, tendons, and muscle.
4. GTPS may originate from tightness in the muscle that travels over the hip and knee, resulting in compression and irritation of the hip area.

5. a) Patients with lateral hip pain will have difficulty putting on their socks and shoes
a) if lateral hip pain is related to hip osteoarthritis (OA); b) if lateral hip pain is related to GTPS..
6. Diagnosis of GTPS includes physical examination findings, plain radiographs (to rule out fractures or calcifications), magnetic resonance imaging (for evaluation of fluid-filled bursa, tendinitis, and soft tissue tears), and ultrasound (for evaluation of fluid-filled bursa).
7. Treatment of GTPS includes both nonsurgical and surgical options dependent on underlying pathology.

HIP PAIN

Hip pain is a common and often challenging symptom affecting individuals of all ages and may be associated with numerous underlying causes or etiologies. Once present, hip pain may become so painful and debilitating that

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it compels those who develop it to seek assistance from their health care providers. Hip pain may be classified by identifying the origin of the pain as anterior, posterior, and lateral, and by noting its location as *within a joint* (ie, intraarticular), *around a joint* (ie, periarticular), or *outside a joint* (ie, extraarticular).¹ Attentive history taking, pertinent physical examination techniques, and practical laboratory testing and imaging studies are essential aids to evaluate underlying causes of hip pain. This review will focus on lateral hip pain in the adult highlighting GTPS as a common underlying cause emphasizing the importance of early detection and treatment. We present nonsurgical and surgical treatment options to assist in the management of patients with lateral hip pain and GTPS.

MECHANISM OF THE HIP JOINT

The hip forms the joint between the upper end of the femur (thighbone) and its socket in the pelvis located in the region of the groin. The hip joint is a stable, major weightbearing ball-and-socket synovial (fluid) joint that allows for extensive mobility, formed by a connection between the pelvic acetabulum (the cup-shaped socket in the hip bone) and the head of the femur (the thighbone).² It forms an articulation from the lower limb to the pelvic girdle (distinctively dissimilar in men and women as to function and size), and thus is intended for stability and weightbearing. Comprised of bone, cartilage, ligaments, muscle, and a lubricating fluid, painful symptoms of a hip disorder will differ depending on

the cause of the underlying disorder and the part of the hip joint causing problems.³

COMMON CAUSES OF LATERAL HIP PAIN⁴

Pain at the lateral hip is usually localized in the region immediately superior to (above) the greater trochanter (which is the site of the gluteal tendon insertions and trochanteric bursa). Lateral hip pain may be persistent and radiate down the lateral (outside) thigh to the lateral knee along the iliotibial band. Underlying causes of lateral hip pain generally include bursa (a closed, fluid-filled sac acting as a cushion and gliding surface to reduce friction between tissues), tendons (connective tissues that transmit mechanical force of muscle contraction to the bones), and muscle (tissue of the body that primarily provides source of power). (See Table 1 for common causes and differential diagnoses of lateral hip pain.) Delayed treatment of 1 cause can lead to others and cause progressively worsening pain and weakness, thereby affecting alterations in biomechanics. Alterations in biomechanics can affect load modification, potentially increasing compressive loads on the gluteal tendons. In addition, this altered condition supports increased morbidity, pain on side lying, and subsequent reduction in physical activity levels that may have serious implications for poorer overall health, employment, and well-being.⁵

GTPS AS A CAUSE OF LATERAL HIP PAIN

GTPS is a common cause of lateral hip pain in adults⁶ and is believed to involve 3 well-described associated

1. <i>Iliotibial band syndrome</i> can involve tightness due to pathology of the gluteal tendon or bursa.
2. <i>Hip bursitis</i> occurs when 1 or more of the small fluid-filled sacs (each sac known as a bursa) become painfully swollen or inflamed. The hip has about 6 small fluid-filled bursae that act as cushions between tendons and bone.
3. <i>Greater trochanteric pain syndrome</i> can involve swelling of 1 or more of the fibrous tendons that attach muscles onto the hip (ie, tendinitis).
4. <i>Impingement or entrapment of the lateral femoral cutaneous nerve</i> (also known as meralgia paresthetica) causes burning pain along the lateral hip area.
5. <i>Femoral acetabular impingement</i> involves abnormal bone growth around the hip and is a precursor to hip osteoarthritis.
6. <i>Muscle spasm or tightness</i> in the gluteal muscles themselves (superolateral buttock region) may occur, or there may be an underlying hip joint pathology causing referred pain in the buttock.
7. <i>Groin strain</i> is usually seen with an injury and can cause pain and tenderness in the groin and along the inside of the thigh and pain with movement of the legs, weak or tight muscles, limping and difficulty moving the leg, and bruising. A popping or snapping feeling can be present at the time of the injury.
8. <i>Snapping hip syndrome</i> (medically known as cox saltans) is a disorder that may cause a snapping sound or sensation with movement of the hip joint. Overuse injuries of the muscle tendons can become inflamed, causing a clicking sound as they rub over the hip socket bone.
9. <i>Spine disorders</i> can cause referred pain in the buttocks and legs.
10. <i>Hip osteoarthritis</i> can cause symptoms referred to the lateral hip region that include a progressive course of morning stiffness with associated groin pain.
11. <i>Combination of causes.</i>

Table 1: Common causes/differential diagnoses of lateral hip pain

1. Pain may progressively worsen over time and be triggered or exacerbated by sudden unusual exercise, falls, prolonged weightbearing, or in cases of sporting overuse, such as long-distance running. ^{13,19}
2. Pain may be described as aching and intense at times of greater aggravation caused by passive, active, and resisted hip abduction and external rotation. ²¹
3. In some cases, greater trochanteric pain syndrome can be characterized by the “jump” sign where palpation of the greater trochanter causes an individual to virtually jump off the bed. ¹³
4. Pain is usually episodic and may worsen over time with continued aggravation and without treatment.

Table 2: Characteristics of greater trochanteric pain syndrome

entities: external iliac bursitis, greater trochanteric bursitis, and gluteus medius and/or minimus tears.⁷ Commonly referred to as trochanteric bursitis, GTPS is the preferred clinical term because lateral hip pain may be unrelated to the trochanteric bursae.⁸ True primary trochanteric bursitis is a less common etiology of lateral hip pain and is typical of microbial etiology.^{6,9-11} Radiological findings for patients with GTPS report variable incidence, while bursitis incidence ranges from 4% to 46% and gluteal tendinopathy ranges from 18% to 50%.⁹⁻¹¹

While the exact cause of GTPS remains uncertain, GTPS as an entity generally encompasses an association of causes acting synergistically to cause major discomfort and dysfunction in the lateral hip region.⁸ In most instances, GTPS involves either the gluteus medius or gluteus minimus buttock muscle, leading to painful tendinopathy. Weakness of the gluteus medius muscle alters body mechanics, causing tremendous strain on the hip and knee.¹² When the gluteus medius muscle weakens, it becomes unable to provide its normal protective capabilities to the hip during normal activities of daily living, such as walking, leading to abnormal hip biomechanics, which are hypothesized to predispose to these gluteal tendinopathies. Tendinopathy (also called tendinosis) refers to the breakdown of collagen in a tendon with fluctuating involvement of the adjacent bursae.⁸ Tendinopathies can affect any tendon and are associated with burning pain, decreased flexibility, and impaired range of motion. Strengthening the hip muscles is shown to have a dramatic effect on recovery of GTPS and lateral hip symptoms.¹²

In addition to bursitis and tendinitis, GTPS may originate from compression forces that cause impingement and tightness in the gluteal muscle, tendons, and bursae into the greater trochanter by the iliotibial band that travels over the hip to the knee, resulting in compression and irritation of the hip area.¹³ Compression forces are increased where there is weakness of the hip abductor muscles due to lateral pelvic tilt.^{13,14} Thus, a more precise diagnosis of GTPS depicts a combination of unpleasant symptoms related to

various compressive forces affecting the outermost (lateral) portion of the hip.

PREVALENCE OF GTPS

GTPS is the cause of hip pain in 10% to 20% of patients presenting with hip pain to primary care, with an incidence of 1.8 patients per 1000 per year.¹⁵⁻¹⁷ GTPS is most common in middle-age to elderly adults and is 2 to 4 times more common in females.¹² Best estimates of prevalence may be obtained from a large, community-based study with over 3000 adults aged 50 to 70 years, in which unilateral GTPS was present in 15% of females and 6.6% of males.¹⁸ GTPS is most prevalent in adults over the age of 50⁴ and is more commonly seen in females between the ages of 40 and 60.^{13,15,16}

CLINICAL PRESENTATION OF GTPS

Patients with GTPS commonly present with persistent lateral hip pain, localized to the outside of the hip (greater trochanter), buttock, and upper thigh.¹² The pain becomes worse with weightbearing activities and side lying at night.^{15,19,20} There may be associated radiation of pain down the lateral (outside) thigh to the knee. A discernible sign of GTPS is weak hip abductors.²⁰ Table 2 describes characteristics of GTPS. Table 3 identifies common symptoms of GTPS.

Accurate and early diagnosis of GTPS is important as inaccurate diagnosis and delay can lead to mismanagement and progression of refractory (unmanageable) symptoms leading to a poorer overall prognosis. The condition can be mistaken for common causes of hip pain, including OA of the hip, lumbar spine referred pain, and pelvic pathology.^{19,20}

1. Lateral hip tenderness (near the greater trochanter)
2. Pain with weightbearing activities such as walking, climbing stairs, standing, and running
3. Referred pain to the lateral thigh and knee
4. Increased pain with prolonged sitting, resisted abduction, sitting with crossed legs, and side lying ²⁰

Table 3: Common symptoms of greater trochanteric pain syndrome

1. Is there pain on activity or on side lying disrupting sleep? (greater trochanteric pain syndrome (GTPS))
2. On physical examination (PE), is there tenderness to palpation of the greater trochanter? (GTPS)
3. Is there pain on straight leg raise of 30 degrees? (GTPS and/or spine disease)
4. Is there morning stiffness, associated groin pain, and progressive nature of symptoms? (hip osteoarthritis (OA))
5. Does the patient have difficulty putting on shoes and socks? (hip OA) Patients with GTPS should not have difficulty with this task.
6. On PE, is there reduced range of motion? Is there pain with internal rotation and external rotation of the hip? (hip OA)
7. On PE, is there pain and weakness with hip abduction and extension? (GTPS)
8. Is there lower back pain? Is there radiation to a lateral hip? (spine disease)
9. On PE, is there reduced range of movement? Is there tenderness to palpation of the back? Is there a positive straight leg raise? (lumbar spine disease with referred pain)

Table 4: Specific questions to ask about lateral hip pain and common PE findings^{13,20}

ASSOCIATED RISK FACTORS FOR LATERAL HIP PAIN

Local risk factors for hip pain include joint dysplasia and developmental disorders that can lead to structural joint abnormalities and can predispose to hip OA.²² Trauma involving fractures of the joint articular surface can lead to posttraumatic arthritis.²² General risk factors for lateral hip pain include age greater than 50 years old (for OA), chondrocalcinosis (an age-related matrix change), sex (females 40 to 60 years old), excess body weight, genetics, and certain occupations involving heavy manual work and high-impact sports are linked to hip OA later in life.²² Both injury and overuse activities can cause pain in the outer hip area. Individuals with referred back pain due to a spine disorder are at risk for lateral hip pain.

HISTORY AND PHYSICAL EXAMINATION

A careful medical history should include a review of relevant past medical and surgical history, medications, allergies, and associated risk factors for lateral hip pain followed by a focused clinical examination of the affected hip with comparison to the contralateral hip. When evaluating a patient with reported hip pain, it is wise to ask the patient to point to where the pain is. (For a list of specific evaluation questions about lateral hip pain, see Table 4.)

On physical examination, it is important to observe the patient ambulate, compare each lower extremity (looking for leg length discrepancies), and look for evidence of an antalgic gait (limp). Pain and weakness are commonly present during gait or testing of hip muscle strength with hip abduction and extension in patients with lateral hip pain due to GTPS.⁴ Evidence of a fever suggests an infectious etiology to hip pain. Focal palpation of the hip should detect the point of maximal point tenderness; in GTPS focal tenderness is

present over the greater trochanter. Pain localized to the super posterior aspect of the greater trochanter suggests GTPS. Pain and weakness with hip abduction and extension can assist with the diagnosis of GTPS. Examination of the feet is recommended, observing for fallen arches and faulty foot mechanics that can maintain the condition.¹²

LABORATORY TESTING

If an infectious etiology of hip pain is suspected, a complete blood count and inflammatory markers (eg, erythrocyte sedimentation rate, C-reactive protein concentration) may be helpful.

DIAGNOSTIC IMAGING

1. Plain film radiograph is usually not helpful in the diagnosis of GTPS but may help exclude other pathologies such as fractures and hip OA. Calcifications may be seen in the bursa or adjacent soft tissues. In patients who have symptoms of GTPS, a plain radiograph is usually normal.¹³
2. Magnetic resonance imaging demonstrates fluid collection within the affected bursa in the case of bursitis, as well as abnormal signal or discontinuity within the abductor muscle tendons in the case of tendinitis and tear.²³
3. Ultrasound in trochanteric bursitis shows a distended, fluid-filled bursa. Ultrasound helps in guidance for fluid aspiration and analysis. Ultrasound can also detect tendinosis and tendon tears of the abductor muscle tendons.^{24,25}

TREATMENT OPTIONS

While optimal management of GTPS remains ill-defined, the main goals of treatment should be to: 1) manage load and reduce compressive forces across greater trochanter, 2) strengthen gluteal muscles, and 3) treat comorbidities. Recommended general principles of nonsurgical management are identified in Table 5 and successfully address the majority of cases of GTPS.

If followed, most cases of GTPS resolve with conservative measures, with success rates of over 90%.^{12,29-31} Refractory or recalcitrant cases to conservative measures may require referral to musculoskeletal experts supporting further specialist evaluation and management.

Surgical treatment for GTPS for recalcitrant cases that have failed optimal conservative treatment options are identified in Table 6 and are dependent on underlying pathology. Criteria for surgical intervention in refractory cases of GTPS remain ambiguous and are not

1. Encourage weight loss. Excess weight and body mass index ≤ 30 (obesity marker) cause additional stress to the hip muscles.
2. Take nonsteroidal antiinflammatory drugs (NSAIDs) or acetaminophen for pain relief.
3. Engage in targeted physical therapy with emphasis on strength training of the hip abductor. Hip strengthening is directly linked to symptom improvement.
4. Support load modification to reduce compressive loads on the gluteal tendons.
5. Optimize biomechanics (including altered foot biomechanics) by being aware of abnormal movements produced by the body's internal and external forces and reacting to counteract them.
6. Avoid activities that cause prolonged stretching of the hip abductors. These include avoiding weightbearing on 1 hip, sitting cross-legged, and sleeping in a side-lying position with top knee flexed and touching the bed. ¹²
7. Adjunct therapies include therapeutic ultrasound (ie, shock wave therapy) ²⁶ and therapeutic laser treatments to promote healing. Corticosteroid injections (CSIs) can be effective in recalcitrant cases. ¹⁹
8. Exercise, load management, and physical therapy. ²⁷ Exercise and load management are the cornerstone of effective tendinopathy management. ⁵ Physical therapy is specific to the individual patient and during the early stages focuses on gluteal strength and control. As hip control improves, muscle strengthening targets the hip abductors. ^{15,19} To reduce compressive loads on the gluteal tendons, positions of excessive hip abduction (such as crossing legs and iliotibial band stretching exercises) should be avoided, and at night patients can sleep with 1 or 2 pillows between their legs. ¹⁹ CSIs provide effective early, short-term analgesia in 70%-75% of cases. ¹⁹ At 12 months, clinical trials show no difference in outcome to a watch-and-wait approach. ^{13-15,19,28} When used, a CSI should provide an analgesic window in which the patient can fully engage with an effective rehabilitation program involving targeted physiotherapy, load modification, and postural control. ¹⁹
9. Awareness and management of biomechanical dysfunction of the feet, including fallen arches, overpronation, or supination. Weakness in the muscles of the hip or knee, or tightness in some of the joints or muscles of the lower limb, may alter the way a person walks or runs. ^{12,27}

Table 5: General principles of nonsurgical management of greater trochanteric pain syndrome

well established.^{8,32,33} Functional outcomes following surgery, however, are generally good.^{32,34}

Discussion

Despite attempts to rename trochanteric bursitis in lateral hip pain as GTPS, lateral hip pain attributed solely to hip bursitis may not be accurate in some cases because lateral hip pain related to true hip bursitis constitutes less than half of the causes of lateral hip pain. GTPS better describes a constellation of unpleasant symptoms leading to a potentially complex dysfunction of body biomechanics. Bursitis, tendinitis, and compression forces leading to impingement and tightness of the gluteus muscles are the main causes of lateral hip pain. Failing to identify the etiology of lateral hip pain and correcting the underlying problems can lead to refractory conservative measures and ongoing intolerable pain and disability. Targeting the exact mechanisms of the altered biomechanics of the hip with focused therapeutic modalities is the cornerstone to alleviating pain and improving functional outcomes in lateral hip pain related to GTPS.

Conclusion

As a constellation of symptoms, GTPS of the hip is a leading cause of lateral hip pain. Delay in accurate

1. Lengthening or release of the iliotibial band and fascia lata
2. Repair of a gluteal tendon tear
3. Minimally invasive endoscopic bursectomy
4. Open trochanteric osteotomy

Table 6: Surgical options in greater trochanteric pain syndrome

diagnosis of lateral hip pain and GTPS and mismanagement can worsen prognosis due to progression of recalcitrant symptoms leading to burdensome and ongoing intolerable pain and disability. Conservative measures, including various therapeutic modalities, myofascial release, and targeted hip control and muscle strengthening exercises, are recommended to alleviate pain and improve functional outcomes. For those refractory to optimal nonsurgical treatment options, surgical options may be available to treat specific dependent underlying pathologies.

Answer Key

Question No	Answer
1	TRUE
2	TRUE
3	TRUE
4	TRUE
5	a) TRUE b) unlikely and therefore FALSE
6	TRUE
7	TRUE

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