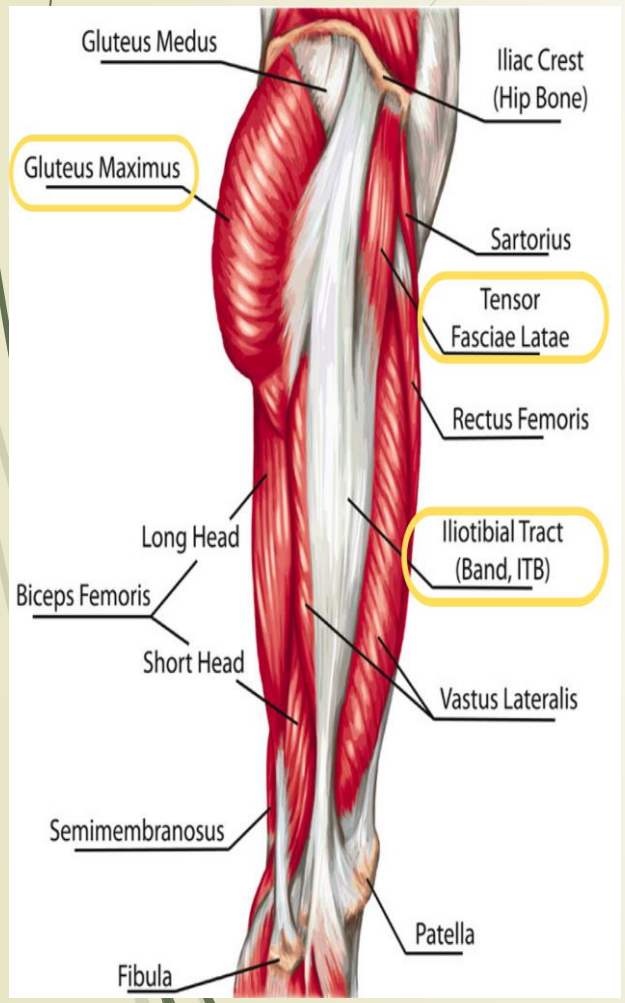
Iliotibial band syndrome

Ola ahmed kamal

Anatomy



- The iliotibial band (ITB) is the distal fascial continuation of the tensor fascia lata, gluteus medius, and gluteal maximus.
- It traverses superficial to the vastus lateralis and inserts on the Gerdy tubercle of the lateral tibial plateau and partially to the supracondylar ridge of the lateral femur.
- There is also an anterior extension called the iliopatella band that connects the lateral patella and prevents medial translation of the patella.

Role in Stabilizing the Knee

- **Lateral Stability**: The ITB plays a crucial role in stabilizing the knee joint, particularly during weight-bearing activities. It helps prevent excessive lateral movement of the knee.
- **Dynamic Stabilization**: During activities such as running or cycling, the ITB assists in controlling knee motion, ensuring that the knee remains aligned and stable.
- **Force Distribution**: The ITB helps distribute forces across the knee joint, reducing stress on other structures, such as ligaments and cartilage.

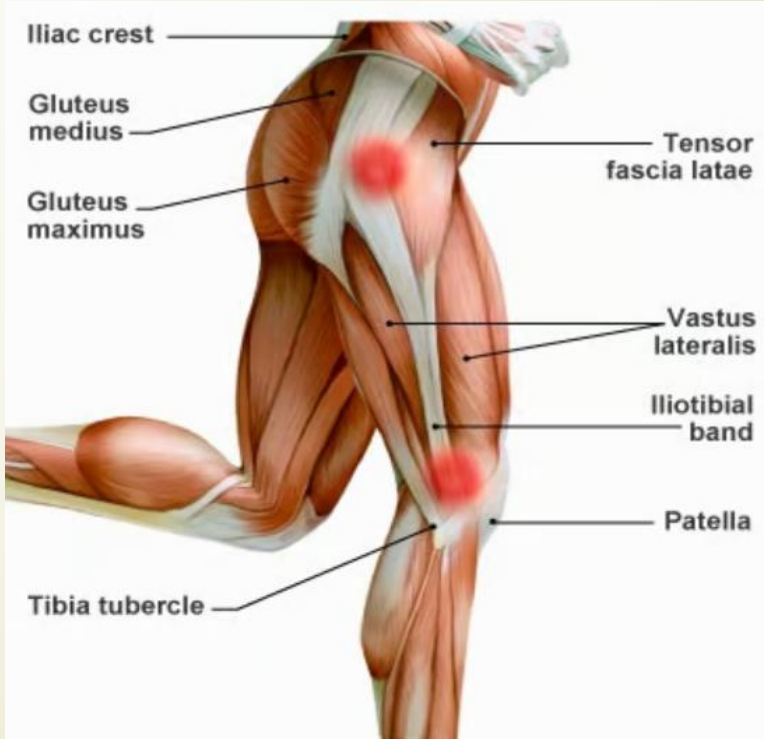
Impact on Gait and Movement

- **Gait Mechanics:** The ITB contributes to proper gait mechanics by maintaining knee alignment and facilitating efficient movement patterns. It helps control hip motion and knee flexion/extension during walking and running.
- The ITB **functions** as a knee extensor when the knee is less than 30 degrees of flexion but becomes a knee flexor after exceeding 30 degrees of flexion.

Definition

- An ITBFS, which is an overuse injury most commonly associated with repetitive lower extremity activities such as running or cycling, can manifest itself at the hip and at the knee.

- At the hip, an ITB contracture can lead to trochanteric bursitis by increasing compression and friction of the sub gluteus maximus bursa between the ITB and the greater trochanter



Epidemiology

- The incidence of ITBS by runners reaches 14%.
- In the ITBS population, the prevalence for women is estimated to be between 16%-50% and for men between 50%-81%.
- ITBS also occurs in cycling, hockey, swimming, rowing, basketball, tennis, and soccer.

Etiology

- The etiology of ITBS is controversial and likely multifactorial.
- One theory advocates that repetitive friction of the ITB and the lateral epicondyle during flexion and extension lead to inflammation of the contact area of the ITB. Contact between the ITB and lateral epicondyle occurs at 30 of flexion, which is the degree of knee flexion at foot strike. This contact area has the name of the "impingement zone."
- Histologic examinations of cadaveric specimens show a highly innervated fat pad that is deep to the distal ITB. Compression of this fat pad is implicated to be the source of the lateral knee pain.
- chronic inflammation of a fluid-filled ITB bursa located between the ITB and lateral epicondyle.

Modifiable risk factors include

- **running on a tilted surface**, hill running, errors in training technique, and abrupt changes in training intensity.
- **Anatomical factors s**uch as internal tibial torsion, hip abductor weakness, excessive foot pronation, and medial compartment arthritis leading to genu varum can increase the tension of the ITB and can perpetuate the pathology.
- ITBS correlates **with greater trochanteric pain** syndrome because of the altered biomechanics of the hip and tension of the proximal fascial complex.
- The **patellofemoral syndrome** is commonly seen in these patients because of the tension through the iliopatellar band.

Symptoms of ITB

1. Pain Location

- **Sharp or burning lateral Knee Pain,** often at the site where the ITB attaches to the lateral femoral epicondyle.
- Some individuals may also experience pain higher up in the hip or outer thigh, especially during activities that involve knee movement.

2. Activity-Related Pain: Pain typically increases during activities like running, cycling, or walking, especially on inclines or declines.

3. Pain Onset: Symptoms often develop gradually, starting with mild discomfort that worsens over time. often increasing with prolonged activity or after periods of rest.

4. Swelling and Tenderness

- **Localized Swelling**: There may be mild swelling or inflammation along the outer knee.
- **Tenderness**: The area along the ITB, particularly around the knee, may be tender to touch.

5. Clicking or Popping Sensation in the knee during movement, which can be associated with the ITB rubbing over the lateral femoral epicondyle.

6. Decreased ROM in the knee, making it difficult to fully extend or flex the leg

Differential diagnosis

The following lists the most common causes of lateral knee pain:

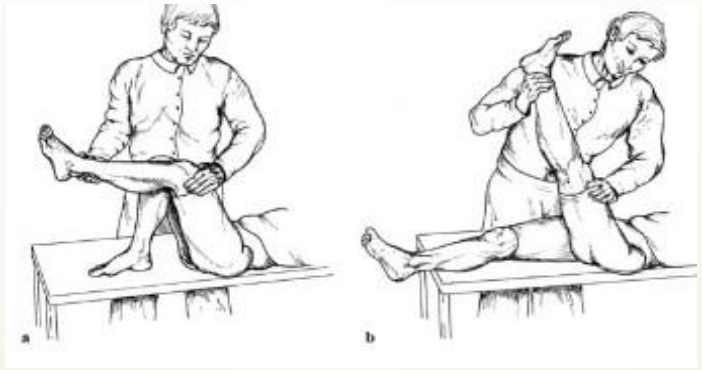
- Stress fracture of the lateral tibial plateau
- Lateral meniscus tear
- Lateral compartment of the knee osteoarthritis
- Lateral collateral ligament strain
- Biceps femoris tendinopathy
- Radiation from hip pathology
- Patellofemoral syndrome
- Popliteal tendinopathy

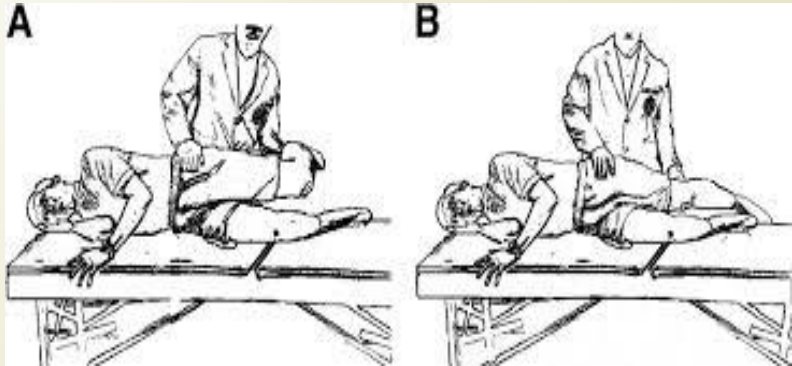
Physical examination

- Iliotibial band syndrome is a clinical diagnosis and
- The patient often presents with lateral knee pain localized to the area between the Gerdy tubercle and the lateral epicondyle.
- The history is commonly consistent with a recent change in prolonged aerobic activities and rarely in the setting of an acute injury.
- The pain initially will occur at the completion of the activity but may be present at the beginning of the activity and even at rest with later disease progression.
- The pain is often worse with running on a cambered surface, and also hills or longer strides may increase symptoms as deeper knee flexion at foot strike and leads to more time in the "impingement zone.

The first step is a physical examination of the knee.

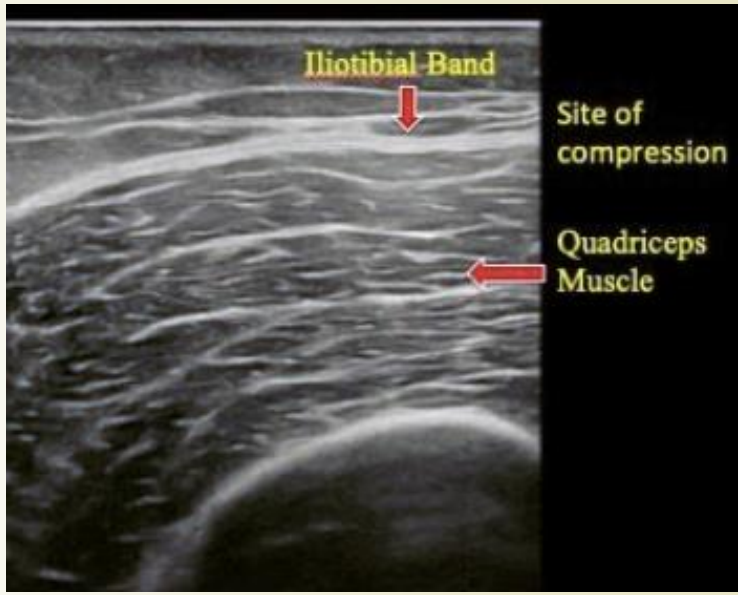
- Coronal and sagittal plane knee misalignments such as genu varum, genu valgum, recurvatum, and procurvatum are worth noting as this can increase tension on the ITB.
- Knee effusion or ligamentous laxities are not commonly part of the presentation with isolated ITBS.
- **Palpation** of the distal ITB can be painful, and the clinician may feel crepitus with ROM.
- Special tests for ITBS include the Noble and Ober tests. To perform
  - The Noble test
  - The Ober test

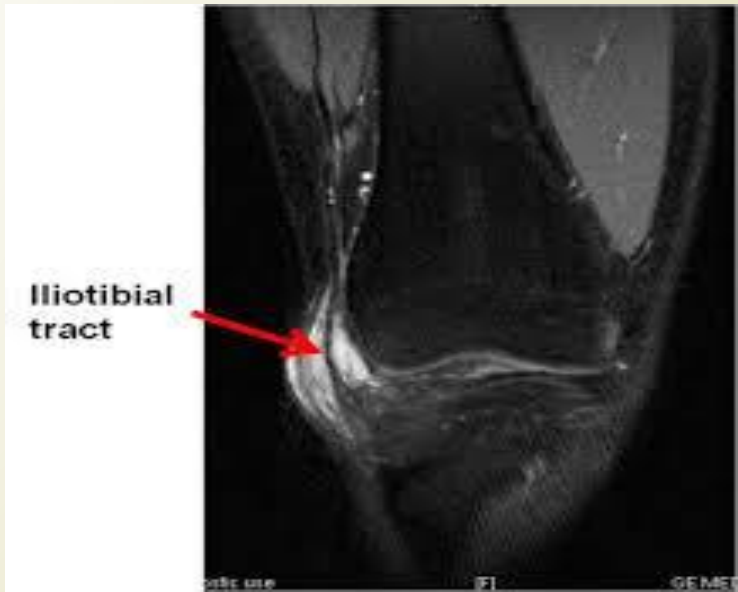




imaging

- Radiographic imaging of the knee is useful for ruling out other pathology that could be causing lateral knee pain such as osteoarthritis, fracture, or patella malalignment.
- Magnetic resonance imaging (MRI) of the knee may confirm the diagnosis if it demonstrates hyperintensities at the lateral epicondyle with a thickened distal ITB.
- ultrasound is a low cost and low-risk modality that may show abnormal distal ITB thickening.





Physical Therapy Rehabilitation Protocol for Iliotibial Band Friction Syndrome (ITBS)

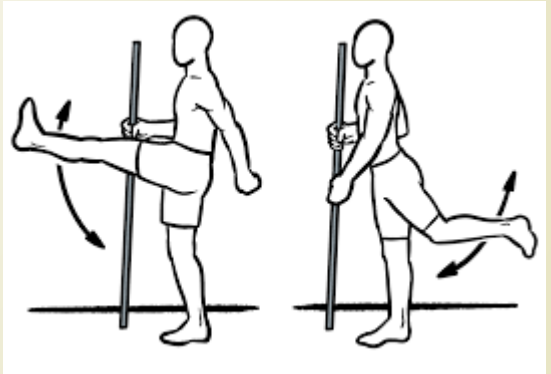
- **Phase 1: Acute Phase (Weeks 1-2)**
- **Goals**: Reduce pain and inflammation, protect the ITB.
- **Interventions**:
  - **Rest**: Avoid activities that exacerbate symptoms (e.g., running, cycling).
  - **Ice Therapy**: Apply ice to the lateral knee for 15-20 minutes, several times a day.
  - **Medication**: Use NSAIDs as prescribed for pain management.
  - **Gentle Stretching**: Begin gentle stretches for the ITB and surrounding muscles (e.g., hip flexors, quadriceps).

Phase 2: Sub-Acute Phase (Weeks 3-4)

•**Goals**: Restore ROM and begin gentle strengthening.

•**Interventions**:

- **Dynamic Stretching**: Incorporate dynamic stretches (e.g., leg swings) to improve flexibility.
- **Strengthening Exercises**: Begin with low-impact exercises, such as:
  - **Clamshells**: 2 sets of 10-15 repetitions.
  - **Side Leg Raises**: 2 sets of 10-15 repetitions.
- **Balance Training**: Introduce single-leg balance exercises to enhance stability.

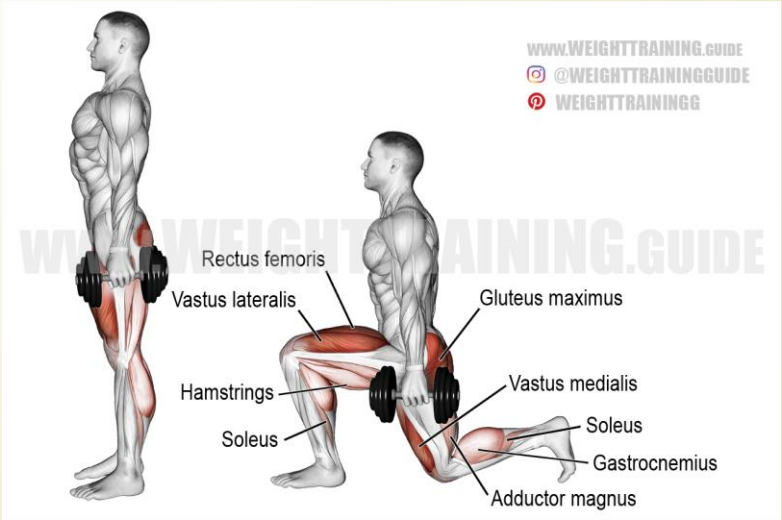


Phase 3: Strengthening Phase (Weeks 5-6)

•**Goals**: Increase strength and endurance of hip and core muscles.

•**Interventions**:

- **Progressive Strengthening**:
  - **Bridges**: 3 sets of 10-15 repetitions.
  - **Squats**: 3 sets of 10-15 repetitions.
  - **Lunges**: 2 sets of 10-15 repetitions.
- **Resistance Training**: Utilize bands or light weights to challenge the muscles.
- **Core Exercises**: Planks and side planks to enhance core stability.



Phase 4: Return to Activity (Weeks 7-8)
Goals: Gradually return to sport-specific activities.
Interventions:

- **Sport-Specific Drills**: Begin with low-impact activities (e.g., cycling, swimming).
- **Gradual Running Program**: Introduce a run-walk program, starting with short intervals.
- **Continued Strengthening**: Maintain hip and core strengthening exercises.

Phase 5: Maintenance Phase (Ongoing)
Goals: Maintain strength, flexibility, and prevent recurrence.
Interventions:

- **Regular Stretching**: Incorporate stretching into daily routines.
- **Strengthening Exercises**: Continue hip and core strengthening at least twice a week.
- **Footwear Assessment**: Ensure proper footwear is used, considering orthotics if necessary.

Orthotics and Footwear in Iliotibial Band Friction Syndrome (ITBS)

- **Role of Proper Footwear**

1. **Support and Stability**: Proper footwear provides essential support for the arch and heel, helping to maintain alignment during movement. This stability can reduce excessive foot pronation or supination, which may contribute to ITBS.
2. **Shock Absorption**: Quality shoes are designed with cushioning materials that absorb impact forces during activities like running and walking. This helps to minimize stress on the ITB and knee.

3. Fit and Comfort: Well-fitted shoes can prevent blisters and discomfort, promoting a more natural gait and reducing compensatory movements that may exacerbate ITBS symptoms.

4. Terrain-Specific Design: Choosing footwear suited for the specific activity (e.g., trail running shoes for uneven surfaces) can enhance performance and reduce injury risk.

Custom Orthotics: When They Are Needed

1. **Biomechanical Assessment**: Custom orthotics are often recommended after a thorough biomechanical evaluation that identifies specific foot and gait abnormalities (e.g., excessive pronation, high arches).
2. **Correcting Imbalances**: Orthotics can help address biomechanical imbalances by providing additional arch support or correcting foot alignment, which may reduce strain on the ITB.

3. Persistent Symptoms: If an individual experiences persistent ITBS symptoms despite proper footwear and conservative management, custom orthotics may be considered to enhance support and stability.

4. Activity-Specific Needs: Athletes or active individuals who engage in repetitive impact activities (running, cycling) may benefit from orthotics tailored to their specific sports, providing enhanced comfort and support.

5. Post-Surgical Rehabilitation: After surgical interventions for ITBS, custom orthotics can aid in recovery by supporting the foot and maintaining proper alignment during the healing process.

Prevention Strategies for Iliotibial Band Friction Syndrome (ITBS)

1. Importance of Warm-Up and Stretching

- **Dynamic Warm-Up**: Engaging in a dynamic warm-up before activities increases blood flow to the muscles, improves flexibility, and prepares the body for movement. **Examples** include leg swings, walking lunges, and high knees.
- **Targeted Stretching**: Focus on stretching the ITB, hip flexors, quadriceps, and hamstrings.
- **Cooldown Routine**: Post-activity stretching helps maintain flexibility and reduce muscle tension, which can contribute to ITBS.

2. Strengthening Exercises for the Hip and Core

- **Hip Abductor Strengthening**: Strengthening the muscles that support the hip and stabilize the pelvis can reduce strain on ITB
  - **Side Leg Raises**
  - **Clamshells**
- **Core Strengthening**: A strong core helps maintain proper posture and alignment during activities. Key exercises include:
  - **Planks**
  - **Bridges:** engaging your glutes and core.
- **Overall Leg Strengthening**: Strengthening the quadriceps, hamstrings, and glutes can provide better support for the knee and reduce the risk of ITBS. Effective exercises include:
  - **Squats**
  - **Lunges**

Surgical intervention

Surgical intervention for refractory cases after 6 months of nonoperative management includes

several options: Techniques:

- Percutaneous/open ITB release
- ITB lengthening (Z-plasty)
- Open ITB bursectomy
- Arthroscopic ITB debridement

- All techniques show success, but comparative studies are limited.
- Indication: ITB bursectomy is preferred for ITBS without ITB enhancement on MRI, involving excision of the ITB bursa while preserving the ITB.
- Satisfaction: Most patients report satisfaction post-bursectomy.
- Minimally invasive techniques target the lateral synovial recess linking the ITB to the lateral femur. Michels et al. reported a 97% good to excellent outcome, with patients returning to full activity.

Complications

- Disease progression is the most common complication of ITBS. As the disease progresses, the patient will experience pain throughout the activities and even at rest.
- Furthermore, because of its attachments to the lateral patella, the progression of the disease may lead to patellofemoral syndrome.

Prognosis

- Roughly 50% to 90% of patients will improve with 4 to 8 weeks of non-operative modalities.
- all surgical modalities have reported good to excellent results.
- ITBS typically follows a fluctuating course and may relapse at any point in the treatment progression or return to activity.

Thank you