Jerash University
Faculty of Applied Medical Sciences
Physical Therapy Department

Sport injury

1201336

Ankle Sprain

Dr. Shadi alkhob

Definition and Epidemiology

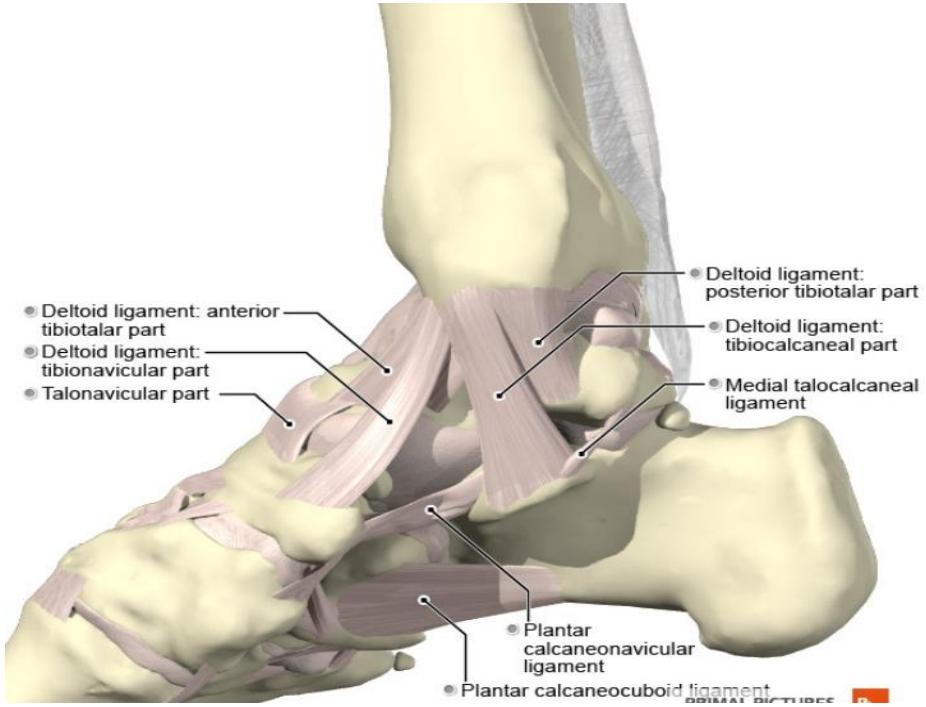
- An ankle sprain is where one or more of the ligaments of the ankle are partially or completely torn.
- An ankle sprain is a common injury. Inversion-type, lateral ligament injuries represent approximately 85% of all ankle sprains.
- The incidence of ankle sprain is highest in sports populations. Poor rehabilitation after an initial sprain increases the chances of this injury recurrence.

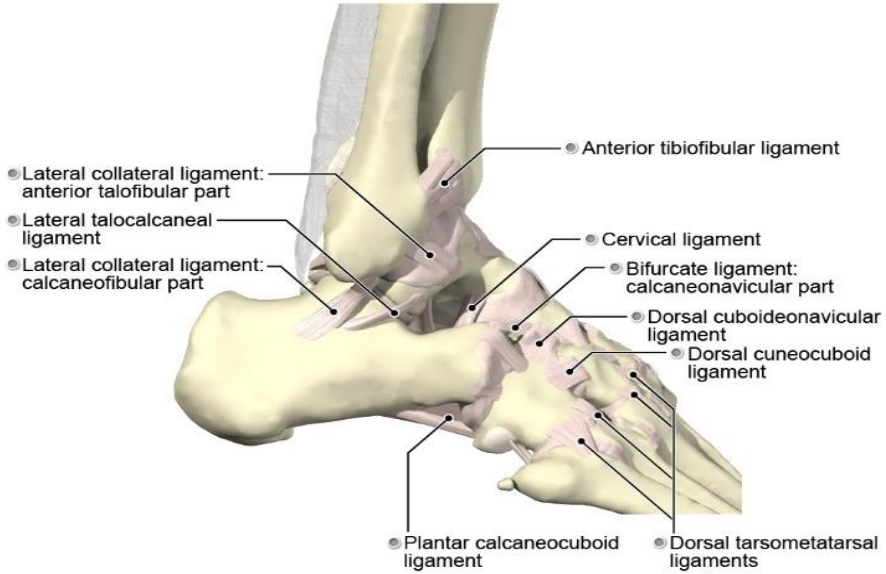
- The ankle joint is the body part that is second most likely to be injured in sport.
- Severe ankle sprains occur commonly in basketball players. Recurrence rates amongst basketball players is reported to be greater than 70%
- Athletes with chronic ankle instability miss practices and competition, require ongoing care in order to remain physically active, and display sub-optimal performance.

Clinically Relevant Anatomy

- Of the lateral ankle ligament complex the most frequently damaged one is the anterior talofibular ligament (ATFL).
- Their anatomical location and the mechanism of sprain injury mean that the calcaneo-fibular (CFL) and posterior talofibular ligaments (PTFL) are less likely to sustain damaging loads.
- On the medial side the strong, deltoid ligament complex [posterior tibiotalar (PTTL), tibiocalcaneal (TCL), tibionavicular (TNL) and anterior tibiotalar ligaments (ATTL)] is injured with forceful "pronation and rotation movements of the hindfoot".

- The stabilising ligaments of the distal tibio-fibular syndesmosis are the anterior-inferior, posterior-inferior, and transverse tibio-fibular ligaments, the interosseous membrane and ligament, and the inferior transverse ligament.
- A syndesmotic (high ankle) sprain occurs with combined external rotation of the leg and dorsiflexion of the ankle.





Risk Factors

- Several intrinsic and extrinsic risk factors predispose an athlete to chronic ankle instability.
- The most common risk factor is previous history of sprain. A previous sprain may compromise the strength and integrity of the stabilisers and interrupt sensory nerve fibers.
- Sex, height, weight, limb dominance, postural sway and foot anatomy are intrinsic.
- Extrinsic risk factors may include taping, bracing, shoe type, competition duration and intensity of activity.

Mechanism of Injury/Pathological Process

- Lateral ankle sprains usually occur during a rapid shift of body center of mass over the landing or weight-bearing foot.
- The ankle rolls outward, whilst the foot turns inward causing the lateral ligament to stretch and tear.
- When a ligament tears or is overstretched its previous elasticity and resilience rarely returns.
- A less common mechanism of injury involves forceful eversion movement at the ankle injuring the strong deltoid ligament.

1. Aspect: Lateral

- Mechanism of injury:
  - Inversion and plantarflexion
- Ligaments:
  - anterior talofibular ligament
  - calcaneo-fibular ligament
  - posterior talofibular ligament
- 2. Aspect: Medial
- Mechanism of injury:
  - Eversion
- Ligaments:
  - posterior tibiotalar ligament
  - tibiocalcaneal ligament
  - tibionavicular ligament
  - anterior tibiotalar ligament

3.Aspect: High

- Mechanism of injury:
  - External rotation and dorsiflextion
- Ligaments:
  - anterior-inferior tibiofibular ligament
  - posterior-inferior tibiofibular ligamen
  - transverse tibiofibular ligament
  - interosseous membrane
  - interosseous ligament
  - inferior transverse ligament

Clinical Presentation

- Patient presents with inversion injury or forceful eversion injury to the ankle.
- May have previous history of ankle injuries or instability.
- Able to partial weight-bear only on the affected side.
- If patient presents with description of cold foot or paraesthesia, suspect neurovascular compromise of peroneal nerve.
- Tenderness, swelling and bruising can occur on either side of the ankle.
- No bony tenderness, deformity or crepitus present.
- Passive inversion or plantar flexion with inversion should replicate symptoms for a lateral ligament sprain.
- Passive eversion should replicate symptoms for a medial ligament sprain.
- Special Tests: +ve Anterior Draw, Talar Tilt or Squeeze Test (depending on the structures involved)

Differential Diagnosis

- The Ottawa Ankle Clinical Prediction Rules are an accurate tool to exclude fractures within the first week after an ankle injury.
- Additional differential diagnosis to look out for:
- Impingement
- Tarsal Tunnel Syndrome
- Sinus Tarsi Syndrome
- Cartilage or osteochondral injuries
- Peroneal Tendinopathy or subluxation
- Posterior Tibial Tendon Dysfunction

3 graded classification based on the severity of sprain injury

- • Grade I Mild - Little swelling and tenderness with little impact on function
- • Grade II Moderate - Moderate swelling, pain and impact on function. Reduced proprioception, ROM and instability
- • Grade III Severe - Complete rupture, large swelling, high tenderness loss of function and marked instability

Different Grades Ankle Sprain

Clinical Examination

- With an ankle sprain multiple structures may be involved, therefore a full foot and ankle assessment is recommended
- including the mechanism of injury, observation of the patient's gait pattern, standing posture and wear on the individual's shoes.
- atrophy of the musculature should also be observed and noted as well as any oedema and/or ecchymosis.

Special Tests

- Anterior Draw - tests the ATFL
- Talar Tilt - tests the CFL
- Posterior Draw - tests the PTFL
- Squeeze test - for syndesmotic sprain
- External rotation stress test (Kleiger's test) - syndesmotic sprain

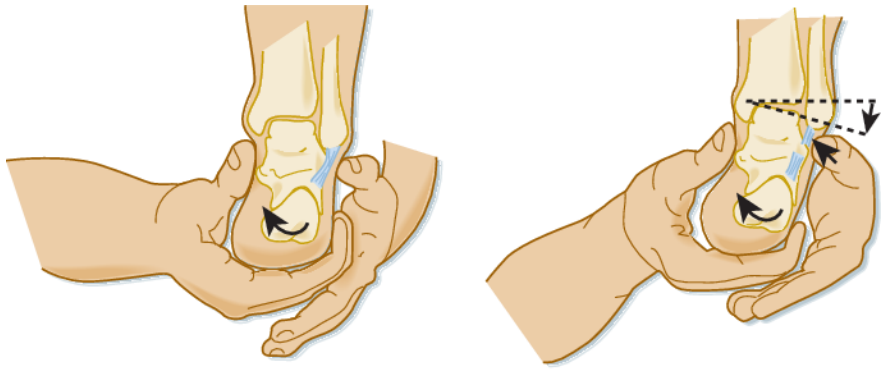


Fig. 85.5 Talar tilt test.

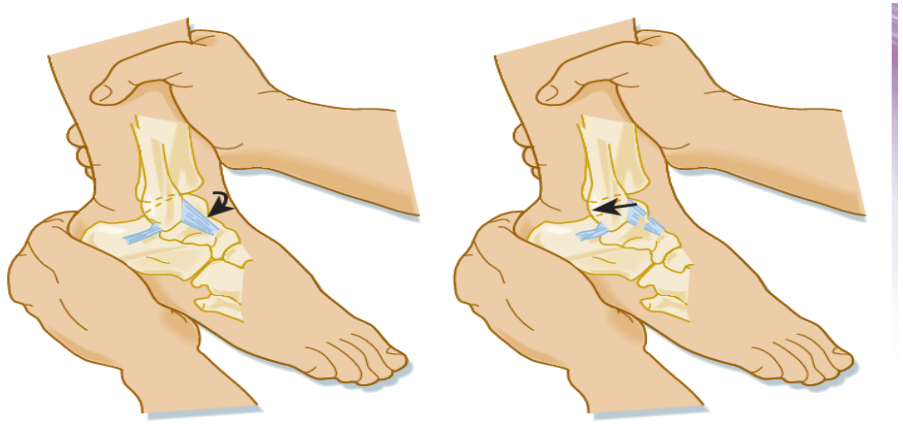
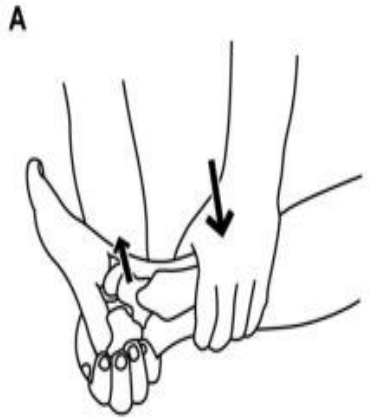
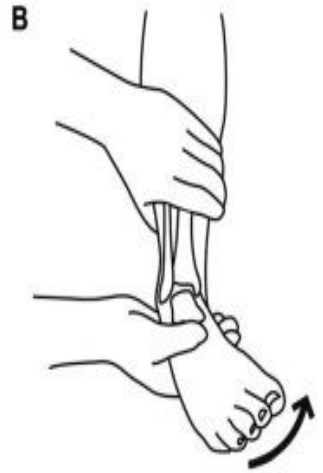


Fig. 85.4 Anterior drawer test.





Posterior Draw

SQUEEZE TEST

ER STRESS TEST

Physical Therapy Management

- 1. Mild Ankle Sprain
- • Natural full recovery within 14 days
- • Taping and follow up to evaluate healing progression

- First time lateral ligament sprains can be innocuous injuries that resolve quickly with minimal intervention and some approaches suggest that only minimal intervention is necessary.

- 2. Severe Ankle Sprain
- Physiotherapy is required with functional therapy of the ankle shown to be more efficient than immobilisation. Functional therapy treatment can be divided in 4 stages, moving onto to the next stage as tissue healing allows
- • Inflammatory phase,
- • Proliferative phase,
- • Early Remodelling,
- • Late Maturation and Remodelling.

Inflammatory Phase (0-3 days)

- **Goals:**
- Reduction of pain and swelling and improve circulation and partial foot support
- The most common approach to manage ankle sprain is the PRICE protocol: Protection, Rest, Ice, Compression, and Elevation
- **Recommendations for the Patient:**
- Protection: Protect the ankle from further injury by resting and avoiding activities that may cause further injury and/or pain
- Rest: Advise rest for the first 24 hours after injury, possibly with crutches to offload the injured ankle and altering work and sport and exercise requirements as needed
- Ice: Apply a cold application (15 to 20 minutes, one to three times per day)
- Compression: Apply compression bandage to control swelling caused by the ankle sprain
- Elevation: Ideally elevate ankle above the level of the heart, but as a minimum, avoid positions where the ankle is in a dependent position relative to the body

Foot and Ankle ROM:

- Patient performs active movements with the toes and ankle within pain free limits to improve local circulation.
- Manual therapy in the acute phase could also effectively increase ankle dorsiflexion.
- Anteroposterior manipulation and RICE results in greater improvement in range of movement than the application of RICE alone.

Proliferative Phase (4-10 days)

- **Goals:**
- Recovery of foot and ankle function and improved load carrying capacity.

1.Patient education regarding gradual increase in activity level, guided by symptoms.

2.Practise Foot and Ankle Functions

- Range of Motion
- Active Stability
- Motor Coordination
- 3. Tape/Brace : (brace, bandage or tape) is most beneficial.

Early Remodeling (11 -21 days)

- **Goals:**
- Improve muscle strength, active (functional) stability, foot/ankle motion, mobility (walking, walking stairs, running).
- **Education:**
- Provide information about possible preventive measures (tape or brace)
- Advice regarding appropriate shoes to wear during sport activities, in relation to the type of sport and surface

Practice foot and ankle functions:

- Practice balance, muscle strength, ankle/foot motion and mobility (walking, stairs, running).
- Look for a symmetric walk pattern.
- Work on dynamic stability as soon as load -bearing capacity allows, focusing on balance and coordination exercises. Gradually progress the loading, from static to dynamic exercises, from partially loaded to fully loaded exercises and from simple to functional multi-tasking exercises. Alternate cycled with non-cycled exercises (abrupt, irregular exercises). Use different types of surfaces to increase the level of difficulty.
- Encourage the patient to continue practicing the functional activities at home with precise instructions regarding the expectations for each exercise.

Taping/bracing:

- Advise wearing tape or a brace during physical activities until the patient is able to confidently perform static and dynamic balance and motor coordination exercises.

Late Remodeling and Maturation

- Goals:
- Improve the regional load-carrying capacity, walking skills and improve the skills needed during activities of daily living as well as work and sports.
- Practice and adjust foot abilities (functions and activities):
- • Practice motor coordination skills while performing mobility exercises
- • Increase the complexity of motor coordination exercises in varied situations until the pre-injury level is reached
- • Encourage the patient to continue practicing at home

Chronic Ankle Instability

- Chronic ankle instability has been describes as a combination of mechanical (pathological laxity, arthrokinematic restrictions, and degenerative and synovial changes) and functional (Impaired proprioception and neuromuscular control, and strength deficits) insufficiencies
- It is recommended that all patients undergo conservative treatment to improve stability and improve the muscle reflex and strength of the lower limb stabilizing muscles. Although this will help some individuals, it cannot compensate for the deficit of the lateral ligament complex and surgery is occasionally required

Ankle Bracing and Taping

- Ankle taping may be used to help stabilise the joint by limiting motion and proprioception.
- Ankle taping have a greater effect in preventing recurrent strains rather than an initial sprain.