**Ankle Movement Coordination Deficit**

"Lateral Ankle Sprain"

ICD-9-CM: 845.02  Sprain of calcaneofibular ligament

*Diagnostic Criteria*

**History:**
- Inversion sprain
- Swelling
- Pain
- If chronic - instability

**Physical Exam:**
- Antalgic gait
- Lateral ankle effusion
- Tender anterior talofibular ligament and possibly also the calcaneofibular ligament.
- Pain reproduced with inversion stress (usually worse with plantarflexion and inversion)
- If severe sprain, or recurring sprains - laxity with anterior drawer

![Anterior Talofibular Ligament](image)

**Cues:**
- 1 = Lateral malleolus (fibula); 2 = Anterior talofibular lig.; 3 = Calcaneofibular ligament
- Locate lateral malleolus - palpate anteriorly and slightly inferiorly
- Palpate using graduated pressure to avoid inadvertent further injury
Inversion Stress Test  (Talar Tilt)

Cues:  Apply graduated force to avoid inadvertent injury
      Slightly reproduce reported pain complaint (must not assume all lateral ankle
            pain/effusion is from anterior talofibular and/or calcaneofibular ligament tears).
      If not symptomatic with gentle inversion – consider tarsal or metatarsal fracture, or
            inferior tibiofibular syndesmosis sprain

Anterior Drawer

Cues:  Either  (1) Stabilize tibia and fibula and pull calcaneus and talus anteriorly, or
        (2) Bend knee to 90 degrees, place calcaneus on table and hold ankle in about 10
            degrees of plantar flexion – push tibia and fibula posteriorly to create a relative
            anterior glide of talus
Lateral Ankle Sprain

ICD-9: 845.02 sprain of calcaneofibular ligament

Description: Lateral ankle sprains are usually caused by an inversion and plantar flexion injury, followed by ankle swelling and decreased function. After the initial recovery from a lateral ankle sprain, some patients exhibit residual pain that limits their activities. Also, some patients are prone to reinjure the ankle. This re-injury predisposition is thought to be caused by neuromuscular deficits following the sprain that result in functional instability.

Etiology: With an inversion force of foot, there is injury to anterolateral capsule, anterior talofibular ligament, and anterior tibiofibular ligament – about 40% of patients will have this injury type. As the inversion force progresses, the calcaneofibular ligament is injured as well. In about 58% of cases, there will be a tear of both the anterior talofibular ligament and the calcaneofibular ligament. Finally, in a small number of cases (3%), there will be tears of the above two ligament and the posterior talofibular ligaments.

Physical Examination Findings (Key Impairments)

Acute Stage / Severe Condition

- Severe swelling (more than 4 cm about the fibula)
- Severe ecchymosis
- Loss of function and motion (patient is unable to bear weight or ambulate)
- Positive anterior drawer test
- Inversion will bring on pain and apprehension
- Tenderness over Anterior Talofibular Ligament, Calcaneofibular Ligament, and Posterior Talofibular Ligament
- Possible anterior shift/displacement of lateral malleolus

Sub Acute Stage / Moderate Condition

- Moderate pain and swelling
- Mild to moderate ecchymosis
- Some loss of motion and function (patient has pain with weight-bearing and ambulation)
- Mild to moderate instability (mild positive anterior drawer)
- Pain with inversion
- Mild to moderate tenderness with swelling/effusion over the lateral malleolus
Settled Stage / Mild Condition

- Mild tenderness and swelling
- Slight or no functional loss (patient is able to bear weight and ambulate with minimal pain)
- No mechanical instability (negative anterior drawer test)
- Slight to no apprehension when taken into inversion
Intervention Approaches / Strategies

Acute Stage / Severe Condition

Goals: Limit effusion
- Reduce pain and protect from further injury
- Prevent movement induced inflammatory reactions

- Physical Agents
  - Cryotherapy / Ice
  - Electrical stimulation

- Therapeutic Exercises
  - Gentle, active dorsiflexion and plantarflexion in painfree ranges
  - Progress to ankle pumps, ankle circles, and ankle alphabet
  - Note: In grade III and severe grade II injuries, AROM exercises for inversion and plantar flexion should be limited until tenderness over the ligament decreases in order to avoid disrupting healing structures.
  - Towel stretch for the calf myofascia
  - Pain free-isometrics strengthening exercises – all directions
  - Towel toe curls
  - Note: Early Mobilization of joints following ligamentous injury actually stimulates collagen bundle orientation and promotes healing, although full ligamentous strength is not reestablished for several months.
  - Limiting soft-tissue effusion speeds healing.

- External Devices (Taping/Splinting/Orthotics)
  - Fit patient with knee support if pain relief requires temporary use of an external device
  - Compression ankle strapping
  - An ankle brace, such as air cast splint, or a walking boot

- Re-injury Prevention Instruction
  - Crutch walking for 2-3 days depending on grade of sprain
  - Wear a brace or have ankle taped when doing activities that have high incidence of ankle injuries.
  - Wear correct footwear for each sport
  - Be aware of uneven terrain, potholes, and high curbs
  - Turn a light on at night when out of bed
  - Watch out for slippery floors
Sub Acute Stage / Moderate Condition

Goals: Decrease and eliminate pain
       Increase pain-free range of motion
       Limit loss of strength and proprioception

• Approaches / Strategies listed above

• Manual Therapy
  Manual joint mobilization if dorsiflexion or eversion range of motion is limited

• Therapeutic Exercises
  Progress active dorsiflexion / plantarflexion and eversion and inversion in painfree ranges – add resistance of tolerated (e.g., with rubber tubing or gravity via toe raises)
  Initiate proprioceptive exercises, such as single leg standing, seated BAPS board – progressing to standing BAPS board type exercises

Settled Stage / Mild Condition

Goals: Regain full pain-free motion
       Regain normal strength
       Regain normal proprioception

• Approaches / Strategies listed above

• Therapeutic Exercises
  Gradual return to sport activities through use of functional progression, such as activity-specific exercise – for example:
  Running in pool, swimming
  Gradual progression of functional activities
  Pain free hopping on both legs progressing to single leg
  Stand on toes and hop on toes
  Step up / over / forward / sideways on high step pain free
  Begin stairmaster, treadmill, biking
  Initiate running when fast pace walking is pain free
  Figure 8’s, cross-over walking
  Jump rope
  Ball on wall
  Weight bearing wobble board
  Heel raises

• External Devices (Taping/Splinting/Orthotics)
  Reinjury is common with ankle sprains; so external bracing is recommended and can include taping, lace-up braces, and air splints
Intervention for High Performance / High Demand Functioning with Workers or Athletes

Goals: Return to desired occupational or leisure time activities
Prevention of recurring injury

- Approaches / Strategies listed above

- Therapeutic Exercises
  Progress functional activities related to desired sport activity – for example:
  - Walk-jog, 50/50 backwards, forwards, patterns, circles
  - Jog-running, backwards, forwards, patterns
  - Jumping rope single limb
  - Figure 8’s, cross-over running
  Improve strength and endurance through use of progressive resistive training

Consider early mobilization with the motivated athlete. However, when choosing the specific intervention strategy, consider the patient’s activity level, age, goals for recovery, degree of injury, previous history of injury, and general motivation.

Selected References


Young CC. Ankle Sprain. EMedicine Journal 2002; (1) 3


Impairment: Limited and Painful Ankle Inversion

Cues: Glide the fibula posteriorly on a stable tibia
      Sustain the posterior glide while the patient actively inverts his/her foot
      As always: 1) alter the direction and amplitude of the glide to achieve painfree active
                 motion, 2) repeat movement several times (sets of ten)  3) add overpressure, if
                 indicated, at the end of available painfree active movement

The following reference provides additional information regarding this procedure:
Brian Mulligan MNZSP, DipMT: Manual Therapy, p. 98-100, 1995