

Syndesmosis Ankle Sprains

ICD 9 code: 719.47 Pain in joint involving ankle and foot

Description: The mechanism of injury for syndesmotic ankle sprains can be difficult to isolate as there are different anatomic structures involved, depending upon the mechanism of injury. The manner in which these structures can be injured may involve 3 planes of motion. There are 3 proposed mechanisms on injury for the syndesmotic ankle sprain. These include external rotation of the foot, eversion of the talus within the ankle mortise, and excessive dorsiflexion. These mechanisms of injury vary significantly from the typical lateral ankle sprain, in which the ankle and foot are plantarflexed and inverted. Forceful external rotation of the foot results in widening of the ankle mortise. Additionally, elevated forces with eversion of the talus can widen the mortise. Finally, forceful dorsiflexion may widen the ankle mortise with the wider anterior aspect of the talar dome entering the joint space. With all the above scenarios, the distal fibula is forced laterally away from its articulation with the distal tibia.

Etiology: The mechanism of injury dictates which structures are involved with the syndesmotic ankle sprain. The three major ligaments involved are the anterior inferior tibiofibular ligament (AITFL), the posterior inferior tibiofibular ligament (PITFL), and the interosseous ligament. Syndesmotic ankle sprains may coexist with traditional ankle sprains, as well as deltoid ligament injuries, or occur independently. Research has shown that between 1% and 18% of all ankle sprains involve injury to the syndesmosis. Patients with incomplete syndesmotic ankle sprains, on average, require 55 days to recover. This period of time is almost twice the recovery period for patients with third degree lateral ankle sprains.

Physical Examination Findings (Key Impairments)

Acute Stage / Severe Condition

- Severe swelling
- Severe ecchymosis
- Loss of function and motion (patient may have heel raise gait pattern in order to avoid dorsiflexion at terminal stance)
- Positive External Rotation Test, Squeeze Test, or Point Test
- Dorsiflexion may bring on pain and apprehension
- Tenderness over Anterior Inferior Tibiofibular Ligament, Posterior Inferior Tibiofibular Ligament, or Interosseous Ligament
- Possible lateral and/or 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
- Pain with dorsiflexion and/or external rotation of the foot
- Mild to moderate tenderness with swelling/effusion over the above mentioned ligaments

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 (ER test and squeeze tests are negative)
- Slight to no apprehension when taken into external rotation or dorsiflexion

Intervention Approaches / Strategies

Acute Stage / Severe Condition

- Pain & Edema Control
Physical Agents: pain and swelling control; rest, ice compression, and elevation (RICE), electrical stimulation, toe curls, ankle pumps
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.
- Temporary stabilization (ie, short leg cast, splint, brace)
- Non-weight bearing with crutches

Sub Acute Stage / Moderate Condition

- Partial weight-bearing without pain
- Low-level balance training: bilateral standing activity or standing on balance pad
- Lower-level strengthening with Theraband
- Manual Therapy to restore accessory and physiological mobility deficits

Settled Stage / Mild Condition

- Unilateral balance training
- Progress from double heel raises to single heel raises
- Treadmill walking with progression to fast walking
- 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

Lin CFL, Gross MT, Weinhold P. Ankle syndesmosis injuries: anatomy, biomechanics, mechanism of injury and clinical guidelines for diagnosis and intervention. *J Orthop Sports Phys Ther* 2006; 36(6):372-384

Alonso A, Khoury L, Adams R. Clinical Tests for ankle syndesmoisis injury: reliability and prediction of return to function. *J Orthop Sports Phys Ther*. 1998; 27:276-284

Fallat L, Grimm DJ, Saraco JA. Sprained ankle syndrome: prevalence and analysis of 639 injuries. *J Foot Ankle Surg*. 1998;37:280-285

Gerber JP, Williams GN, Scoville CR, Arciero RA. Persistent disability associated with ankle sprains: a prospective examination of an athletic population. *Foot Ankle Int*. 1998;19:653-660

Hopkinson WJ, St Pierre P, Ryan JB, Wheeler JH. Syndesmosis sprains of the ankle. *Foot Ankle*. 1990;10:325-330