

Module 2 Kinesiology Project
Jonathan Jordan (“JJ”)
Talocrural Joint

About the Talocrural Joint

The talocrural joint (“the ankle joint”) is a synovial hinge joint formed by the bones of the tibia, fibula and talus. It permits dorsiflexion and plantarflexion of the foot in the sagittal plane. Eversion and inversion are produced at other joints of the foot including the subtalar joint. Plantarflexion is produced by posterior muscles of the cru including the gastrocnemius, soleus, plantaris and posterior tibialis. Dorsiflexion is produced by the anterior muscles of the cru including the tibialis anterior, extensor hallucis longus and extensor digitorum longus.

The tibia is the second largest bone of the body and bears most of the body’s weight in the leg while the fibula supports the muscles of balance in the lower leg and ankle. The tibia and fibula are bound together by the interosseous membrane and strong tibiofibular ligaments, producing a bracket shaped socket called the mortise which is covered in hyaline cartilage. The body of the talus fits “snugly” into the mortise and is stabilized by two sets of supporting ligaments of the medial and lateral malleoli.

1. The medial (or deltoid) ligament originates from the medial malleolus and consists of four separate ligaments which “fan out” and attach to the talus, calcaneus and navicular bones. It’s primary action is to resist over-eversion of the foot.
2. The lateral ligament originates from the lateral malleolus and consists of three separate ligaments which span between the lateral and posterior aspects of the talus and the calcaneus. The lateral ligament is weaker than the medial ligament.

The articulating part of the talus is wedge shaped and is wider anteriorly and thinner posteriorly. During dorsiflexion the anterior part of the talus is held in the mortise and the joint is most stable.¹

Importance of the Foot

Important sensory input comes from the feet to the brain. When the joints of the feet get “jammed” (from wearing the wrong shoes, having unstable arches or injury/trauma) the information flow from our surroundings to our bodies to our brains (and from our brains to our bodies in response) can get jammed. It’s like we’re stuck in traffic and the brain looks for whatever detour it can take to make movement happen. It will always try and find strength and mobility wherever it can to produce the movement requested of it. Until we unjam these joints and free up that highway we can be stuck with poor movement that can lead to pain, injury and less than optimal performance.²

Common Injuries of the Ankle Joint

Lateral Ligament Sprain

An ankle sprain refers to partial or complete tears in the ligaments supporting the ankle. Inversion injuries (“ankle rolling”) are more common than eversion injuries due to the relative instability of the lateral joint and weakness of the lateral ligament compared to the medial. Eversion injuries are possible, but the stronger medial ligament requires a greater force to be injured. Medial ligament sprains typically take longer to rehabilitate.³

Lateral ligament injuries typically occur during rapid changes in direction especially on uneven surfaces. They are common when playing sports involving jumping or landing (basketball, volleyball, tennis, running, soccer, etc). They can also occur from direct impact such as being tackled in football. They also occur outside of athletics in daily life when walking downstairs, running or jogging downhill too quickly or simply stepping off the sidewalk carelessly.

Most ankle joint injuries are accompanied by swelling, pain, instability, a decrease in range of motion and reduced strength and proprioception. Examination, diagnosis and treatment of a sprain should be performed by a licensed medical professional such as a doctor of physical therapy or physician. Massage therapists should obtain medical clearance from the client’s doctor before performing bodywork if the client exhibits symptoms of a sprain or confirms diagnosis of a sprain.

The RICE regime is the most commonly prescribed treatment for lateral ligament injuries in the acute phase. RICE stands for Rest, Ice, Compression and Elevation. RICE helps to avoid further trauma and to reduce blood and edema around the joint. It is important to avoid heat and continued heavy weight bearing activities during the acute phase as these increase blood flow and swelling.

The doctor may advise crutches in the early phase of rehabilitation. Over-the-counter pain relievers such as ibuprofen can help reduce pain and swelling but should be (and commonly are) recommended by a medical professional or pharmacist. The doctor may also (less commonly) prescribe muscle relaxants. Massage therapists do not prescribe or recommend these. Rehabilitation modalities may include soft tissue work, joint mobilization, electrical stimulation and functional exercises to regain muscle strength and conditioning. More severe injuries may require surgical reconstruction.⁴

Assuming medical clearance has been provided to receive bodywork, massage therapists should ask how the injury occurred, what phase of injury/rehabilitation the client is currently in, what over- and under- the-counter medications the client is taking (and should know how they may affect or contraindicate massage). The therapist should perform a gait analysis, a gentle

range of motion assessment and appropriate muscle palpation to formulate a plan. Protocols may include lymphatic massage if swelling is present (with proper training), ankle mobilization and myofascial or deep tissue release of the gastrocnemius and soleus, tibialis anterior and petrissage on the retinaculum of the foot.

Pott's Fracture

A Pott's fracture (or dislocation) describes a bimalleolar (medial and lateral malleoli) or trimalleolar (medial and lateral malleoli and distal tibia) fracture. This is typically produced by forced eversion of the foot in a series of stages: forced eversion pulls on the medial ligament producing a fracture of the medial malleolus, the talus moves laterally and breaks the lateral malleolus and the tibia is forced anteriorly shearing off the distal and posterior part against the talus.¹

Contact sport athletes, particularly football and rugby players, can incur this injury during tough tackles or from missing a kick. It can also occur from impact such as hitting a piece of furniture or losing one's footing. It can also result from falling from a high distance on one's feet.

Treatment involves restoration of the normal relationship between the talus and the mortise. Immobilization, crutches, casts, walking heels, surgical fixation and a comprehensive rehabilitation program are commonly prescribed by doctors to address Pott's fractures.³

Similar to a sprain, bodywork should be cleared by a medical professional and similar questions, assessments and modalities as noted above may be appropriate.

Calcaneal Tendinitis

The calcaneal tendon, commonly referred to as the Achilles tendon, is the thickest tendon in the human body and attaches the plantaris, gastrocnemius and soleus muscles to the calcaneus. Via the calcaneal tendon the gastrocnemius and soleus help plantarflex the foot at the talocrural joint.⁵

The calcaneal tendon is used during walking, running, lunging and jumping and although it can withstand a great deal of stress it is prone to tendinitis or inflammation generally caused by overuse, repetitive stress or improper conditions. For instance, increasing running distance or speed too quickly, repetitive jumping during sports like basketball, wearing improper footwear, having chronically tight calves or running uphill or on uneven surfaces.

Symptoms include pain and stiffness, especially in the morning and during/after activity, thickening of the tendon, bone spurs, swelling and loss of ankle mobility, including dorsiflexion and plantarflexion at the talocrural joint.

There are two types of calcaneal tendinitis:

1. Noninsertional: where the fibers in the middle of the tendon have begun to break down with tiny tears, swell and thicken.
2. Insertional: involves the lower portion of the heel where the tendon inserts to the heel bone.⁶

Diagnosis and treatment should be performed by a medical doctor and massage therapists should receive clearance from the client's doctor before performing bodywork. In most cases treatment is nonsurgical and can include RICE, nonsteroidal anti-inflammatory medication, exercise/physical therapy, cortisone injection and supportive shoes/orthotics. It may take several months for symptoms to subside (with early treatment as long as three months). If pain does not improve after six months surgery may be recommended.⁶

Following my personal experience with calcaneal tendinitis I benefited, under the care of a doctor of physical therapy, from a mix of soft tissue work, manual ankle gliding drills and electric stimulation.⁴

Sources

¹ <http://teachmeanatomy.info/lower-limb/joints/the-ankle-joint/>

² <http://www.jj-fit.com/blog/2015/11/6/unjam-your-bodys-highway-from-the-foot-up>

³ http://www.sportsci.org/encyc/drafts/Ankle_acute_injuries/ankacuinj.html

⁴ <https://www.youtube.com/watch?v=WvVPKAFhxdU&feature=youtu.be>

⁵ https://en.wikipedia.org/wiki/Achilles_tendinitis

⁶ <http://orthoinfo.aaos.org/topic.cfm?topic=a00147>