

Chronic Ankle Instability

OVERVIEW

Chronic ankle instability is a pathology that affects all age groups. This multifactorial condition can be debilitating for active individuals and athletes, but can also severely limit activities of more sedentary persons. The pathology typically involves the lateral ankle, and can occur to varying degrees of severity. An attempt at non-surgical management of these injuries should always be made. For those that fail, surgical management via anatomic and non-anatomic repair has very good results.

ANATOMY

There are both dynamic and static stabilizers of the lateral ankle. Excluding the bony stability offered by the tibiotalar joint, the static stabilizers consist of the anterior talofibular ligament (ATFL), the calcaneofibular ligament (CFL), and the posterior talofibular ligament (PTFL). The ATFL extends from the anterior-inferior border of the fibula to the lateral talar neck. The CFL runs from the tip of the fibula to the lateral calcaneal tubercle. The PTFL extends from the posterior distal fibula to the posterior lateral talar tubercle.

The primary dynamic stabilizers of the lateral ankle consist of the peroneus longus and brevis muscles and tendons. Both muscles make up the lateral compartment of the leg. The peroneus brevis muscle originates from the mid-diaphysis of the fibula and proceeds behind the distal fibula and attaches to the base of the 5th metatarsal. It functions to evert the ankle. The peroneus longus originates higher up on the fibula and proceeds alongside the peroneus brevis until it reaches the cuboid, where it crosses underneath the cuboid and proceeds across the plantar surface of the foot to attach to the lateral base of the first metatarsal. It functions to plantar flex the first ray, and evert the hindfoot. Both muscles are essential to prevent sudden inversion stresses on the ankle.

PATHOGENESIS

The major factors contributing to chronic ankle instability can be divided into two categories: mechanical and functional. Mechanical factors include pathological laxity, synovial changes in the joint, degenerative conditions affecting the hind foot and hind foot stiffness. Functional factors include impairments to proprioception, neuromuscular control of the ankle, postural control deficits and strength deficits around the ankle. Deformity at the level of the hindfoot, specifically features such as a hindfoot varus, first ray plantar flexion or midfoot cavus also plays a role in creating an environment for a chronically unstable ankle. It is important to note that chronic instability is frequently due to a combination of multiple factors.

CLINICAL PRESENTATION

Persistent pain, recurring episodes of the ankle giving way or frequent sprains are the classic findings of a chronically unstable ankle. Patients will often report that they no longer feel confident walking on uneven ground, or that they need to consistently wear an ankle stabilizing orthosis (ASO) in order to play sports or engage in activities that cause high strain on the lateral ligaments. Special attention should be paid to the mechanism causing the instability, patient's level of activity and the degree of disability their instability is causing them. It is important to also note any non-operative or operative treatment that the patient has already received.

EXAM

Physical exam findings will be subtler when compared to an acute ankle sprain. There may be some residual lateral ankle swelling, but very little compared to an acute ligament injury. Evaluation of a patient's gait will reveal some difficulty with single leg standing and toe walking on the affected side. Lateral movements will reveal significant apprehension on the part of the patient. Both the normal and symptomatic ankles should be compared. The amount of anterior displacement of the ankle when compared to the asymptomatic side will be greater. To adequately test this movement, the hindfoot should be in neutral, which will force the ATFL to act as the primary restraint to anterior translation. Patients will often present with excessive inversion of the ankle as well, signaling a deficiency in the CFL. To test this, inversion of the ankle with the foot in dorsiflexion should be performed.

IMAGING STUDIES

For chronic injuries, inversion stress radiographs may sometimes reveal subluxation of the tibiotalar joint. Magnetic resonance imaging can be useful to demonstrate associated causes of ankle pain like chondral injuries, bone bruising, stress fractures or associated tendon tears. A chronically disrupted ligament on magnetic resonance imaging will appear thickened, lax, wavy, or discontinuous. Sometimes it will be completely non-visualized.

TREATMENT

Initial treatment of the chronically unstable ankle should include a structured functional rehabilitation program and associated external splinting (ASO). Such a program is more likely to help patients with functional instability than mechanical instability. For those who have mechanical instability and have failed rehabilitation, surgical treatment is beneficial. Surgery can consist of anatomic reconstruction or tenodesis stabilization.

Anatomic repair is aimed at restoring normal ligament anatomy and mechanics while maintaining subtalar and ankle motion. The Brostrom is the mainstay of anatomic repair techniques and involves imbrication or shortening of the ATFL and CFL and reattachment to the fibula in their anatomic locations.

Depending on the condition of the ligaments, anatomic repair is not always feasible. The ligaments are often attenuated or completely deficient and require supplementation or non-anatomic reconstruction. There are many techniques for non-anatomic reconstruction, the oldest involves the split peroneus brevis graft that is weaved through the calcaneus and talus, thereby attempting to recreate the function of both the ATFL and CFL. This technique was later modified to attach the graft through an oblique posterior-superior drill hole in the fibula. This latter method is used frequently to augment the Brostrom repair. When performing a non-anatomic repair, care should be taken to protect the sural nerve and be mindful of excessive trauma to the skin, as wound complications are more frequent in the non-anatomic repair group.

CONCLUSION

Chronic instability can be a debilitating condition that can severely limit athletic and recreational activities in many age groups. For those that have failed non-operative treatment, surgical reconstruction is a highly successful method of dealing with this problem. More recent use of allograft tendons and suture based augmentation devices is currently being investigated as an alternative to current non-anatomic techniques and as an augment for anatomic techniques that will allow for earlier functional rehabilitation post-operatively. The use of ankle arthroscopy to perform ligament repair, as well as an adjunct therapeutic tool for associated intraarticular pathology that is associated with chronic instability is also under study.

Written by Sourendra Raut, MD
Reviewed by John Early, MD
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