Ankle Instability

Summary

Ankle instability is caused by injury to the lateral [outside] ankle ligaments. This usually causes strain or stretch, and in more severe forms, causes a sprain or tear in the ligaments. This can lead to a sense of instability (giving out) in the ankle and predispose the patient to get frequent ankle sprains even with minor trauma or twist. Often, patients with ankle instability can be treated without surgery by strengthening the muscles that control the ankle joint, avoiding high-risk activities and using a supportive brace or shoe to decrease the risk of recurrent ankle sprains. In some patients, non-operative treatment is not successful and surgery is required to either tighten up the ligaments supporting the outside of the ankle, or to reconstruct these ligaments using a tendon graft.

Clinical Presentation

Patients with ankle instability relate either a history of multiple ankle sprains or a sense of instability – often both of these. They report a sense of their ankle rolling inwards more easily. They may also give a history of multiple prior ankle sprains. Things that make people at higher risk for suffering an ankle sprain include:

- A history of previous significant ankle sprains
- Hindfoot varus alignment where the heel position slopes inward towards the midline
- Generalized ligamentous laxity (loose ligaments)
- Participation in high-risk activities (ex. basketball and volleyball. etc.)

The defining symptom of ankle instability is the instability itself. However, pain is commonly present. Any complaints of associated chronic pain demand the treating physician identify its source. Pain can originate from sources inside the ankle joint [intra-articular] or outside of the ankle joint [extra-articular]. Common sources of pain originating from inside the ankle joint include talar osteochondral injuries/lesions, impinging bone spurs, and ankle arthritis. Common sources of pain originating outside of the ankle joint include peroneal tendonitis, and irritation to the restraining lateral ligaments of the ankle joint. Even though the ligaments are on the outside of the ankle, patients with instability may experience pain on the inside of the ankle as well due to the altered ankle mechanics.

Pure ankle instability (i.e. a floppy loose ankle) needs to be differentiated from “functional ankle instability”. Functional ankle instability is defined as the sensation that an individual ankle is unstable when in fact the ankle joint itself is still stable. Commonly with functional ankle instability, patients place their ankle in a certain position or load it in a certain way they will experience a pain (often sharp) that gives them a sensation that their ankle is loose. This can be caused by a problem inside the ankle joint such as a talar osteochondral lesion, ankle impingement, or ankle arthritis. It is important to identify whether a patient has true ankle instability (a loose floppy ankle) or functional ankle instability because the treatment is often different. Treatment of true ankle instability is focused on reconstructing the ligaments on the lateral side of the ankle, whereas treatment of functional ankle instability is focused more on identifying and eradicating (or controlling) the source of pain.

Relevant Ankle Anatomy

Patients with true ankle instability have stretching out or even complete incompetence of some or all of the ligaments on the outside of the ankle joint. The two main ligaments in questions are the anterior talofibular ligament (ATFL) and the calcaneofibular ligament (CFL). The incompetence of these ligaments can lead to looseness (increased opening) of the ankle joint and/or the subtalar joint.

Physical Examination

Physical examination starts with gait and hindfoot assessment. It is not uncommon for patients to have the back part of the foot curving inwards (hindfoot varus), whereby the alignment of the heel slopes towards the midline of the body. The patient is likely to demonstrate increased inversion laxity. There may also be a positive anterior drawer test. A lateral stress test of the ankle may also be positive. These tests are done in comparison to the opposite ankle. If the patient does complain of chronic pain, this should be localized by palpation. This can help narrow the diagnosis based on the anatomical structures in this area.

Imaging Studies

X-rays are the starting point for evaluation of ankle instability. Weight-bearing ankle x-rays should be performed to assess the ankle joint itself. The ankle joint mortise should be symmetrical.

Stress x-rays are also often taken in patients with suspected ankle instability. By stressing the heel towards the midline while x-ray or fluoroscopic image is taken, a sense is gained of how much the outside part of the ankle joint opens up. This should be compared to the opposite ankle. This will also help differentiate whether instability is originating from the ankle joint or the subtalar joint, or both.

MRIs do not diagnose instability. Ankle Instability is a clinical diagnosis based on history, exam and possible stress radiographs. However, in patients with chronic pain, an MRI may be indicated. MRI is a sensitive test that usually identifies intra-articular abnormality, such as a talar osteochondral injury, or extra-articular sources of pain, such as tendonitis or scarring of the restraining ligaments. It should be noted that scarring of the anterior talofibular ligament (ATFL) is a common, almost universal finding of most MRIs of the hindfoot, regardless of whether patients have ankle instability or not.

Treatment

A history of multiple ankle sprains is one of the most common presentations of ankle instability. If the patient has recently had an ankle sprain, it should be treated as any normal ankle sprain would be.

Non-Operative Treatment

For chronic ankle instability, a combination of the following treatments is often successful at relieving symptoms and minimizing the risk of recurrent ankle sprains:

Therapy to strengthen the muscles surrounding the ankle joint: These include exercises to strengthen the muscles that evert and invert the ankle, particularly the everting muscles that allow the ankle to resist inversion, including the peroneus longus and peroneus brevis

Therapy to improve ankle proprioception. or brain ankle coordination: Aggressive therapy to improve proprioception should also be performed. Exercises such as standing on one foot with the eyes closed and later on a soft surface with the eyes closed can be very helpful in improving proprioception

Evaluation and treatment by a physical therapist: The patient may benefit from strengthening and proprioception training under the guidance of a trained physical therapist.

Prophylactic splinting of the ankle: Prophylactic ankle splinting with the use of an ankle stirrup, ankle lacer, or ankle taping, can be very helpful in patients who are participating in high-risk activities.

With appropriate rehabilitation, including strengthening and proprioception training as well as splinting or bracing as required, most patients with ankle instability can be treated non-operatively.

Operative Treatment

Surgery is usually reserved for patients who failed non-operative management, and their symptoms are not adequately controlled with non-operative management. In addition, patients with significant intra-articular pathology, such as a talar OCL that are noted on clinical or intraoperative examination to have gross ankle instability, will benefit from stabilization of the attenuated lateral ligamentous structures.

Anatomical repair of the outside (lateral) ankle ligaments is one common means of surgically stabilizing the ankle operatively. This procedure, called the Broström procedure, involves cutting the stretched out ligaments (anterior talofibular ligament or ATFL and calcaneofibular ligament or CFL) on the outside of the ankle and repairing them in a tightened position.

Another operative treatment is a tendon reconstruction of the lateral ankle ligaments. This more complex procedure involves reinforcing the stretched out ligaments by weaving a tendon graft through bones in the outside of the ankle to provide additional support to this area. While many techniques for a free tendon graft have been described, it's often preferable to replicate the normal anatomic alignment of the lateral ligaments to minimize any alteration of normal ankle mechanics.

A closing calcaneal osteotomy may be required to realign the hindfoot in both patients that fail an initial attempt at reconstructing the unstable ankle, or patients with marked inward (varus) hindfoot alignment. This is typically done using a closing wedge calcaneal osteotomy. This procedure involves cutting the heel bone on the outside of the heel bone and correcting the alignment. The bone cut is then stabilized with a screw.

Properly performed ankle reconstruction surgery has a very high success rate in treating ankle instability. Failure can occur if a Brostrom procedure is done when the ligaments are grossly deficient or if mechanical abnormalities (ex. high arched foot) are left uncorrected. Despite a successful surgery, patients pursuing high risk activities may still re-sprain their ankle.