Lateral Ligament Instability

OVERVIEW

Lateral ligament instability is one of the most common conditions affecting the ankle. Both acute sprains and chronic instability can lead to pain and dysfunction affecting both daily and recreational activities. Most cases of lateral ligament injury or instability can be treated conservatively. Surgical repair or reconstruction is reserved for patients who fail conservative measures. Various treatment options exist including direct repair or reconstructions employing autograft or allograft techniques.

ANATOMY

The lateral ligament complex is comprised of the anterior talofibular ligament (ATFL), the calcaneofibular ligament (CFL) and the posterior talofibular ligament (PTFL). The talocalcaneal ligaments provide stability to the subtalar articulation, which can be a component of lateral ankle instability. The ATFL in certain cases can present as a double-banded ligament with superior and inferior bands. The ATFL originates along the anterior colliculus of the lateral malleolus and blends with the anterolateral joint capsule, inserting anterior to the lateral talar articular facet. The CFL originates from the anteroinferior aspect of the anterior colliculus and inserts posterior and superior to the peroneal tubercle on the lateral calcaneal wall, crossing both the ankle and subtalar articulations. The PTFL is the largest and strongest of the three ligaments and originates from the posteromedial aspect of the lateral malleolus and inserts adjacent to the posterolateral talar tubercle.

BIOMECHANICS

The lateral ligament complex acts to resist varus stress as well as anterior and posterior translation of the talus within the ankle mortise. They serve as static stabilizers. In particular, anterior talar translation is resisted by the ATFL while talar tilt and internal rotation are limited by the CFL. The PTFL aids in controlling posterior talar translation within the ankle mortise. Subtalar laxity can also contribute to lateral ankle instability. Stability of

the subtalar joint is conferred by the stout talocalcaneal ligaments, of which the cervical ligament is the most important with respect to surgical reconstruction.

PATHOGENESIS

Lateral ligament instability can result from either an acute injury or more commonly from chronic repetitive stress that alters the mechanical properties of the static stabilizers. Pathologic elongation of the lateral ligament complex occurs that reduces the ability of the ligamentous complex to maintain stability of the ankle. Once injured, the ligaments heal in an elongated position that can lead to plastic deformation, further reducing the ability to provide restraint. Most commonly, the ATFL and CFL are affected with respect to chronic instability with involvement of the PTFL occurring infrequently.

CLINICAL PRESENTATION

Patients with lateral ankle instability can present either acutely or chronically. Acute injury in the form of a lateral ankle sprain is one of the most common orthopaedic injuries encountered. Swelling, diminished range of motion, difficulty ambulating and tenderness over the lateral ligament complex are encountered. With respect to chronic instability, patients may give a history of repetitive sprains or will use a brace for recreational endeavors. Patients may demonstrate apprehension with particular situations such as uneven terrain that can induce instability. It is also important to assess for malalignment (in particular varus alignment of the heel or a plantar-flexed first ray) that can contribute to subtle instability.

EXAM

Examination of the patient with lateral ankle instability should commence with inspection for areas of swelling, ecchymosis, and deformity if present. Tenderness to palpation directly over the lateral ligament complex should be assessed. Laxity of the ATFL is assessed via an anterior drawer test in which the examiner stabilizes the anterior tibia with one hand and with the other hand grasping the heel, anteriorly translates the talus on the tibia. A comparison should be made with the contralateral side. In cases of instability, a soft endpoint will be encountered or a greater degree of translation in comparison to the contralateral side. Laxity of the CFL is assessed with the talar tilt examination. Again, one hand is utilized

to grasp the anterior tibia, while the other grasps the heel and forcibly inverts and internally rotates the foot. A comparison to the other side should be performed. Patients will often exhibit laxity and pain. Most authors recommend flexing the knee during the exam. It is important to differentiate lateral ligament instability from syndesmotic instability that presents with pain directly over the syndesmosis, pain with a syndesmotic squeeze test or external rotation stress testing. The posterolateral ankle should be evaluated to assess for peroneal instability or tears.

As stated previously, the alignment of the extremity should be evaluated and compared with the contralateral side. Hindfoot varus, plantar flexed first ray or a cavus arch can contribute to lateral ankle instability and will need to be considered to develop an appropriate treatment plan. Strength and range of motion of the knee, ankle, hindfoot, midfoot and forefoot will also have to be evaluated. Neuromuscular imbalance can also be an important contributor to ankle instability.

STAGES

Stages of ankle instability are graded based upon the degree of injury to the lateral ligament complex.

- **Stage 1**-ATFL involvement, characterized by microscopic tears and mild pain with ambulation.
- **Stage 2**-ATFL involvement predominantly, with CFL injury encountered in certain cases. A greater degree of tearing is noted in comparison to stage 1 injuries. Moderate pain is encountered with ambulation.
- **Stage 3**-ATFL and CFL involvement with complete disruption of both ligaments and gross laxity noted on examination. Patients are typically unable to ambulate.

IMAGING STUDIES

Imaging initially begins with a weight-bearing examination of the foot and ankle if the patient is able to stand. AP, lateral and mortise radiographs should be obtained. If there is pain within the foot as well in the acute setting, a dedicated foot series should be obtained to evaluate for additional injury (such as fifth metatarsal injuries). In cases of chronic instability, a hindfoot alignment view should be obtained in cases with malalignment. Stress radiographs are also helpful in assessing the degree of laxity and can assist in surgical planning. An MRI should also be obtained in patients who fail to improve following an initial

instability event or in cases of chronic instability to evaluate for additional pathology such as an OCD lesion, peroneal tendon pathology or anterolateral soft-tissue impingement. Causes for residual pain in the setting of acute or chronic instability can include an osteochondral defect (talar or tibial), peroneal tendon tear, syndesmotic instability, synovitis or tarsal coalition.

TREATMENT

The majority of patients with lateral ankle instability can be treated with a period of immobilization in the acute setting followed by functional rehabilitation and a gradual return to activity. The severity of the initial injury will dictate the timetable for return to activity. In general, grade 1 and 2 sprains can return to sports/activity within 2-4 weeks while those with grade 3 sprains will take longer – sometimes as long as 4-8 weeks. In cases of chronic instability in the absence of overt surgical pathology, conservative measures such as physical therapy and bracing during physical activity can be helpful.

Surgical treatment is reserved for those individuals in the acute and chronic setting who fail to improve with conservative measures. In cases where there is no significant laxity, obesity or failed prior surgical procedure, a direct repair (Brostrom) of the ATFL and CFL can be performed with use of the inferior extensor retinaculum (Gould modification) for additional stability. Historically, in cases of significant laxity or prior failed repair, non-anatomic reconstructions such as the Evans or Crisman-Snook procedure have been employed. However, they can pathologically restrict motion of the ankle and subtalar joint and are not frequently employed. Current surgical treatment in cases of chronic instability relies on anatomic free tendon reconstructions employing either hamstring autograft or allograft.

In cases of misalignment, additional surgical procedures should be considered such as a lateralizing calcaneal or Dwyer type osteotomy or dorsiflexion osteotomy of the first ray depending upon the pathology present. In cases of chronic lateral instability, intra-articular pathology is also frequently encountered which can be addressed arthroscopically.

CONCLUSION

Lateral ankle instability is a commonly encountered condition that often responds well to conservative measures. Surgical intervention is reserved for those who fail nonoperative

treatment. Surgical treatment is tailored to the individual depending upon the nature of the instability (acute or chronic) and the presence of additional pathology encountered.

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