CHAPTER **9**

EVALUATION AND TREATMENT OF PERSISTENT ANKLE PAIN IN THE ATHLETE

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INTRODUCTION

Ankle injuries in the athlete are not uncommon. Ankle injures make up 15% of all sports injuries, with sprains representing 75% of those cases.[1] Typically, the injury is treated conservatively, and in a healthy population, the individual will move on in a relatively short amount of time to continue with activities at a pre-injury level without complication. However, in the small percentage that do not progress to pre-injury status, correct diagnosis with appropriate treatment can be difficult to execute. Frustration will frequently be felt by not only the patient, but also the treating physician.

Many questions arise in the physician's mind when the athlete has sustained discomfort beyond the expected course of pain. The authors will discuss specific injuries separately, although multiple injuries may occur at any one time. We will discuss current literature on this difficult topic and provide experiences and insight from the viewpoint of the senior author.

CHRONIC ANKLE INSTABILITY

Approximately 10-20% of patents with severe ankle sprains will subsequently develop symptomatic chronic instability.[2] Lateral ankle instability can be described as either mechanical or functional. Mechanical instability constitutes range of motion beyond normal physiologic function due to structural abnormality in the ankle ligaments. Functional ankle instability can be characterized by recurrent ankle sprains with loss of proprioception while not necessarily exceeding the normal range of motion.[3]

The patient with functional chronic ankle instability will relate a sense of "giving way" and uncertainty about ambulation, especially on uneven surfaces. The ankle will usually be painful only after an instability episode.[3]

Physical examination can reveal several clues as to the cause of instability. Standing evaluation may elucidate malalignment such as hindfoot varus or forefoot valgus that can be a cause of recurrent sprains. Generalized hypermobility from familial disorders such as Marfan or Ehler-Danlos syndrome should be ruled out.[4]

Routine radiographs of the ankle should rule out osseous deformity, while stress views can show anterior talofibular ligament or calcaneofibular ligament insufficiency. Bilateral examination may be helpful and often necessary. Morphologic characteristics of the foot should be assessed. A cavus foot, plantarflexed first ray, or calcaneal varus can lead to chronically recurring ankle sprains. In these cases, the anatomic variant may have to be addressed with custom orthoses or surgery before the patient can be cured of any ligamentous instability.

Patients with chronic mechanical ankle instability still cause a good deal of controversy regarding the best treatment. Treatment goals should include functional rehabilitation for acute ankle sprain or ligament rupture. Functional instability is treated with a structured physical therapy program focused on proprioceptive-based rehabilitation of the ankle. Mechanical instability is treated with at least 6 weeks of active muscle strengthening focusing on the peroneal musculature to increase dynamic ankle stability.[4-6]

Operative treatment is indicated with persistent instability after nonoperative treatment has been tried. More than 70 different operative procedures have been described for the treatment of chronic lateral ankle instability.[4] These procedures, in essence, focus on anatomic repair or tenodesis procedures to restrict ankle motion without repair of the ligaments of the ankle.

Many studies show no difference in outcomes when comparing operative to nonoperative treatment.[4,7] In 2007, The Cochrane Database review of interventions for treating chronic ankle instability found a low quality of most studies and found no sufficient evidence to support any specific surgical or conservative intervention for chronic ankle instability. The only conclusion found was after surgical reconstruction early functional rehabilitation was shown to be superior to 6 weeks immobilization regarding return to work and sports activities.

IMPINGEMENT SYNDROMES

Altered ankle joint mechanics result in impingement syndromes that are osseous or soft tissue in nature located at the anterior, anterolateral, or posterior ankle joint. The distal fascicle of the anterior inferior tibiofibular ligament has been well studied and is often blamed for the cause of an impingement syndrome, although its presence and also the contact with the anterolateral talus is probably a normal finding.[8]

Soft tissue impingement of the ankle is a common cause of chronic ankle pain that usually arises at the lateral or anterolateral compartment of the ankle joint following an inversion injury.[9] It appears that 3 types of ankle soft tissue impingement lesions are present: the distal fascicle of the anterior inferior tibiofibular ligament, the meniscoid lesion, and synovitis.[8,9]

Generally, athletes whose sports involve sudden acceleration, jumping, and extremes of dorsiflexion or plantar flexion are prone to this injury. It will be difficult to distinguish the source of pain in athletes with both instability and impingement. Patients with an impingement syndrome should have a stable ankle, normal plain films, and isolated point tenderness on the anterolateral aspect of the talar dome and in the anteroinferior tibiofibular ligament. A popping sensation and aggravation of pain with dorsiflexion and eversion can be noted. On examination, pain will be present on palpation at the anteromedial and/or anterolateral ankle joint. Some swelling or limitations of dorsiflexion may be present.

Conservative treatment after an inversion sprain of the ankle should be attempted for at least 6 months before surgical intervention is considered. These treatments include immobilization, bracing, icing, anti-inflammatory medications, and physical therapy modalities. In the review by van den Bekerom, only 3 studies were found to have looked at the results of surgical treatment, with 35/37 achieving good to excellent results with arthroscopy or arthrotomy.[8]

SYNDESMOTIC INJURY

"High ankle sprains" or ankle syndesmosis sprains have been reported to represent from 1-11% of ankle sprains.[10] Mechanism of injury is due to external rotation of the talus in the ankle mortise, thereby putting an external stress on the fibula and its ligamentous attachments to the tibia that form the ankle syndesmosis.

Diagnosis of a syndesmotic sprain is accomplished clinically, although there is no study demonstrating one specific test is predictive of the severity of a syndesmosis sprain.[10] The squeeze test, the external rotation test, Cotton test, and the fibula-translation test have been described.[10] Imaging modalities can be helpful and should begin with plain radiographs to rule out ankle fracture or diastasis of the syndesmosis. Further imaging studies include stress radiography, magnetic resonance imaging (MRI), and arthroscopy. Arthroscopy has been found to be the most useful diagnostic tool compared with MRI and plain radiography to diagnose a syndesmotic tear.[11,12]

The amount of time lost from pre-injury activity varies wildly with a range from 0 to 137 days,[10] reflecting both the variation in severity and difficulty with diagnosis. The treatment goals should try to reflect the severity of injury. Generally, if a widened mortise is present, surgical correction is indicated. With most sprains, the mortise remains intact, even with stressed external rotation. Conservative treatment includes removal from activity, immobilization, ice, and physical therapy modalities usually lasting 2-6 weeks. Once the patient becomes pain-free, activity is gradually increased.

OSTEOCHONDRAL INJURIES

Osteochondral lesions in the ankle are defects of the cartilaginous surface and underlying bone in the talar dome or tibial plafond. The rate of chondral injury in patients with lateral ligament injuries and unstable ankles has been reported to be as high as 89% in acutely injured ankles and 95% in chronically injured ankles.[13]

Diagnosis can often be made on history alone. A high clinical suspicion must be present in patients suffering from chronic pain after an acute ankle injury with patients complaining of a "clicking" or "catching" sensation during activity. Pain may not be localized to a specific location, or there may be pinpoint tenderness. Conventional MRI may not be reliable, although the presence of subchondral edema should raise suspicion of a cartilage lesion. Arthroscopy can be considered early after injury if the athlete presents with exertional ankle pain, effusion, and joint line tenderness on palpation.[11]

Joint cartilage has a poor reparative capability; therefore conservative therapy is rarely indicated. Surgical treatment should be geared toward the severity of injury once an accurate diagnosis has been made.

PERONEAL TENDON INJURY

Injuries to the peroneal tendons may be yet another cause of lateral ankle pain. Given the geographic proximity to other lateral ankle components, accurate diagnosis can be

difficult and the true incidence of this injury is most certainly unknown.

Anatomic variations have been linked to acute or chronic peroneal injury caused by the presence of peroneus quartus muscle, low-lying peroneus brevis muscle belly, a shallow posterior fibular groove, or a high-arch foot type.[14] Mechanisms of injury can include inversion ankle sprains, chronic ankle ligamentous laxity, and peroneal subluxation.

Diagnosis of this injury can be difficult because the patient may not recall a significant traumatic event. Pain on palpation of the peroneal tendons with edema and erythema are the most consistent findings clinically, whereas pain on inversion/eversion is less common.[14,15]

Imaging studies should include standard radiographs of the foot and ankle complex. MRI can aid in diagnosis and surgical planning, but can not be considered reliable on its own as a diagnostic tool. It has been shown to be 83% sensitive and 75% specific for predicting peroneus brevis tears when compared with intra-operative findings.[14-16]

Peroneal tendon injuries are resistant to nonsurgical therapy and surgical intervention are often required.[14-16] In Dombek's study, all 40 patients failed conservative therapy, while they found surgical treatment to be quite successful. In a prospective study by Saxena and Cassidy, 14 of 16 athletes were able to return to pre-injury activity with surgical intervention. Also in their study, 20% of patients had a concomitant ankle stabilization procedure underscoring the multi-faceted approach that must be taken when dealing with these injuries.

SINUS TARSI SYNDROME

Sinus tarsi syndrome is thought of as a painful condition of the sinus tarsi that often responds to corticosteroid injection and is associated with a feeling of instability in the hindfoot. Despite references in the literature, there seems to be no agreement on the history, clinical tests, or imaging studies that could help in confirming the diagnosis or establishing the etiology. Some authors relate the clinical condition of sinus tarsi syndrome with instability of the subtalar joint.[17] Dellon describes this condition as a traumatic neuroma of the branches of the deep peroneal nerve that innervate the sinus tarsi.[18] According to Dellon, diagnostic nerve blocks demonstrate relief of the symptoms, and this pain can be surgically treated by resection of the appropriate branch of the deep peroneal nerve and concluded that denervation of the sinus tarsi can relieve recalcitrant pain emanating from the sinus tarsi.[18]

Histologic studies have shown evidence of a possible role for nerve endings in the sinus tarsi that can contribute to feelings of pain and instability. Akiyama et al suggested the sinus tarsi is not only a joint space, but a source of nociceptive and proprioceptive information on the movement of the foot and ankle complex.[19]

Diagnosis is based clinically, with pain in the sinus tarsi during supination or pronation, pain during walking, and the feeling of "giving way" without signs of a structural instability. Injection of a steroid and local anesthetic into the tarsal sinus or tarsal canal will relieve the pain if the underlying pathology is sinus tarsi syndrome.[20]

PREVENTION OF INJURY

Perhaps the best way to manage these complicated injuries is to stop them from happening at all. Education stressing strength and conditioning exercises have been proven effective in prevention of injury. A basketball-specific balance training program with a wobble board was effective in reducing acute-onset injuries in high school basketball. A trend was also relevant toward reduction of all lower extremity injuries.[21] These results are supported by similar findings in other studies.[22-24]

In order to prevent chronic ankle pathology after acute injury, therapy should focus on restoring proprioception, ankle inversion-eversion weakness and peroneal latency. Early functional treatment is favored over immobilization for the treatment of acute lateral ankle sprains, while lace-up ankle braces appear to be the most effective in the subacute period after a sprain.[25] Bracing has also been shown to be more effective in decreasing the frequency and severity of instability episodes in athletes.[8,26,27]

CONCLUSION

Ankle injuries in the athlete are quite common and the mind frame of "just an ankle sprain" should be avoided. Vigilant physical examination with a thorough knowledge of anatomy and etiology will guide the physician to accurate diagnosis with a successful treatment plan. Prevention strategies can be employed, especially in team sports.

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