ORTHOSPORTS

QUESTION FOR PHYSIOTHERAPISTS

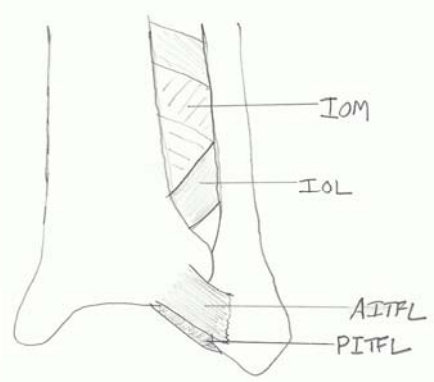
QUESTION | I HAVE A PATIENT, MALE AGE 41, WHO SPRAINED HIS (L) ANKLE PLAYING SQUASH. HE ROLLED THE ANKLE AND EXPERIENCED PAIN IMMEDIATELY AND WAS UNABLE TO WALK. XR REVEALED "PRESENCE OF # THROUGH THE DISTAL CALCANEUS WITH AN AVULSION OF THE CALCANEOFIBULAR LIGAMENT. INCREASE DISTANCE B/W THE CALCANEUS AND TIBIA WITH IRREGULARITY ALONG THE INTEROSSEOUS MEMBRANE SUGGESTIVE OF AN INTEROSSEOUS MEMBRANE STRAIN. THERE IS ALSO EVIDENCE OF CALCANEAL NAVICULAR COALITION WITH OSSEOUS FRAGMENT NOTED AT THE ANTERIOR TIP OF THE CALCANEUS. I REVIEWED HIM 1/52 POST INJURY AND HE WAS FWB WEARING AIRCAST; REVIEW TODAY REVEALED LESS BUT STILL PAIN ON MOST ACTIVITIES.

QUESTIONS ARE: IS THIS THE BEST MX? 6/52 IN AIR CAST THEN REMOVE? THEN STRENGTHEN? HE IS AN ELECTRICIAN WHO WORKS IN A FACTORY WEARING STEEL CAP BOOTS AND THUS IS UNABLE TO RTW UNTIL OUT OF BRACE. I WOULD APPRECIATE YOUR ADVICE REGARDING MX AS I AM CONCERNED ABOUT THIS PATIENT AND WISH TO ENSURE I AM ON THE RIGHT PATH.

ANSWER | When a patient presents to a physiotherapist with an acute ankle sprain, one must keep in mind that the precise diagnosis is paramount to provide the patient with the most appropriate treatment. The "ankle sprain" really refers to the injury caused by a twisting force to the ankle. The initial task for the examiner is to gather enough information to decide what ligament, bone, or tendon, has been damaged and whether this has resulted in a stable or unstable ankle. Information is obtained from the history or mechanism of injury, physical examination, and investigations**.** Once a proper diagnosis is obtained, the patient can be started on the appropriate treatment.

In the example described by the patient, the presentation gives clues to the possible injuries. Fractures of the calcaneus associated with an ankle sprain are usually the result of a traction force from a ligament. For instance, Anterior process calcaneal fractures occur from traction on the bifurcate ligament. These are often small and can be treated non-operatively. An immobilizing boot or brace can be worn and the patient allowed to bear weight immediately as comfort allows. Progression out of the boot or brace and on to strength, proprioception and return to sport follows whenever symptoms allow.

The concerning part of the history reported lies in the possibility of an interosseous membrane strain. Damage to this structure indicates a syndesmosis sprain, a potential devastating injury with a prolonged recovery and possible need for surgery to prevent arthritis. A keen suspicion and understanding of this more serious injury is crucial to be able to identify it early and direct the patient to the most appropriate treatment, whether nonoperative or with surgery.



The syndesmosis consists of the ligamentous structures that connect the distal tibia to the fibula and keep the fibula in the incisura fibularis. These structures include the Anterior Inferior Tib-Fib ligament (AITFL), the Posterior Inferior Tib-Fib ligament (PITFL), Interosseous Ligament (IOL) and the interosseous membrane (IOM).

A rupture of these structures, even without fracture of the fibula, can result in instability between the tibia and fibula and allow lateral movement of the talus. Studies have shown that with as little as 1mm of lateral displacement of the fibular, the tibiotalar contact area available for weight bearing is reduced by 42%. A lack of anatomic reduction of the syndesmosis can result in increased stresses across the joint, resulting in early degeneration or arthritis.

Suspicion for the syndesmosis sprain and subsequent need for specific investigations begins with the physical examination. While a history of an external rotation injury to the foot describes the classic mechanism that leads to a syndesmosis sprain, patients are often unable to describe what exactly happened to the ankle. Therefore, palpation of the injured structures will help to give clues to the diagnosis. Tests specific to the syndesmosis injury include the following:

Tib-Fib Squeeze test: The hands are clasped around the mid-calf level of the leg, and the tibia and fibular are compressed together. Pain elicited more distally at the ankle indicates a syndesmosis rupture.

External rotation stress test: the leg is stabilized, and with the other hand an external rotation force is applied to the ankle. This motion places the syndesmosis under stress and results in pain when these structures are injured.

Syndesmosis Tenderness length: The syndesmosis is palpated from the ankle joint more proximally. Pain along the syndesmosis indicates injury to the ligaments. A study has shown that the longer the length of tenderness along the tib/fib region, the greater then severity of injury and the longer the recovery.

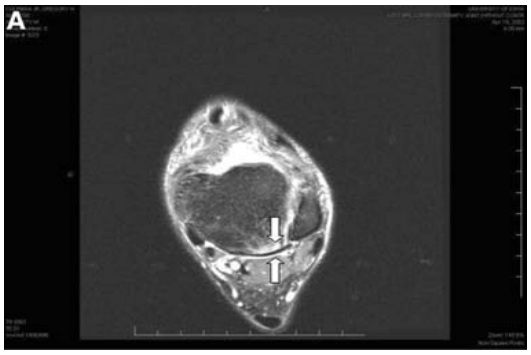
Syndesmosis sprains can be classified into three grades. This classification illustrates the severity of the injury and helps to dictate treatment.

Grade I: Stable syndesmosis sprain, even with dynamic stress to the joint. These sprains can be treated non-operatively. Patients should be counseled that they might have a prolonged recovery. A West Point study reported the average recovery time of 43 days in these stable sprains.

Grade II: Dynamic instability. Static radiographs may appear anatomic, but stress views, or arthroscopic assessment reveals an unstable joint. Treatment of these grade II injuries is controversial, and may range of nonweightbearing immobilisation to surgery.

Grade III: Static instability. Radiographs reveal gross instability, even without stress to the joint. These injuries require immediate surgery to stabilize the syndesmosis.

With the above classification in mind, initial investigation for a syndesmosis injury begins with a weight bearing oblique or “mortise” view of the ankle and of the opposite ankle for comparison. Instability can be determined by assessing the tib/fib overlap and the medial clear space. A grade I or II may look normal on these x-rays, while a grade III injury will show clear signs of instability.



An MRI indicating PITFL rupture (arrows)

In my opinion, an x-ray alone will not help to differentiate a grade I from a grade II injury. Therefore, with any patient that I am suspicious of a syndesmosis sprain, I will obtain an urgent MRI to assess the ligaments and anatomic alignment of the tibia and fibula.

Any patient with tears of the AITFL and PITFL ligaments requires further assessment arthroscopically. Under anaesthesia, with arthroscopic visualization of the syndesmosis, the tib/fib space can be stressed to assess for instability. If there are clear signs of instability, then my preference is to stabilize the joint with fixation consisting of screws and/or sutures. Fixation remains for three months and is then removed to allow more normal physiologic movement at the joint after the ligaments heal.

In summary:

- One must be able to differentiate a syndesmosis injury from the more benign low ankle sprain, as these injuries may require urgent surgical treatment.
- Physical examination findings will give clues to this injury and prompt the examiner to order further studies.
- While a weight bearing x-ray helps to demonstrate grade III injury, an MRI is often needed to differentiate grade I and grade II injuries. When there is still question as to stability, an arthroscopic assessment is necessary to assess for instability and the need for fixation.

References:

1. Williams GN, Jones MH, Annunziato A. Syndesmotic Ankle Sprains in Athletes. Am J Sports Med 2007 35:1197.
   This article gives a comprehensive overview of the syndesmotic ankle sprain in athletes, current diagnosis and treatment.
2. Sankey RA, Brooks JH, et al. The Epidemiology of Ankle Injuries in Professional Rugby Union Players. Am J Sports Med 2008 36:2415.
   This article discusses the epidemiology of ankle injuries in Rugby Union players.
3. Bekerom MP, Raven EE. Current Concepts Review: Operative Techniques for Stabilizing the Distal Tibiofibular Syndesmosis. Foot Ankle Int 2007: 28:12, 1302.
   This article reviews the evidence on current fixation techniques to surgically stabilise and unstable syndesmosis injury.

Todd Gothelf
Foot, Ankle, and Shoulder Surgeon