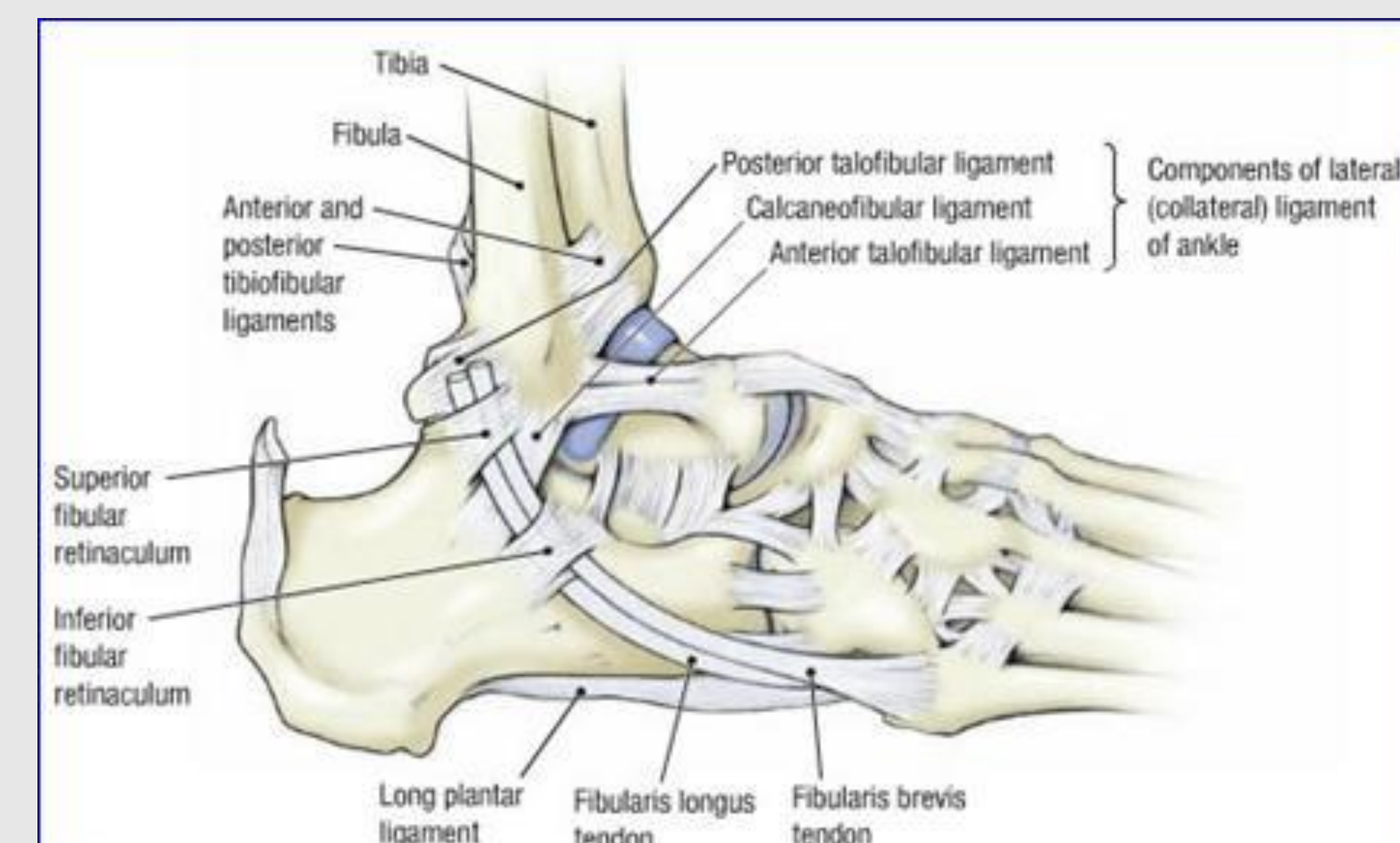


Abstract

Background: Athlete was an 18-year-old female NCAA D1 soccer player. Athlete had prior ankle sprains bilaterally with the same mechanism of injury. Athlete fell during a training session while running, rolling her ankle laterally. Pain reported on the dorsal and lateral surfaces of the ankle joint. Swelling over sinus tarsi and under lateral malleolus. Active range of motion and passive range of motion within normal limits, manual muscle testing 4/5 eversion, 4/5 dorsiflexion, 5/5 plantar flex, 5/5 inversion all with some pain during motion. She was tender to palpate over anterior talofibular ligament, the length of both peroneal brevis and longus and the lateral malleolus. Squeeze test (-), Bump Test (-), Anterior Drawer (slight laxity when compared bilaterally, possibly from previous injuries, endpoint solid with pain), Talar Tilt (Plantar flexed +, Neutral -, Dorsiflexed-), Kleigers (-). **Differential Diagnosis:** Anterior Talofibular sprain (grade 1+), Calcaneofibular Ligament sprain, Fibular Fracture. **Treatment:** Applied open basket weave lateral sprain tape job, then tested for return to play, functional cutting and passing, could not continue practice. Rest, elevate and ice for 20 minutes, applied horseshoe pad with compression ACE wrap to alleviate pain and swelling. Athlete followed a conservative protocol for the first two days of recovery consisting of ankle pumps, tracing letters, ice and E-stim application. More aggressive treatments including 4-way ankle exercises using blue thera-band resistance, Calf raises, balance exercises while on a stable and unstable surface. Ankle strength back to 5/5 6 days' post injury. Athlete follows up consistently for exercises and tape application. Lateral ankle sprains are extremely common in college athletes, specifically soccer players. According to evidence the possibility of a lateral ankle sprain reoccurring is 80% due to the instability due to muscular weakness and proprioceptive deficits caused by the injury. This case will highlight the best acute treatments to help an athlete stabilize their ankle while strengthening and treating with modalities. This case highlighted the diagnosis of a lateral ankle sprain and an athlete during her successful return to competition following strengthening protocol and additional stability application. This case further highlights how severity of ankle sprains can affect the time at which the athlete is removed from play and an increased emphasis on strengthening of the muscles around the talocrural joint.

Purpose

The purpose of this case report was to further investigate the possible injuries that may arise from a lateral ankle sprain while exploring the different modes of treatment and the possible effects they may have on the athlete. This report explored the differences of using a conservative rehabilitation protocol in comparison to an aggressive rehabilitation protocol and the different effects that they may have had on the athlete. The research also investigated the different styles of prophylactic support that can be applied to help further increase the support that the ankle has.



Introduction

Lateral ankle sprains (LAS) are one of the most common injuries occurring in sports today. Studies demonstrated that lateral ankle sprains occur in 15 to 45% of all sports related injuries (Malliaropoulos 2009). So LAS' s have a high prominence in all athletes, particularly soccer players, solely because of the constant movement, fatigue, jumping, and cutting. In fact, 66.8% of occurring soccer injuries are LAS' s. (Kofotolis 2006) Lateral ankle sprains can affect a group of anatomical structures in and around the subtalar and talocrural joint. The most common injured ligament is the Anterior Talofibular ligament which runs from the lateral malleolus to the lateral aspect of the talar neck. The other ligamentous structures that could be affected by a lateral ankle sprain would be the posterior talofibular ligament and the calcaneal fibular ligament. The difference in mechanism for each ligament is the severity of the sprain and the position of the foot during the mechanism." The ATFL is the first ligament to be damaged during a lateral ankle sprain, followed most often by the CFL" (Hertel 2001). A more serious injury that could result from a lateral ankle sprain is a "high ankle sprain" this is the tearing of the interosseous ligaments of the tibia and fibula. The mechanism for a high LAS is likely that the athlete had an extremely dorsiflexed foot/talus, and a combination of a lateral ankle sprain or twisting of the lower leg while the ankle is planted, causing the mortise to spread the tibia and fibula adding stress to the interosseous ligaments, in turn causing a sprain. The most common ankle sprains are caused by an athlete running on a semi pronated, plantar flexed foot and an inversion force causes the athletes ankle to shift laterally. Poor strength in the peroneal longus and peroneal brevis are common precursors to the injury, since the musculature helps with stabilization and everting the subtalar and talocrural joint. If these muscles fire and are not able to hold the pressure of the inversion force, a strain of that muscle will ensue along with spraining the ATFL and/or CFL if a strong enough force. The more times an athlete goes through this injury, the more likely it is to reoccur. The ligaments of that structure begin to "loosen up" in a sense, meaning they have more laxity to the motions at which they should be restricting, which leads to an increased injury rate. When an athlete has an excessive amount of lateral ankle sprains, he/she may be diagnosed with chronic ankle instability, which is when the musculature and ligaments are weak and have more laxity than normal. This makes for minimal support for the forces being applied to the joint resulting in recurrent lateral ankle sprain injuries. When an athlete injures that musculature, it affects the entire kinetic chain of the lower extremity. This is called arthogenic muscle inhibition, (Bleakly 2010) it causes a great impact on the surrounding musculature causing deficits in proprioception and balance, which creates a bigger set-back for the athlete to recover from

Background

- 18-year-old female NCAA D1 soccer player.
- Prior ankle sprains bilaterally
- Pain reported on the dorsal and lateral surfaces of the ankle joint

Clinical Evaluation

The clinical evaluation from this study proceeded as normal. Swelling present distal to lateral malleolus. Active and passive range of motion were within normal limits as compared bilaterally. Manual muscle testing resulted that the athlete had a lack of strength 4/5 in eversion, dorsiflexion, plantar flexion and inversion. During palpations she was tender to palpate over the distal lateral malleolus, anterior talofibular ligament and the length of the peroneal longus and peroneal brevis musculature. Squeeze test (-), Bump (-), Anterior Drawer (+) Slight laxity compared bilaterally possible due to previous injuries. Talar Tilt (Plantar flexed +, Neutral -, Dorsiflexed -). Assessment finished, diagnosis is a grade 1+ sprain of the Anterior Talofibular Ligament.



Differential Diagnosis

- Lateral Ankle Sprain Grade 1 ATF Sprain
- Calcanealfbular Sprain Grade 1
- Fibular Fracture

Treatment

- Immediately following injury, athlete could not continue current practice. Horseshoe pad, compression wrap and ice applied to decrease swelling and pain.
- The athletes rehabilitation consisted of an aggressive approach in order to reactivate inhibited musculature and remove fluid using musculature motion. This rehab was completed 3-4 times per week over the span of three weeks under supervision of present ATC or ATS
- Applied ultrasound at 3 Mhz, using 1.2 W/cm² for 6 min at 50% duty cycle to heat up tissue and mobilize swelling.
- During the acute stage the athlete was to complete supine ankle pumps with her foot elevated 3 x 25
- The athlete will complete four way ankle motion using theraband as a resistive motion (red theraband) 3 x 8 each direction.

Treatment Continued

- Calf Raises 3 x 15 Progress to eccentric calf raises hanging heels off step stool.
- Wobble Board 3 way 1 min each direction (DF/PF, INV/EV, CW,CCW)
- Single Leg Balance Exercises: Solid Surface Progress to Airex Pad single limb support 3 x 30 second each leg
- Massage on lower leg to decrease and swelling or spasms that could accumulate in the area.

As the athletes strength and confidence increased, increased intensity of rehab and incorporation of functional activities increased.

- Athlete will warm up with 5 min on the bike moving at a 60 rpm rate.
- Eccentric Calf Raises 3 x 25
- 4 Way Ankle exercises 3 x 12 (Black Band)
- BOSU Ball w/ Medicine Ball Squats 3 x 8
- Wobble Board 3 way 1 min each way
- Single Limb Support on Airex Pad with Distractions 3 x 1 min each leg.
- 4 Way Lunges 3 x 12
- Landing Technique 3 x 8 drops
- The athlete progressed to running on elliptical, to the treadmill, eventually leading to running on grass with soccer ball contact

Implications

Lateral ankle sprains are one of the most common injuries in sports today. It is imperative to know the reasons why they happen so often. It is also important to know multiple methods of rehabilitation for every injury due to the variety of athletes and the different ways that each person may react to a treatment plan. This case report can be used to further narrow down the different choices when determining an athletes treatment protocol.

Conclusion

The research and case report demonstrated that a more aggressive rehabilitation approach with applied prophylactic tape for practice showed to have the best effect on the athletes functional ability as well as mental toughness. Having an aggressive style rehabilitation that started in the acute stages of the injury showed to have a greater effect on returning the athlete to play quicker in comparison to using a conservative treatment.

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