

# Lateral Ankle Triad in A Collegiate Football Athlete

*Ereia Alexander, Shawn D. Felton, Kellen Shervington, Jason C. Craddock*  
*Florida Gulf Coast University, Department of Rehabilitation Sciences, Fort Myers, FL USA*

## Abstract

**Background:** This Level 4 Case Report presents an athlete that was a 19-year-old 185.42 cm and 97.52 kg) male NAIA football athlete. Athlete's prior medical history included right chronic ankle instability resulting from three severe lateral ankle sprains. Athlete also had history of peroneal tendon tear 15 months prior. Athlete reported to the athletic trainer following practice complaining of pain and stiffness on the lateral aspect of his right ankle. Athlete stated pain was worse in the morning and improved throughout the day. Symptoms had been occurring for approximately a week. Initial evaluation revealed swelling and difficulty with weight bearing. Athlete was point tender over right lateral malleolus, anterior talofibular ligament, calcaneofibular ligament, peroneal tendon, and sinus tarsi. Lack of Active ROM and strength with ankle dorsiflexion, plantarflexion, inversion, and eversion. (+) Anterior Drawer Test for Pain and Laxity, (+) Squeeze Test for Pain, (+) Talar Tilt Test for Pain, (+) Kleigers Test for Pain. **Differential Diagnosis:** Anterior Talofibular Ligament Sprain, Calcaneal Fibular Sprain, Peroneus Longus Strain, Peroneus Brevis Strain, High Ankle Sprain, Ankle Synovitis, Peroneal Tendon Tear. **Treatment:** Athlete started conservative treatment with no significant decrease in swelling or relief of pain after a week and a half. Athlete was then referred to university physician due to no change in signs and symptoms. Athlete underwent a physician evaluation including MRI and Musculoskeletal Diagnostic Ultrasonography. The MRI demonstrated significant fluid present on the anterolateral aspect of the right ankle surrounding the lateral malleolus and sinus tarsi area, overlying the anterior talofibular ligament. The Diagnostic Ultrasonography indicated a Grade 2 tear in the Anterior Talofibular Ligament, the Calcaneofibular Ligament, and the Peroneal Tendon. Athlete was then conservatively treated with NSAIDs to assist with pain and a compression wrap to reduce swelling. Athlete was also placed on crutches until he underwent Ankle Arthroscopy, Lateral Ligament Repair, and Peroneal Tendon Reefing. Athlete was placed in a non-weight bearing cast for 6 weeks. After the removal of the cast the athlete underwent rehabilitation. Athlete has a projected return to play after full weight bearing, full ROM, and no pain. **Uniqueness:** Lateral ankle sprains are a common injury in collegiate athletes. Researchers have reported that approximately 20 to 40 percent of acute ankle sprains progress to chronic issues. It has been reported there are approximately 27,000 ankle sprains daily in the United States. Of those 27,000 approximately 15 to 20 % experience persistent pain or instability. Research also suggested that only 60% of peroneal tendon disorders were accurately diagnosed on the first clinical evaluation. This case is unique because there is not much research on the treatment of the Lateral Ankle Triad to assist in returning the athlete back to competition post-surgical. **Conclusion:** This case highlighted the diagnosis and treatment of an athlete dealing with the Lateral Ankle Triad. This case further highlighted the success of Ankle Arthroscopy, Lateral Ligament Repair, and Peroneal Tendon Reefing after consultation with university physician and failed attempts at conservative treatment.

## Introduction

Ankle injuries are among the most common injuries affecting athletes in all sports. "An estimated 28,000 ankle injuries occur in the United States each day." (Kaminski, 2013) Even though lateral ankle sprains are more common than syndesmotom injuries, syndesmotom ankle sprains result in a larger amount of missed playing time. Syndesmotom ankle sprains are more difficult to diagnose than a lateral or medial ankle sprain, and makes recovery complicated for the athlete and medical staff. The following information will explain the mechanism of injury, clinical assessments, radiographic findings, diagnosis, treatments and return to play to provide additional information to this athlete's unique injury.

## Purpose

The purpose of this case report was to introduce a 19 year-old NAIA football athlete who complained of pain and stiffness after practice. An overview of this unique injury is presented to obtain additional information and a better understanding regarding the injury to the anterior talofibular, calcaneal fibular, and posterior talofibular ligaments as well as the fibularis with its associated tendon sheath from onset of injury to return to play of a NAIA football player.

## Anatomy

Understanding the detailed anatomy of the lateral ligament complex of the ankle joint and their relationships to the osseous structures is essential in understanding the injury and the anatomy of the lateral complex of the ankle joint is composed osteochondral structures, multiple ligaments and muscles. The anterior talofibular ligament, the posterior talofibular ligament and the calcaneofibular ligament form the lateral ligamentous complex. The peroneal tendons intersect these ligaments. Although some variations can be seen, the peroneus longus and brevis (fibularis) generally run distally after exiting the fibular groove. Also there are three more morphological variations of peroneal tendons which are peroneus tertius, quinti and quartus. While considering ankle pathologies such as instability, degenerative arthrosis or other abnormalities, surgeons must also bear articular surfaces in mind besides ligament or tendon disorders. All of these structures maintain ankle stability by anatomical and geometrical means.

## Case Report

**Patient:** This NAIA football player is a 19 year-old (185.42 cm and 97.52 kg) athlete with prior medical history including right chronic ankle instability resulting from three severe lateral ankle sprains. Athlete also had a history of a peroneal tendon tear 15 months prior. Athlete reported to the athletic trainer following practice complaining of pain and stiffness on the lateral aspect of his right ankle. The following information will explain the mechanism of injury, clinical assessments, radiographic findings, diagnosis, treatments and return to play to provide additional information to this athlete's unique injury.

## Case Report cont.

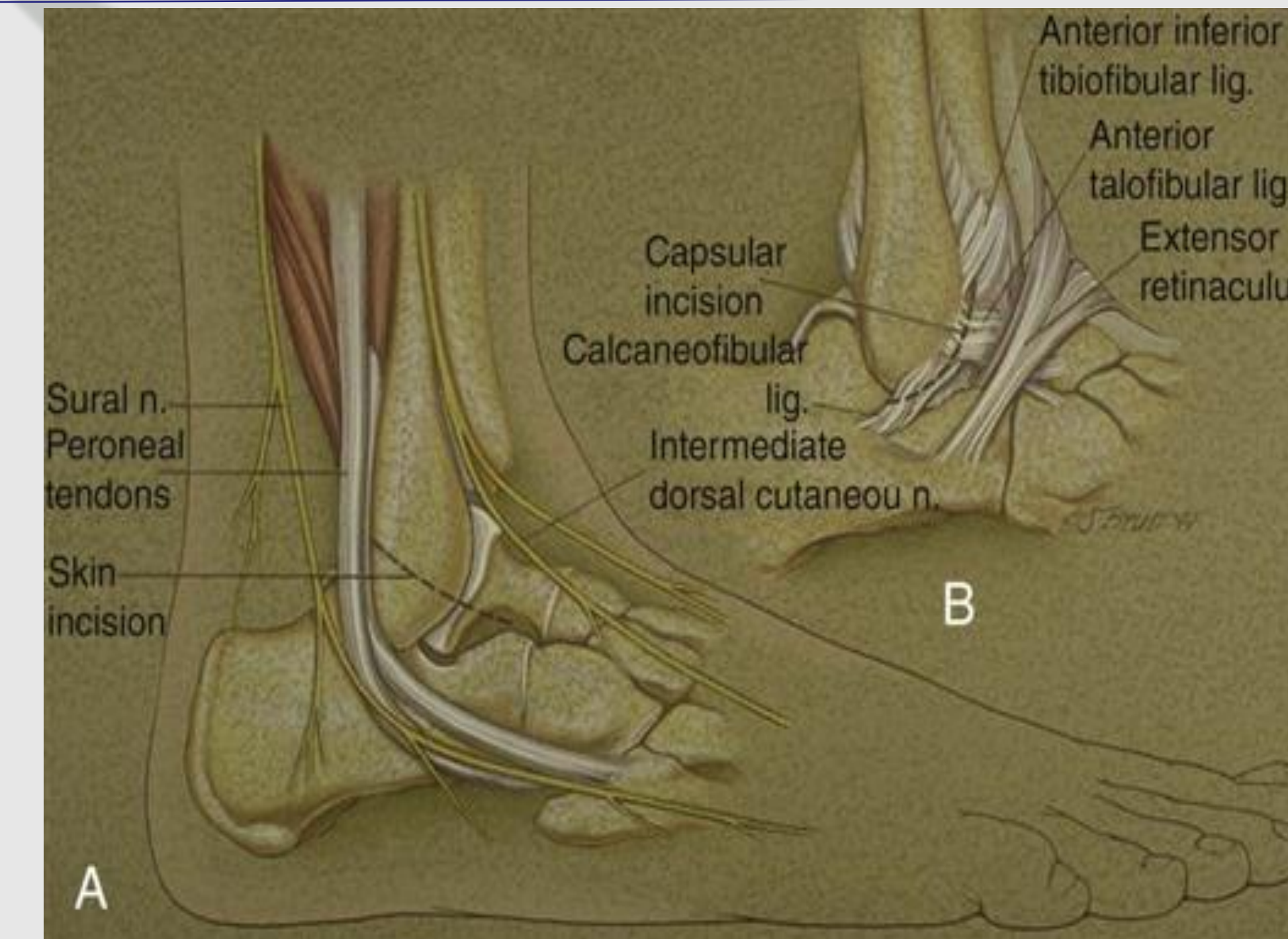
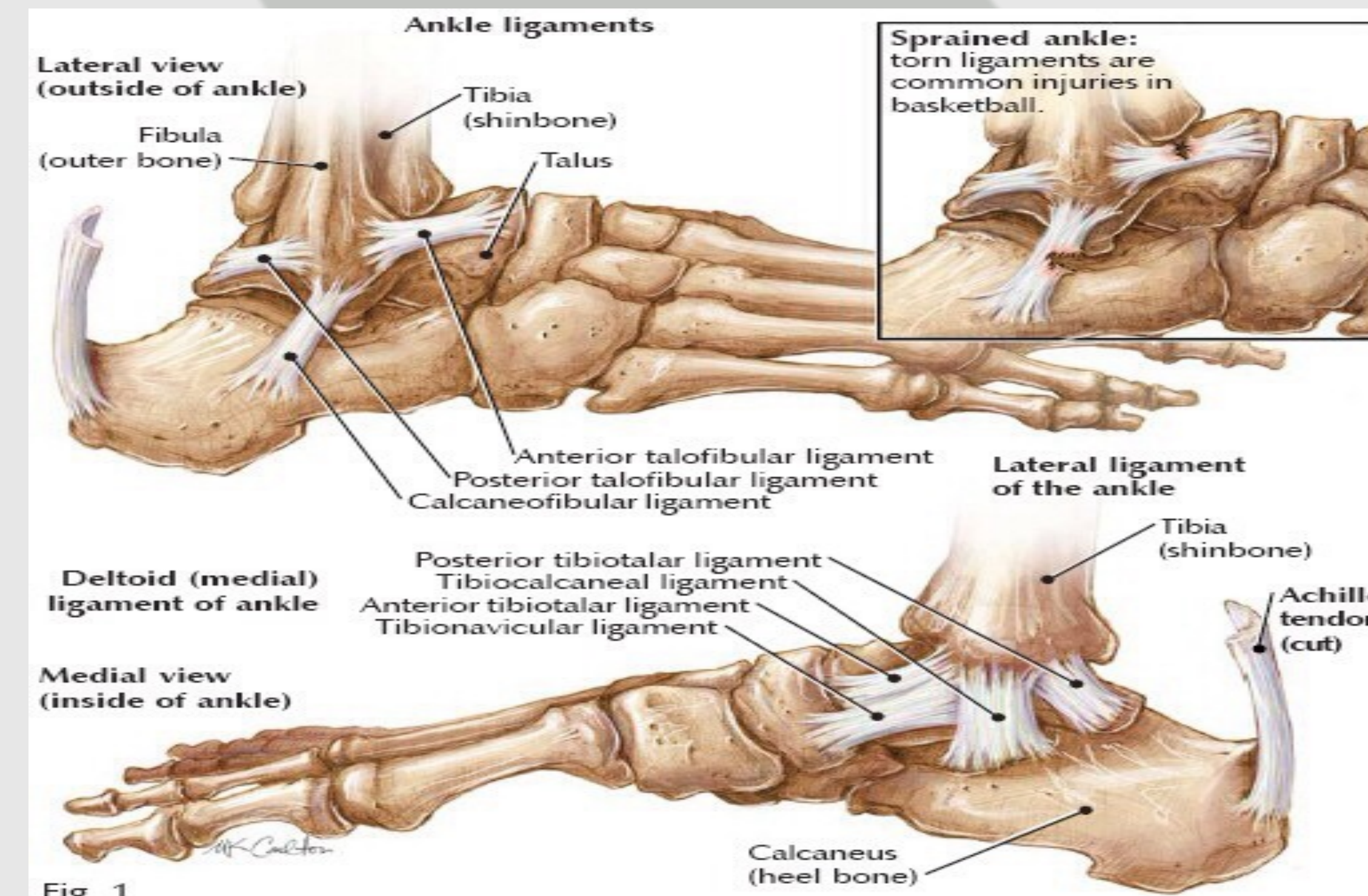
**Mechanism of Injury:** A common injury to the ankle are lateral ankle sprains that usually occur as a result of a sudden twisting or rolling motion of the ankle. This action can be from either a contact or non-contact situation. Approximately 85% of sprained ankles involve the lateral ligament complex (Garrick, 1977). During practice the wide receiver was constantly complaining of pain and stiffness in his ankle. As the athlete was going up for the ball during a play the athlete landed with his foot in plantarflexion and inversion causing a strain on the ATFL and a sprain of the peroneal longus.

**Clinical Examination:** An on the field assessment was performed prior to the athlete being assisted off the field. As the athletic training staff arrived to the athlete he was found side lying favoring his right ankle. The assessment revealed pain over his right lateral malleolus, anterior talofibular ligament, calcaneofibular ligament, and peroneal longus. No obvious deformities were observed Athlete also stated that he did not recall hearing or feeling a "pop" at the time of injury. Upon further evaluation off the field by the team physician, the athlete was tender to palpation over his right sinus tarsi and lateral aspect of his fibular head. Passive and active range of motion was decreased due to pain with ankle dorsiflexion, plantarflexion, inversion, and eversion.

During the clinical special testing for this injury, the athlete tested positive when performing the Anterior Drawer Test, Squeeze Test, Talar Tilt Test, and Kleigers Test. All special test were positive pain and/or laxity.

**Radiographic Findings:** The team physician performed initial x-rays and found no deformities. The results of the MRI found that the athlete received a Grade 2 tear in the Anterior Talofibular Ligament, the Calcaneofibular Ligament, and the Peroneal Tendon.

**Clinical Examination:** During physical examination, swelling and tenderness during palpation was inspected. Pain was diffuse, and located at the head of the right fibula and the lateral aspect of the right ankle joint. Clinical tests used to evaluate lateral ankle injuries included the Anterior Drawer Test, Talar Tilt Test, Kleigers Test, and Inversion Stress Test. None of these tests were accurately diagnostic, but the reliability was found to be high towards the conclusion of a lateral ankle sprain. Athlete underwent a physician evaluation including MRI and Musculoskeletal Diagnostic Ultrasonography. The MRI demonstrated significant fluid present on the anterolateral aspect of the right ankle surrounding the lateral malleolus and sinus tarsi area, overlying the anterior talofibular ligament. The Diagnostic Ultrasonography indicated a Grade 2 tear in the Anterior Talofibular Ligament, the Calcaneofibular Ligament, and the Peroneal Tendon. With the athlete having such extensive damage to the ankle complex, the choice of a surgical procedure and a non-surgical procedure was given to the athlete and the athlete chose to go with the Ankle Arthroscopy, Lateral Ligament Repair, and Peroneal Tendon Reefing.



## Rehabilitation and Results

Following the decision of proceeding with the surgical repair of the Anterior Talofibular Ligament, the Calcaneofibular Ligament, and the Peroneal Tendon, conservative treatment is usually recommended. With this athlete, the sports medicine staff along with the surgeon devised a rehabilitation protocol in which the athlete followed for 6 months. The protocol was designed with four phases with specific criteria for the athlete to progress to the next phase. Phase I goals consisted of protecting the healing tissue, decreasing pain and inflammation, retarding of muscular atrophy, controlling weight-bearing forces maintaining muscular strength and flexibility of all uninvolved extremities of the body. In order to reduce inflammation the use of GameReady and IFC Electrical stimulation was utilized. Besides the use of modalities, the team physician prescribed anti-inflammatories for the athlete until inflammation decreased. At the end of phase 1 the athlete began submaximal isometrics at week 4, Hip Abduction and Adduction and Straight leg raises into flexion. Lastly at week 4 the athlete's cast was removed and was placed by a cam walker. Phase II goals were to protect healing tissue, continue to retard muscular atrophy, progress weight-bearing tolerance, and begin proprioceptive drills. All weight-bearing drills were as tolerated in the cam walker for weeks 4-8. Athlete then discontinued use of the cam walker at end of week 8 and was placed in air cast for 3 additional weeks. The athlete also began begin passive dorsiflexion, plantarflexion and eversion with No active INVERSION past neutral for 12 weeks. Lastly the athlete began strengthening exercises with 3-way TheraBand isotonic (dorsiflexion, plantarflexion, eversion), seated proprioceptive drills, leg press, and knee extensions from weeks 6-8. For Weeks 8-9 the athlete performed vertical squats, side and front lunges, and lateral step-ups. And for weeks 10-12 the athlete's rehabilitation protocol was standing proprioceptive drills and the stair climbing machine. The athlete also had a pool program designed to take the load off of the ankle while still performing exercises and utilizing the cardiovascular system. The program consisted of swimming from weeks 6-8, fast-paced walking from weeks 8-10, and running in pool from weeks 10-12. Each week's exercises were designed to add to and build off of the previous weeks exercises. Phase III goals consisted of progressing to full range of motion, advanced proprioceptive drills, increased strength, power, and endurance, gradually initiating sport specific activities. The athlete's exercises consisted of continuing strengthening exercises, TheraBand strengthening inversion/eversion, dorsi/plantarflexion, towel crunches, standing toe-calf raises, bicycle, stair climber, vertical squats, front lunges, and proprioceptive training. The athlete was also introduced to a plyometric program including a running program, agility drills, sport specific training, and sport specific drills. Once phase VI was reached, the return to functional levels in sport specific drills was applicable under the completion of all phases of the rehabilitation protocol. The athlete continued to increase strength, power, and endurance of lower extremity and gradually started return to sport activities. The athlete also continued his exercises with a light running program, continued isokinetic (light speed, full ROM), continued eccentrics, continued mini squats/lateral step-ups, continued closed kinetic rehabilitation, and continued endurance exercises. The athlete had no setbacks during his rehabilitation and progressed through each phase as projected.

## Discussion

Chronic lateral ankle instability is a documented complication following 10-30% of significant ankle sprains. Some reports suggest that chronic instability remains about the lateral ankle as frequently as 40% of the time leading to high re-injury rates with increased and repetitive use of the same unstable ankle. Not all ankle sprains are alike because of severity and mechanism, which is important to consider when individualized treatment plans and injury preventions are established. The mechanism of injury may be created in a different manner, but similarly consists of forced plantarflexion and inversion of the ankle in relative to the lateral aspect of the lower leg. Physical examinations that include a thorough history, proper palpation, special tests, and clinical findings are imperative in a proper and accurate diagnosis. Once a diagnosis is hypothesized, radiographic findings may be necessary for some patients depending on severity and confidence of the diagnosed injury. Conservative treatment is followed and created with a rehabilitation protocol from the sports medicine staff in conjunction with the surgeon. The uniqueness of this athlete was the Grade 2 tear in his Anterior Talofibular Ligament, the Calcaneofibular Ligament, and the Peroneal Tendon in conjunction with the athlete's extensive lateral ankle sprain history. From the initial onset to full functional return to play, the athlete followed the assigned rehabilitation protocol from the sports medicine staff with no time lost during this process.

## Conclusion

This case highlighted the diagnosis and treatment of an athlete suffering from complication due to injuries and not having proper rehabilitation. The case further highlighted the treatment options that were completed to assist the athlete. This case examined a peroneal tendon tear and a lateral ankle sprain involving the ATFL and the CFL. These injuries are all common amongst athletes, however seeing all three injuries at once is not so common.

## References

- Bell, S., Molongue, T., Sittler, D., Cox, J. (2006) Twenty-six-year results after Brostrom procedure for chronic lateral ankle instability. *Am J Sports Med.* 34, 975-8.
- Beynonn, B., Renstrom, P., Haugh, L., Uh, B., Barker, H. (2006) A prospective, randomized clinical investigation of the treatment of first-time ankle sprains. *Am J Sports Med.* 34(9), 1401-1412.
- Bonnin, J. (1944) The hypermobile ankle. *Proc R Soc Med.* 37, 282-8.
- Brooks, S., Potter, B., Rainey, J. (1981) Treatment for partial tears of the lateral ligament of the ankle: a prospective trial. *Br Med J.* 282:606-7.
- Brostrom, L. (1968) Sprained ankles. VI. Surgical treatment of "chronic" ligament ruptures. *Acta Chir Scand.* 132:551-65.
- Brostrom, L. (1965) Sprained ankles. III. Clinical observations in recent ligament ruptures. *Acta Chir Scand.* 130:560-9.
- Buener, Y., Winkler, M., Burn, A., Chopra, S., Chevotter, X. (2013) Evaluation of a modified Brostrom-Gould procedure for treatment of chronic lateral ankle instability: A retrospective study with critical analysis of outcome scoring. *Foot Ankle Surg.* 19, 36-41.
- Dombeck, M., Lamm, B., Saltrick, K., Mendicino, R., Cattanzariti, A. (2003) Peroneal tendon tears: a retrospective review. *J Foot Ankle Surg.* 42, 250-258.
- Ferkel, D., Chams, N. (2007) Chronic lateral instability: arthroscopic findings and long term results. *Foot Ankle Int.* 28, 24-31.
- Garrick, J. (1977) The frequency of injury, mechanism of injury, and epidemiology of ankle sprains. *Am J Sports Med.* 5, 241-2.
- Karlsson, J., Lansinger O. (1992) Lateral instability of the ankle joint. *ClinOrthop.* 276, 253-61.
- Krauss, J., Brodsky, J. (1988) Peroneus brevis tendon tears: pathophysiology, surgical reconstruction, and clinical results. *Foot Ankle Int.* 19, 271-279. doi: 10.1177/107710079801900502.
- Miller, C., Shelton, W., Barrett, G., Savoie, F., Dukes, A. (1995) Deltoid and syndesmosis ligament injury of the ankle without fracture. *Am J Sports Med.* 23, 746-750.
- Miura, K., Ishikashi, Y., Tada, E., Kusumi, T., Toh, S. (2004) Split lesions of the peroneus brevis tendon in the Japanese population: an anatomic and histologic study of 112 cadaveric ankles. *J Orthop Sci.* 9, 291-5.
- Nordin, M., Frankel, V., Lippincott Williams & Wilkins. (2001). *Basic biomechanics of the musculoskeletal system.*
- Rockner, P. (1995) The subtalar joint: anatomy and joint motion. *J Orthop Sports Phys Ther.* 21, 361-372.
- Sarafian, S. (1993) Biomechanics of the subtalar joint complex. *Clin Orthop Relat Res.* 290, 17-26.
- Spier, W., Henkenmeyer, H. (1977) Pathophysiology of ligamentous injuries of the ankle joint. In: Chapchal G, ed. *Injuries of the ligaments and their repair.* Stuttgart: Georg Thieme, 175-8.
- Stormont, D., Morrey, B., An, K., Cass, J. (1985) Stability of the loaded ankle: relation between articular restraint and primary and secondary static restraints. *Am J Sports Med.* 13, 295-300.