Hyperextension of the Knee Leading to a 3rd Degree LCL Pathology and Hamstring Strain in College Football Athlete

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Abstract

Background: Athlete was on 14 year-old male division I football player. Athlete had no known prior injuries on affected extremity, but two minimus procedures on contralateral knee. During practice the athlete was participating in a scenario on the offensive line and tried to make a play on the ball. The offensive player caught the ball, and upon completing this, the defender player issuing him and planted. The athlete immediately grabbed his knee wincing in pain. He recalled that when he hyperextended his knee he heard a “pop” then felt immediately in the ground. The sport medical staff halted the athlete of the field. Upon inspection the athlete had pain on proximal fibular, posterolateral and anteromedial joint line of the knee. Athlete had full range of motion of affected knee. When manual muscle testing the athlete affected knee flexion was 4/5 with pain and knee extension was 5/5. The anterior drawer test was positive with pain and knee extension was 5/5. The athlete immediately grabbed his knee wincing in pain. He recalled that when he hyperextended his knee he heard a “pop” then felt immediately in the ground. The sport medical staff halted the athlete of the field. Upon inspection the athlete had pain on proximal fibular, posterolateral and anteromedial joint line of the knee. Athlete had full range of motion of affected knee. When manual muscle testing the athlete affected knee flexion was 4/5 with pain and knee extension was 5/5. The anterior drawer test was positive with pain. The athlete had a history of knee injuries. The following information will expound on the mechanism of injury, clinical assessments, diagnosis, treatments and return to play to provide additional information to this athlete’s unique injury. The purpose of this case report was to introduce a 19 year-old football player that sustained a grade three LCL sprain with partial tearing of the biceps femoris, long head. The following information will explain the mechanism of injury, clinical assessments, diagnosis, treatments and return to play to provide additional information to this athlete’s unique injury.

Case Report

Patient: This Division IA football player is a 19-year-old (85 kg and 183 cm) athlete that sustained a grade three LCL sprain with partial tearing of the biceps femoris, long head. The following information will explain the mechanism of injury, clinical assessments, diagnosis, treatments and return to play to provide additional information to this athlete’s unique injury.

Case Report cont.

Clinical Examination: During physical examination, swelling and tenderness during palpation was noted. Pain was located on the lateral aspect of the knee. Clinical tests used to evaluate LCL strain are a varus stress test, a complete extension and in 30 degrees of knee flexion. The varus stress test came back positive. Although the evidence is inconclusive on varus stress test, the reliability was found to be high towards the conclusion of a LCL strain. The results of the MiRI-H Woo, however, was ruled out since the athlete suffered a complete grade III collateral ligament on his left knee, with a partial tear to the biceps femoris long head. Grade III is the most severe grade where a total rupture of the ligament causes symptoms that contain swelling, bruising, and pain. With the athlete experiencing a grade III tearing, sprain, and partial tear of the biceps femoris long head the choice of surgical intervention was given to the athlete. The athlete opted to perform surgery, then begin rehabilitation.

Ligaments #1 attached using soft anchor

Anatomy

Introduction

Knee injuries are extremely common in US football players. In fact, the second and third most common behind ankle injuries. In a study conducted on 332 elite collegiate US football players suggested fifty-four percent, 233 out of the 332, of athletes had a history of knee injuries. The article stated: the most common injuries were medial collateral ligament injury (n = 79), meniscal injury (n = 51), and anterior cruciate ligament (ACL) injury (n = 40) (Bradley, et al., 2008). The following information will expound on the mechanism of injury, clinical assessments, diagnosis, treatments and return to play to provide additional information to this unique injury.

Purpose

The purpose of this case report was to introduce a 19-year-old Division IA football athlete who ruptured his lateral collateral ligament and partially tore his biceps femoris during practice. The athlete opted for a surgical repair of the affected ligament and muscle tendon. An overview of this unique injury is presented to obtain additional information and a better understanding regarding the complete injury of a lateral collateral ligament, from onset to return to play of a Division IA football player.

Rehabilitation

The initial phase was weeks 1-4, with goals being pain modulation for the lateral aspect of the knee, non-weight bearing and hamstring activation for 6 weeks, lock the knee at 30° to 90° of flexion and ambulate on crutches. Early strengthening exercises of the joints above and below. Rehabilitation exercises to perform during this phase is sagittal plane exercises like straight leg raises, and isometric contraction of the quadriceps. Transverse friction massage was also performed to allow for tissue healing, scar tissue management, and decrease sensitivity. Phase 2 consisted of weeks 5-9, with the post-op knee brace at 0° to 120° and discontinuing while rehabilitation progression. Progress weight bearing gradually in ADL till normal gait. Develop quadriceps strength with open and closed kinetic chain exercises. Begin hamstrings strengthening exercises, proprioceptive training, and aquatic jogging at chest level. Phase 3 and return to play spanned from weeks 10-16. Increase aquatic exercise to begin land running with functional brace. Also, start isokinetic quadriceps strengthening. Multiplanar, as well as, frontal plane exercise was prescribed to help in the later stages to strengthen the affected knee. The multiplanar exercises, like cutting drills, were used to help the dynamic stabilization of the affected knee, and selective muscle firing.

Discussion and Conclusion

LCL tears are common sequelae of a varus force applied to the knee. This mechanism of injury is a hyperextension of the knee when the athlete planted. These injuries can occur in all sports that produce high collision and high velocity forces on the joint. LCL sprains are very rare but can lead to instability of the affected knee in the frontal plane. The lateral knee system is stronger than the medial structures because it is subject to increased stress during the initial contact phase of gait when the knee is extended and weight bearing, placing varus forces on the joint (Chen, Rokito, & Pitman, 2000). This is also paramount to sports, especially football, due to the dynamic phase, the athlete is on the field makes. This case highlighted a Div IA collegiate athlete who suffered a complete rupture of LCL, and partial tear of the biceps femoris long head. The research suggest that the common mechanism of LCL injury result in a blow to the knee or by internal rotation of the tibia on the femur. The uniqueness of LCL injuries of the knee are the least common injury, with incidence of 4%, compared to all the knee ligament injuries. Injuries to the LCL are relatively uncommon but it is important to understand the sequence, severity, and significance associated with an injury to the LCL and biceps femoris long head to have a better understanding of a complex injury. As athletic trainers it is important to be aware of the mechanism of injury and ensure a complete orthopedic evaluation to ensure a correct diagnosis.

References