

A Significant Knee Injury in a Division III Football Player: MCL and ACL Tear

Kellie Hanno, ATS

Shawn D. Felton, EdD, ATC, LAT

Florida Gulf Coast University

Ray Knight, MS, ATC, LAT

College of Health Professions and Social Work

Introduction

- Athlete is a 20 year old male running back in a division III football program
- No previous injury to the right knee
- Mechanism of injury (MOI): athlete was running the football and was hit directly on the medial of the right knee by an opponent resulting in a varus stress
- Upon initial palpation, athlete was point tender over the MCL
- No obvious deformity or discoloration was present on field
- Positive tests included anterior Lachmann and Valgus stress test; the Lachmann revealed no end point
- Athlete did not finish the game and was immobilized and put on crutches
- On field assessment was performed by the team physician and head athletic trainer

Imagery

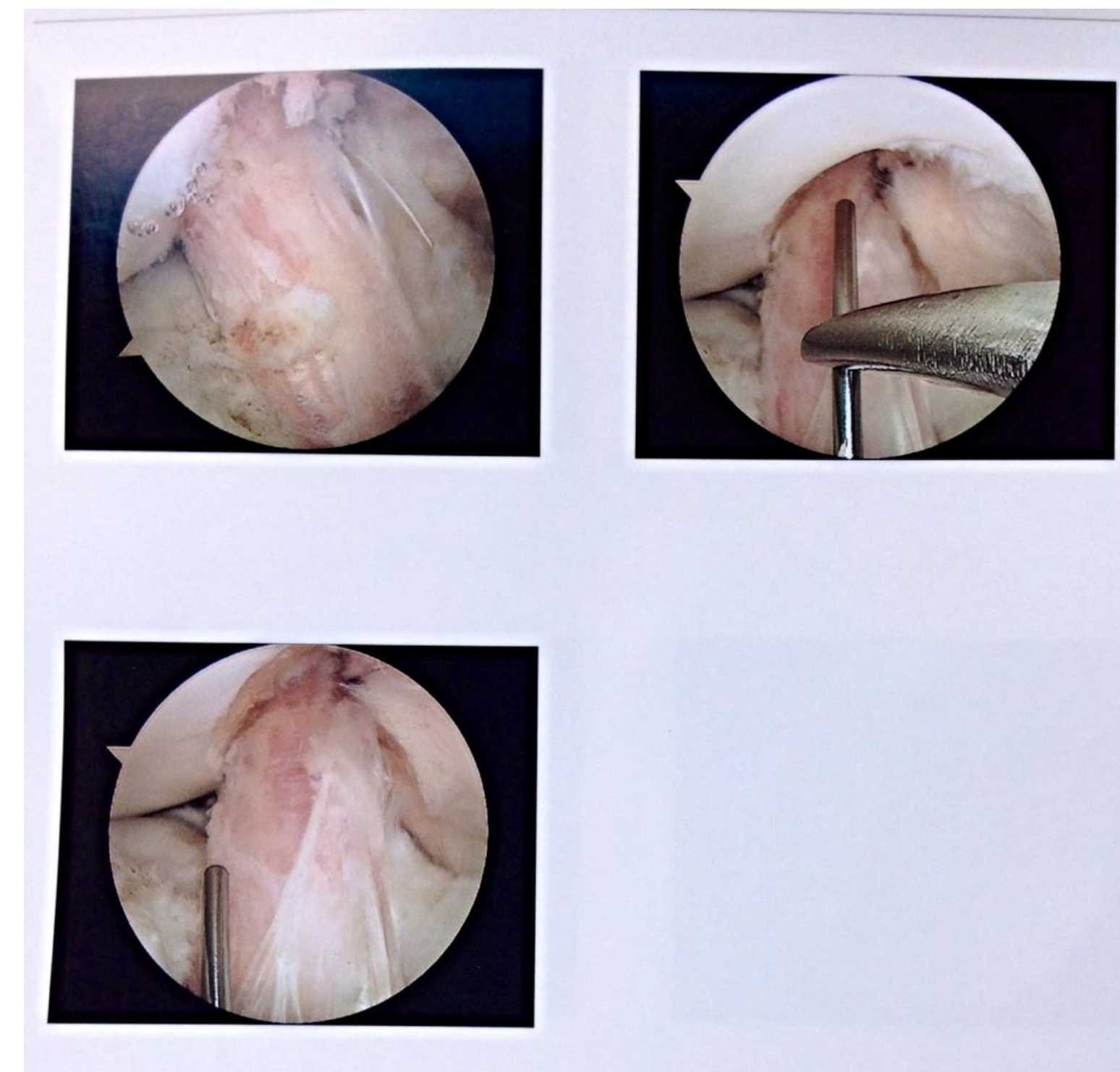
- Athlete was referred for an MRI three days post-injury
- MRI impression revealed:
 1. Grade 2-3 medial collateral ligament sprain
 2. Partial tear mid to proximal anterior cruciate ligament
 3. Moderate contusion dorsal aspect of the medial tibial plateau, very mild contusion present posterior lateral aspect of the lateral tibial plateau
 4. Moderate effusion

Significance

This athlete had an untraditional mechanism for the type of injury he sustained. A typical ACL injury occurs from a plant and twist resulting in femoral rotation on the fixed tibia. A typical MCL injury occurs from a valgus stress to the knee. This athlete was jumping in the air and was hit on the medial side of his leg resulting in a varus stress. Running backs are among the highest rate of injury for a position in football. This athlete was also playing on turf which some studies show may have a higher risk of injury to the ACL. Peak torque and rotational forces are higher on turf. Division III football was found to have a slightly higher rate of ACL injury as well as compared to division I and division II.

Surgical interventions

- This athlete received a patellar tendon autograft surgery.
- In the meta-analysis done by Kraeuter, Bravman, and McCarty, 69 studies with surgical procedures including 3,819 autograft and 579 allograft patients were evaluated at follow ups (2013).
- In 53 studies, 4.3% of the autograft group had a graft rupture compared to 12.7% in the allograft group.
 - In 28 studies, anterior knee pain was reported by 38.2% of autograft patients and 15.1% in allograft patients.
 - Autograft was favored in 16 studies that analyzed patients' single leg hop test. There was a hop index of greater than 90% in 76.8% of autograft patients and 44.8% of allograft patients.
 - Overall, graft rupture rates were lower, knee laxity was lower, and single leg hop test results were better in the autograft groups analyzed (Kraeutler et al., 2013).



Rehabilitation

- The MCL was allowed to completely heal conservatively and pre-rehab was performed to strengthen surrounding musculature before surgery. Athlete's surgery was completed with a patellar tendon autograft. Athlete is currently 18 weeks into his rehabilitation.
- Phase I (Day 1-21)
 - Goals: establish quad control, normalize ROM, minimize pain and swelling, protect ligament reconstruction
 - Exercises included isometrics to begin quadriceps firing and working on extension through heel props and prone hangs. Other exercises include calf raises, straight leg raises, side lying abduction and adduction, and standing terminal knee extension.
 - Patellar mobilizations are also introduced to prevent the patellar tendon from becoming restricted.
 - Precautions: perform exercises in locked knee brace
 - Modalities: ice and e-stimulation to control swelling and pain
- Phase II (Week 4-12)
 - Goals: Increase quad/hamstring strength, tone, and girth, normalize gait pattern, progress to community-level ambulation, and protect ligament reconstruction
 - Exercises begin to become more resistive, gait training initiated, treadmill forwards and backwards walking, leg press, step ups, balancing exercises, and beginning aquatic program.
 - Once athlete received custom ACL brace, lateral walking, mini trampoline exercises, and bounding in place were introduced (week 9+)
 - Precautions: no cutting, twisting, running, jumping
 - Modalities: as needed
- Phase III (Week 16-28)
 - Goals: normalize quad/ham strength, tone, and girth, and progress to sport specific activity
 - Exercises are continued from above, addition of light jogging progressing to running, and addition of a light agility program (line jumps, clock drill, short hops, slide board, etc.)
 - During weeks 17-20, progression to full speed running, full speed agilities, initiation of plyometric jumping and sport specific drills.
 - During weeks 21-28, progression to full sport activity begins.
 - Precautions: ACL brace must be worn during jogging, running, agilities and for all sport specific activities.
 - Modalities: as needed
 - Athlete is now working out with the football team again and is incorporating tire flips, pushing the golf cart, romanian dead lifts, box squats, and progressing to full sprints and agilities.

•Currently, athlete is experiencing patellar tendon pain but otherwise is following the protocol and progressing well. Through his rehabilitation, step ups have been difficult. Squatting also reproduces pain on the medial aspect of his knee while leg presses reproduce pain in his patellar tendon. To address this, the athlete was instructed to lighten the weight being used and has undergone drug therapy. A PRP (platelet rich plasma) injection is currently being considered. Blood is taken from another area of the body and the blood is centrifuged to produce a concentration of platelets. These are then injected into the site of injury. This is an experimental therapy.