

Chronic Patellar Tendinitis and Partial Patellar Tendon Tear in a Female Collegiate Soccer Athlete

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Abstract

Background: This case presents a 20-year-old female collegiate soccer midfielder that had initial complaints of persistent left anterior knee pain. She came to the athletic trainer (AT) last November and was diagnosed with chronic patellar tendinitis. The following April, she received a platelet-rich plasma (PRP) injection in the left knee. She was immobilized for six weeks following the injection of which she spent at home. Immediately after the immobilization period concluded, she returned to soccer. In July, she had a recurrence of left knee pain. Upon reassessment, the AT referred her for an MRI scan. The MRI scan displayed a partial patellar tendon tear and significant edema. The athlete was then scheduled to receive an arthroscopic debridement and partial patellar tendon repair in August. **Differential Diagnosis:** Patellar Tendinitis, Quadriceps Tendinitis, Patellar Tendon Strain. **Treatment:** Following surgery, the athlete underwent a 12-day immobilization period. A rehabilitation plan with short and long term goals were established for the athlete. The athlete only experienced a 7-day set back, two months post-operative of which the rehabilitation protocol was adjusted. The athlete was successful despite set backs and was able to fully return to sport after five months. **Uniqueness:** Limited research is available pertaining to partial thickness tears and surgical repair methods. Partial thickness tears are typically treated conservatively. However, this case presents a surgical tendon suture method in the repair of a Grade 2 patellar tendon strain. **Conclusion:** The results of this case report suggested that an arthroscopic debridement and tendon suture repair can be successful methods in facilitating a healthy return-to-sport for athletes with a partial patellar tendon tear. During the rehabilitation process, the athlete reported 2 times a day where multiple modalities and therapeutic exercises were implemented. With the exception of a seven-day time loss, no other set backs were acquired during the rehabilitation process. This study is a broad explanation of a complex injury and the recovery process from an injury that is typically treated conservatively, yet was treated surgically and may therefore e clinicians.

Introduction

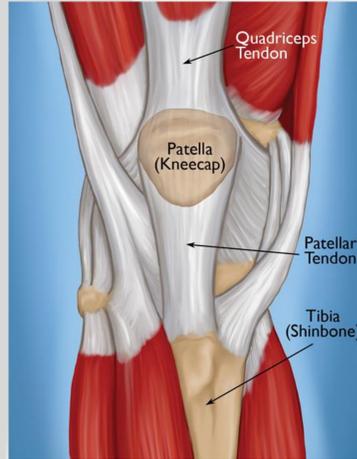
The knee is a joint that is commonly injured in athletics. Contact sports along with repetitive motions and high physical demands of the knee predispose an athlete to injury. The patellar tendon is a tendon of the knee and is an essential component of the extensor mechanism of the leg, which functions to allow the athlete to extend the knee and stabilize the patellofemoral joint. Injury to this tendon can be detrimental to the athlete's ability to sufficiently function biomechanically. Patellar tendinopathy, an overuse injury that can result in weakening of the tendon, affects 14 percent of the athletic population (Kruckeber, Chahla, Ferrari, Sanchez, Moatshe, & LaPrade, 2017). With this prevalence, diagnosis, treatment, and appropriate medical care for patellar tendinopathy and other knee injuries are crucial for an athlete's recovery and return to optimal knee health. 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 20-year-old female collegiate soccer player that initially was diagnosed with patellar tendinitis and later sustained a partial patellar tendon tear. Full thickness tears and various reparative methods have been studied in extent throughout literature, however limited research is available pertaining to partial thickness tears and surgical repair methods. An overview of this unique injury is presented to obtain additional information and a better understanding regarding partial patellar tendon tears and a respective method of repair.

Anatomy

Understanding the anatomy in relation to the patellar tendon and extension mechanism of the knee is essential in understanding the injury and radiographic findings. The quadriceps and patellar tendons work in conjunction to extend the knee. The quadriceps muscles all join into one distal tendon that lies on top of the patella and connects to the patellar tendon at the inferior pole of the patella. The patellar tendon then connects the inferior pole to the tibial tuberosity. Contraction of the quadriceps muscles acts as a pulley on the patella, resulting in knee extension.



Case Report

Patient: This Division I soccer midfielder player is a 20 year-old athlete that had initial complaints of anterior knee pain in November two seasons prior. She was diagnosed with patellar tendinitis. She received a PRP injection the following April in which she was instructed to follow a 6-week immobilization period. She returned to soccer activities immediately at the conclusion of the immobilization period. She had recurrent knee pain 8 months later, leading to a referral for MRI scans. Imaging found a grade II patellar tendon strain. 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.

Mechanism of Injury: The knee is a joint that is commonly injured in athletics. Contact sports along with repetitive motions and high physical demands, such as those of soccer, predispose an athlete to injury. As a result of repetitive movements, primarily involving forces through the knee, the athlete's patellar tendon became inflamed from overuse and ultimately weakened over time. Micro-tearing is more likely to occur when stress is applied through a tendon, increasing the risk of strains. In this case, the grade II patellar tendon tear occurred due to the athlete's chronic overuse of the tendon.

Clinical Examination: Upon athlete's recurrent anterior knee pain, she was examined by the athletic trainer. Mild swelling was noted around the left knee. Lachman's and Anterior Drawer tests were performed to assess the integrity of the ACL; both were negative. Varus and Valgus stress tests were both performed at 0 and 30 degrees to assess the integrity of the LCL and MCL, respectively; these tests were negative. McMurray's special test was performed to assess any meniscal issues; this test was also negative. A patellar grind test was performed to assess for patellofemoral pain syndrome; this test was positive since the athlete experienced significant pain. Based on the findings and the athlete's history, the athletic trainer referred the athlete to a team physician for imaging.

Radiographic Findings: The athlete was referred to a team physician where she underwent imaging. MRI scans were taken to examine patellar tendon thickness and edema. The results of the MRI found the athlete sustained a grade II patellar tendon tear and exhibited significant edema in her left knee.

Rehabilitation and Results

Following the athlete's surgical procedure, the athletic trainer devised a rehabilitation protocol based on guidelines given by the surgeon. The protocol consisted of four phases with specific goals required to be accomplished for the athlete to progress to the next phase.

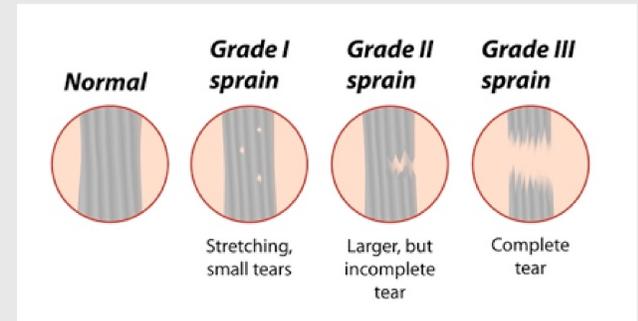
Phase I: Goals—diminish pain and inflammation, restore range of motion (ROM), and maintain muscular strength. *Instruction:* no active range of motion, weight-bearing gait with crutches and brace locked in full extension. Pain and inflammation were reduced via daily modality treatments, including GameReady and electrical stimulation. The athlete also took pain medications as prescribed by the team physician. Once the athlete had minimal pain and inflammation, range of motion exercises were incorporated. Russian setting electrical stimulation was also used for quadriceps activation and strength maintenance.

Phase II: Goals—restore pain-free ROM, progress to full weight bearing with normal gait, progressively increase muscle strength and endurance, increase proprioception. *Instruction:* At the beginning of this phase, unlock brace to 90°, progressed to gait w/o crutches as quad strength allows. Previous modalities were utilized as needed. Quad isometrics, straight leg raises, and glute activation exercises were incorporated, as well as static proprioception training. Light walking on the treadmill was allowed with adequate quad strength. Light stationary biking was introduced near the end of this phase to prepare the athlete for phase III.

Phase III: Goals—restore muscular and cardiovascular endurance, increase eccentric muscular control, participate in non-contact portion of soccer practice. *Instruction:* progress previous exercises, incorporate sport-specific movements in rehab sessions. This phase incorporated progressive strengthening and proprioception exercises, plyometrics, agility drills, and bike intervals. Unfortunately, in the second week of phase III, the athlete experience substantial knee pain. After consulting with the team physician, she was instructed to have full rest from rehabilitation for a week. Following that week, she returned to rehab, starting back at week one of phase III, modifying exercises as needed. She was able to complete the remainder of the rehab protocol without complications.

Phase VI: Goals— accelerate, decelerate, and cut without pain; progress running to 100 percent; participate in full soccer practice.

Instruction: progress open and closed chain strengthening for entire lower extremity with focus on single limb strengthening. Sport specific activities were progressed in this phase to incorporate deceleration, cutting, and single leg agility activities. Running progression was initiated with alter-G sessions and progressed to full running. Strength and conditioning exercises were progressed with the purpose of the athlete being adequately prepared to fully return to soccer activities at the conclusion of this phase. At the end of six months post-operative, the athlete was back to adequate health and achieved full return to sport.



Discussion and Summary

The patellar tendon is a crucial component of the knee. Overuse of the knee can lead to inflammation and ultimately weaken the tendon over time, resulting in patellar tendinitis. Patellar tendinopathy affects 14 percent of the American athletic population (Kruckeber, et al., 2017). This prevalence warrants proper diagnosis, treatment, and appropriate medical care to ensure an athlete's recovery and return to optimal health. Unfortunately, more severe injuries might occur as a result of an undertreated patellar tendinopathy. According to a study by Hsu and Siwiec (2019), a mere 0.5 percent of the American population sustains a patellar tendon rupture each year. The literature contains extensive data on various operative procedures in the repair of patellar tendon rupture; however, literature pertaining to operative methods for partial tears is limited. This case presented an athlete that sustained a grade II patellar tendon tear and chose operative repair. The purpose of this case study was to assess the athlete's recovery and return to sport success as a result of the respective operative method chosen.

The athlete in this study underwent an arthroscopic debridement and tendon suture repair. These operative methods followed by a carefully implemented rehabilitation protocol were performed to facilitate a prompt and healthy recovery and return to sport. Despite a week-long set back, the athlete was still able to recover, accomplish the entire rehabilitation protocol, and fully return to soccer within a normal recovery time of 7 months. This case study presents a single case in which an operative method was chosen and proved to be successful for the athlete. Although a surgical route for partial patellar tendon tears is uncommon, it is important to further expand research in this area to gain a better understanding of the outcomes of various operative techniques in assisting in an athlete's return to full health.

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