Isolated Grade II Posterior Cruciate Ligament Sprain in Collegiate Football Player

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Abstract

Background: Football athlete who was 82kg and 178cm reported from practice complaining of anterior right knee pain. Athlete reported falling on bent knees trying to catch a pass and noted that pain was exacerbated with knee flexion. Athlete denied any problems with running or cutting; however complained of unpleasant sensation on the anterior portion of the knee. Athlete was point tender between the tibial tuberosity and the inferior pole of the patella. Athlete reported no prior history of knee pain or injuries. Athlete had full active range of motion of the right knee, as compared bilaterally. Athlete presented with 5/5 manual muscle tests with knee flexion and extension. Athlete has 2/10 on the pain analog scale, with pain localized over the patellar ligament. Orthopedic clinical examination included (-) anterior drawer and posterior drawer, and (-) McMurray tests. One-day post injury athlete reported to athletic training room with an increase in right knee pain. Athlete denied any activity or mechanisms following initial evaluation to explain the increased pain. Upon re-evaluation pain was 6/10 on the analog scale, and athlete could not actively flex the knee. Athlete denoted that the pain increased with his attempts of flexion. Athlete had 60 degrees of passive knee range of motion with full extension and pain. Athlete had 2/5 MMT with knee flexion and 3/5 with knee extension. Orthopedic clinical exam revealed: (-) Lachmans test, (+) Reverse Lachmans, (-) Thessaly test. **Differential Diagnosis:** PCL sprain, Hamstring strain, patellar tendonitis, Meniscus tear. **Treatment:** Athlete began conservative treatment for a grade 2 PCL sprain. Athlete referred to team physician who ordered an MRI, which confirmed diagnosis. Athlete started his conservative treatment with active assistive range of motion exercises to increase the athletes overall right knee range of motion. Once athlete was back to full range of motion we began increasing rehabilitation interventions with quadriceps and hamstring exercises increasing based on level of soreness. After full strength was acquired by means of manual muscle test the athlete was put through the jumping functional test and the star functional test. The athlete was also fitted for a PCL brace that he must wear during football. **Uniqueness:** This case when first assessed presented with full strength, range of motion, and negative posterior draw test, mostly showing signs of patellar tendonitis, with pain between the tibial tuberosity and the inferior pole of the patella. After applying the patella strap he felt a substantial decrease in pain, after practice saying he had “no pain.” However, pain increased and ROM decreased within 24 hours. Also the occurrence rate of PCL injuries is much lower than any other knee related injuries within sports. **Conclusion:** This highlighted the importance of reassessments and conservative treatment methods for a grade 2 PCL sprain. Also this case report demonstrated the use of great functional tests and rehabilitation to ensure full return to activity. This case further demonstrated an evidence-based research plan when designing a rehabilitation program for a conservative PCL sprain. This case additionally highlighted the possible complexities when evaluating and treating athletes with this injury.

Introduction

With any rehabilitation process, it is imperative to look into the recent and previous research to support the rehabilitation plan, which will be devised to help the patient with a quick and safe recovery. When presented with a posterior cruciate ligament sprain, the research was vast in all stages of the process. The three stages of the process for returning the athlete to play that were researched were the acute actions, implementation of rehabilitation interventions, and functionality of importance of the PCL ligament. A realization was the immense differences in each study that pleaded for one paper bringing all the information together to create a better understanding of the processes, which have been proven with evidence-based practices and research. Although rare, rehabilitation is the most common route for the recovery and safe return to activity for the patient from a PLC strain. The rarity of the injury also hinders the ability to conduct research on the process. According to Doberstein and Schrodt (1997), this rarity can be contributed to the fact that, “the PCL is almost two times stronger, 12 times thicker, and is shorter than the ACL. Contributing to the strength of the PCL, are its unique attachments to the femur and tibia. Its fibers attach to the femur in an anterior to posterior direction while the tibial attachment is in a medial to lateral direction.” This is why it is so important especially with a rare injury to keep research in mind when making the rehabilitation plan for the patient. When looking into rehabilitation intervention, research shows many similarities and differences in regard to what may be preferred, quicker, safer, and most efficient for the patient to tolerate. It is vital as professionals to analyze the research and choose the best applications to ensure the quick and safe recovery of the patient. When this approach is overlooked or skipped it could hinder the patient from the best possible care, which is the most important aspect of any profession when looking at a health care facility. Seeing a patient through the whole rehabilitation process requires the professional to research all phases of the injury. Additionally, the acute phase, an important factor which research has decided upon is the controversy between conservative care versus surgical repair. These factors are heavily debated and are important to decipher through research on the subject.

Background

- Intercollegiate Football athlete
- 82kg & 178 cm
- No Prior History

Clinical Examination

Upon first evaluation : Athlete has full active range of motion of the right knee when compared to the left knee. Athlete also has 5/5 manual muscle tests with knee flexion and extension. Athlete has 2/10 on the pain analog scale, with most pain over the patellar ligament. Negative anterior draw, posterior draw, and McMurray tests.
Upon second evaluation: Athlete has 60 degrees passive range of motion with knee flexion with exuberated pain but has full extension. Athlete has 2/5 manual muscle test with knee flexion and 3/5 with knee extension. Athlete has negative Lachmans test, Thessaly test. With positive Reverse Lachmans.

Differential Diagnosis

- PCL sprain
- Hamstring strain
- Patellar tendonitis
- Meniscus tear

Treatment

Athlete began conservative treatment for a grade 2 PCL sprain. Athlete referred to team physician who ordered an MRI, which confirmed diagnosis. Athlete started his conservative treatment with active assistive range of motion exercises to increase the athletes overall right knee range of motion. Once athlete was back to full range of motion we began increasing rehabilitation interventions with quadriceps and hamstring exercises increasing based on level of soreness. After full strength was acquired by means of manual muscle test the athlete was put through the jumping functional test and the star functional test. The athlete was also fitted for a PCL brace that he must wear during football

Rehabilitation plan

For the first week the primary focus was on ROM, decrease swelling, and pain management. He did 3 sets of 15 wall slides (AAROM) then he was put of the e-stim machine, on pre-mod till the patient felt comfortable, then patient was placed in the Game Ready for 20 mins. at the coldest setting. Once the patient had full ROM the patient began strengthening exercises by warming up on the bike for 10 minutes then doing 2 sets of 15 squats, 2 sets of 30 leg lifts all 4 ways, and 2 sets of 30 of contractions of the quad holding for 5 seconds, after all this relaxed on the bike for 10 minutes. Focus on isometric, isokinetic exercises, and the reeducation of the quad muscle at this point. We reevaluate him every Monday and either decrease, increase, or keep the workouts or reps the same. While also allowing the patient to fill out the patient related outcome measures to allow us to see how the patient is feeling and also to see the progress, these are shown below. This is dependent on how the week went with the workouts, the patient relays to us before starting every day to report his soreness level from a scale from 0 to 10, 0 being not sore at all, 10 being too sore to even walk. To increase the sets or exercises the patient must complete the new workouts with the reports of soreness below a 2 for two consecutive days. Any soreness reported of 7 or higher the athlete was given a day off and the reps and exercises were decreased to what they were before. First to be increased is reps to 30, then sets to 3 and then weight added by 5 lb. increments, and if the patient is mastering the exercises we will add new exercises last. The patient increased the exercises all the way to this work out before being released by the doctor, the patient is warming up on the bike for 15 minutes then doing 3 sets of 30 squats with 30 lb., 3 sets of 30 side lunges, 3 sets of 30 front lunges, 3 sets of 30 elevated lunges, 3 sets of 30 tape pick ups, 3 sets of 30 RDL's with 8 lb., 3 sets of 30 leg press using the power machine set at “26”, and 3 sets of 30 single legged leg press using the power machine set at “20”. The patient was doing high repetition to help the muscle with strength but mostly endurance. When patient was demonstrating the same strength in both legs when measured with MMT he began plyometric workouts.

Functional Tests

Most research accentuates rehabilitation plans that include functional movements for a specific patient, with a functional test at the end. An additional point that much of the research stated is to begin strengthening both legs with the exercises near the end of rehabilitation. The reason is the over strengthening of one leg could create a weaker healthy leg when performing the functional tests. With proper exercises the legs, when tested functionally, should be within 85% of strength of each leg for return to play. The functional test that was used in this study was the BioDex. One thing to remember during functional testing is how certain motions can have the ability to compensate for others. However, Higgins shows different functional tests, for example, the star test and jumping test which allow the patient objective measures that are not as expensive as the BioDex. Functional tests allow one to ascertain if the knee is ready for functional activity. The importance of functional testing, none of the athletes returning to play reinjured the PCL within a 5-year range. Once passing the functional tests that are in place (Bio Dex, jumping test, and star test) with the affected leg being at least 85% strength when compared to the unaffected leg, working on functional strengthening by doing cutting drills and sprinting, and since one of the athletes goals was to have the same 40 yard dash time we spent time doing some ladder drills as well.

Uniqueness

This case when first assessed presented with full strength, range of motion, and negative posterior draw test, mostly showing signs of patellar tendonitis, with pain between the tibial tuberosity and the inferior pole of the patella. After applying the patella strap he felt a substantial decrease in pain, after practice saying he had “no pain.” However, pain increased and ROM decreased within 24 hours. Also the occurrence rate of PCL injuries is much lower than any other knee related injuries within sports

Discussion and Summary

The importance of research is always needed especially when looking into the health care professions. However, as shown in the research that was looked upon, it is difficult to be precise because of the unpredictability of the human body and the fact that we don't want the injuries to happen just to provide us with more research opportunities. When looking at research some information found has a low testing group, which would need more information before it is widely accepted and practiced. Overall, in the research we see time is the main concern with the controversy of conservative treatment versus surgical intervention. With surgery, it is a year process, where conservative treatment is much less. Also, a determination of what is completely wrong with the knee at the time of injury can assist in deciding between these two possibilities.

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