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CASE REPORT

Post-operative management of lateral knee snapping syndrome: A case study

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Abstract

Background: Snaps are caused by the rapid displacement of an anatomic or pathologic structure when an adjacent joint moves. Lateral knee snapping or snapping of the biceps femoris tendon is uncommon. The tendon snaps over the fibular head when it is being flexed or extended. **Objective:** This study was undertaken because there is limited evidence in the literature regarding the benefits of physical therapy after biceps femoris surgery for treatment of lateral knee syndrome. **Methodology:** A 27-year-old man had been having clicking sounds in his left leg for 3 years. The condition had been diagnosed medically and physically as snapping of the biceps femoris tendon, and biceps reinsertion surgery had been performed. This study was carried for 8 months. The agility T-test and the International Knee Documentation Committee (IKDC) score were used to evaluate the outcome of a rehabilitation regimen. The rehabilitation was administered three times a week for 16 weeks and once a month for another 16 weeks, and the condition of the patient was monitored. **Results:** The IKDC score was 18.3% and the agility T-test score 13.50 seconds at the initial evaluation after the biceps femoris reinsertion. After 16 weeks of physical therapy, the patient's IKDC score was 83.9% and the agility t test score was 9.50 seconds. After 32 weeks the IKDC score was 91.9% and the T-test score was 7.90 seconds. **Conclusion:** A rehabilitation strategy is beneficial after biceps femoris tendon surgery. It reduces pain and stiffness and improves the range of motion, functional ability, and sports performance.

Keywords: Snapping syndrome, biceps femoris, rehabilitation, International Knee Documentation Committee.

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BACKGROUND

The knee joint is one of the largest and most complex joints in the body. It connects four bones, has an extensive network of ligaments and muscles. It is designed to support weight, provide stability, and allow motion[1]. Static stability is provided by the ligaments and menisci whereas dynamic stability is provided by the muscles and tendons[2]. The quadriceps, on the anterior side of the knee, and the hamstring, on the posterior side, are the two main muscle groups that help with stabilization and movement[3]. The biomechanical functions of the knee joint include permitting gait, flexing, and rotating while maintaining stability during daily activities and transmitting forces[4].

Snaps occur due to the rapid displacement of an anatomic or pathologic structure when an adjacent joint moves. Both intra- and extra-articular structures can cause conditions such as snapping biceps femoris tendon syndrome, snapping popliteus tendon, snapping meniscus, and snapping plica syndrome[5]. Lateral knee snapping (LKS), or snapping of the biceps femoris tendon, is an uncommon condition.

Repeated snapping causes pathologies such as abnormal fibular heads, anatomical anomalies, and partial tears of the distal tendon. The majority of cases involve males between the ages of 15 and 44 years old[5,6]. Physically active young boys who run, cycle, or perform deep squats are seriously impacted5. Individuals may experience chronic knee pain with or without numbness or tingling over the lateral side of the knee during physical activity, with an audible clicking sound[6-10]. Conservative treatments mostly fail when there is no anatomic anomaly, and so surgical management to reinsert the tendon is frequently required[11-13]. After biceps femoris reinsertion procedures, the daily activities of patients are limited, and so rehabilitation (rehab) is necessary[13,14]. The agility T-test and the International Knee Documentation and Committee (IKDC) score are used for monitoring before and after rehab[15,16]. No evidence has been documented about the effectiveness of physical therapy in restoring activity levels after biceps femoris surgery for LKS. The aim of the study was to establish whether anterior cruciate ligament (ACL) or rehabilitation protocol is effective after ACL reconstruction is equally efficient or not for an individual with post-snapping of biceps femoris syndrome.

Patient characteristics

The patient was a 27-year-old male who had previously been physically fit and had no medical history. His employment as an information technology specialist required him to sit for long periods of time. He used to run for an hour six times a week. He had been having clicking sounds on the left side of his knee for the past three years, but there was no pain. He consulted a medical doctor, who observed that muscles on the lateral side of the left knee were snapping.

Examination findings

A subjective evaluation showed that the patient had clicking sounds during knee flexion and extension. There was no pain. Pain, clicking sounds, and subluxation of the biceps femoris tendon caused by deep squatting are readily identified in a physical examination. Osteoarthritis knee, meniscal rupture, proximal tibiofibular joint instability, LKS, and osteochondroma were considered as different diagnoses on the basis of the observations[6]. An X-ray and an Magnetic resonance imaging (MRI) scan were recommended by the doctor to confirm the diagnosis of LKS. The X-ray revealed tendon damage and the MRI showed a partial tendon tear. A physical examination and a medical diagnosis test confirmed the diagnosis of LKS[6,7,9].

A biceps femoris reinsertion operation was indicated by the doctor. The patient went to a clinical pro-physio physiotherapy clinic in Alshaasa, Saudi Arabia. The activities of daily living (ADL) of a patient are limited after tendon reinsertion surgery. On the fifth day after the surgery, the patient had sharp, inconsistent pain (3 out of 10 according to the IKDC evaluation)[17] and tenderness and swelling around the knee joint. The knee range of motion (ROM), as measured using a goniometer, was 20° in extension and 70° in flexion. The muscle power was determined through manual muscle testing as Grade 3. The surgical leg was partial weight bearing, with crutches. The score in a sensory examination was Grade 4[18].

Clinical impression

Individuals experience discomfort, tenderness, edema, and muscular weakness around the knee joint as a result of surgical treatment, as well as limited ROM. To address the condition, the muscles must be rehabilitated appropriately. There is no clear rehabilitation protocol. However, patients can be treated to help them become self-sufficient and confident. Some research shows that muscle strength training and proprioceptive training are beneficial for the lower limb after knee surgery[14,19,20].

METHODS

After the surgery, the patient began undergoing rehabilitation process. The patient's goal was to return to his normal life without any limitations. The therapy was administered three times a week for 16 weeks and once a month for another 16 weeks. This rehabilitation was based on the Mass General Brigham protocol[14]. The details of the rehabilitation are described in Figures 1 to 8.

Rehabilitation goals	**Protect graft:** Reduce swelling and soreness, recover complete extension, gradually improve flexion, reduce arthrogenic muscle inhibition, re-establish quad control, and regain full active extension. **Patient education:** Sitting or lying down, keep your knees straight and lifted. Do not rest with a towel under the knee, and do not deliberately kick your knee out straight. When conducting transfers, support your surgical side and do not rotate on it.
Weight bearing	**Walking**: Initially brace locked, crutches, when climbing stairs, non-surgical side when going up the stairs and when going down the stairs with the crutches and surgical side
Interventions	**Swelling management:** Ice, compression, elevation, retrograde massage, ankle pumps, ROM Seated assisted knee flexion, extension; low-intensity, long-duration extension stretches; gastrocnemius and hamstring stretch; strengthening—calf and quad; electrical stimulation; isometric exercises

Figure 1. Phase I: Immediate post-op (0–2 WEEKS)

Rehabilitation goals	Continue to protect graft, maintain full extension
Additional interventions	Stationary bicycle, gentle stretching of all muscle groups Strengthening: quad, ham, lumbopelvic, balance training

Figure 2. Phase II: Intermediate post-op (3–5 WEEKS)

Rehabilitation goals	Brace unlock once able to perform SLR without lag and walking without crutches, maintain full ROM, safely proceed with strengthening, avoid post-exercise pain/swelling
Additional interventions	ROM, rotational tibial mobilization (if ROM is limited), cardio (8 weeks): elliptical, stair climber, flutter kick exercise, jogging **Strengthening:** Increase intensity and duration of exercises, seated leg extension **Proprioception**: Increase single-limb balance, including perturbation training

Figure 3. Phase III: Late post-op (6–8 WEEKS)

Rehabilitation goals	Maintain full ROM, safely intensify strengthening, promote proper movement patterns, avoid post-exercise pain/swelling
Additional interventions	**Gym equipment**: leg press, seated hamstring curl, hip abductor and adductor, hip extension, Roman chair, seated calf Begin sub-max sport-specific training in the sagittal plane, bilateral PWB plyometric progressed to FWB plyometrics

Figure 4. Phase IV: Transitional (9–12 WEEKS)

Rehabilitation goals	Safely initiate sport-specific training program, avoid post-exercise pain/swelling, no episode of instability
Additional interventions	Interval running program, progress to plyometrics and agility program
Criteria to progress	Completion of run program without pain/effusion/swelling, International Knee Committee Subjective Knee Evaluation score > 93

Figure 5. Phase V: Early return to sport (13–16 WEEKS)

Figure 6: Single leg Dumbbell row

Figure 7: Dumbbell Squat

Figure 8: Standing Hamstring Curl

RESULTS

Table 1. International Knee Documentation and Committee (IKDC) and agility T-test scores before and after 32 weeks of rehabilitation

Outcomes	Pre-rehab	4 week	6 week	8 week	12 week	16 week	20 week	24 week	28 week	32 week
IKDC in %	18.3	25.0	32.0	45.0	56.0	65.0	76.0	78.0	83.9	91.9
Agility Test- in sec	13.5	13	12.5	12	11.8	11.5	11	10	9.5	8.1

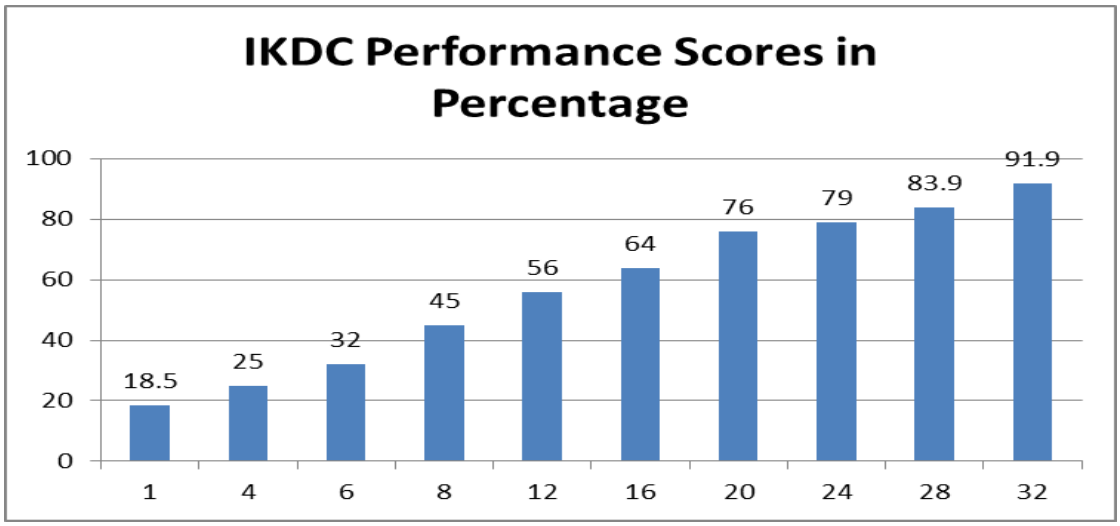

Figure 9. Pre and Post Test Value of International Knee Documentation and Committee (IKDC) Test

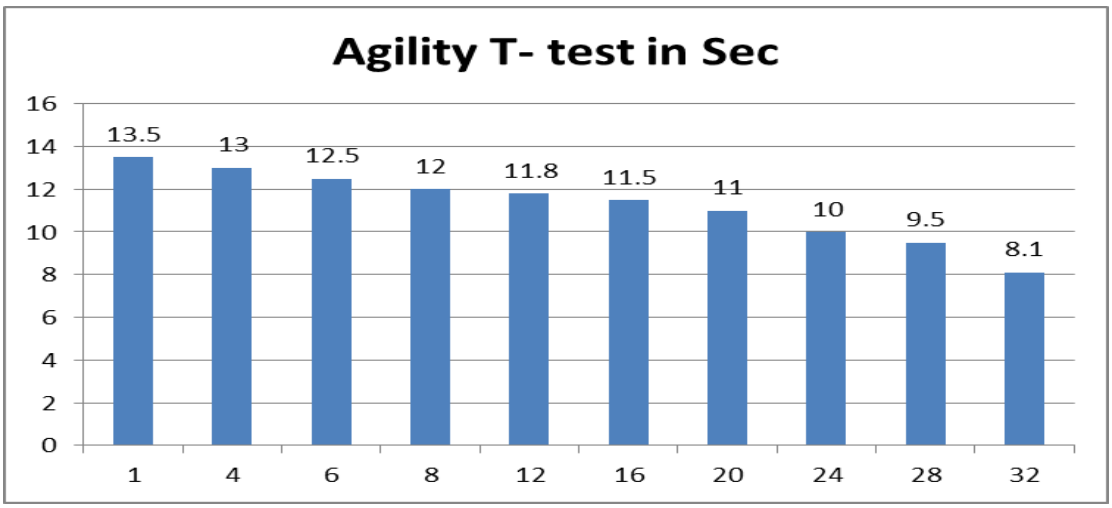

Figure 10: Pre and Post Test Value of AGILITY T-TEST

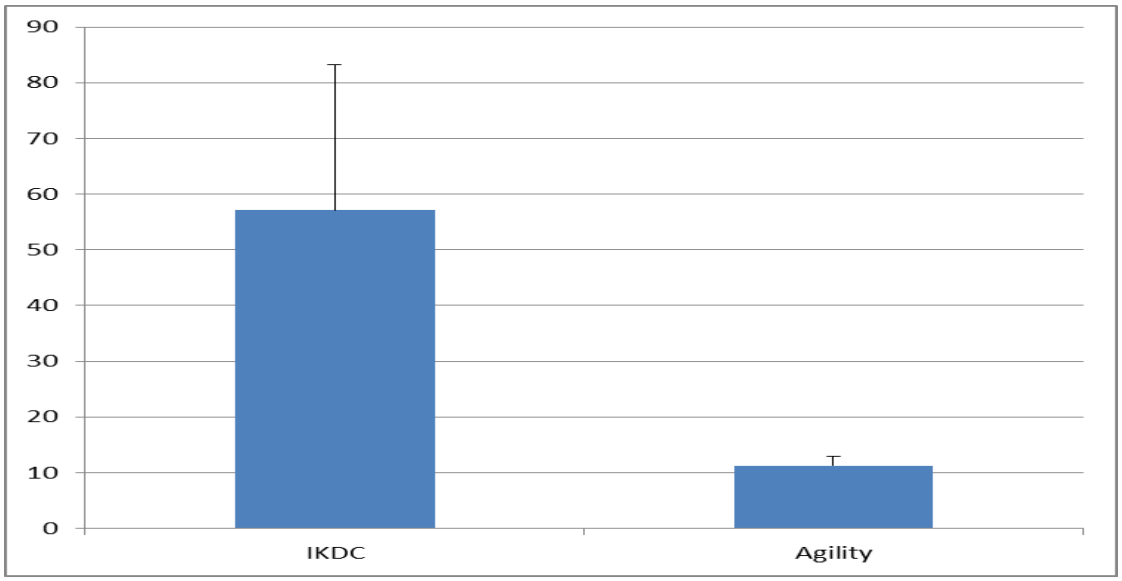

Figure 11. Average and Standard deviation of International Knee Documentation and Committee (IKDC) and Agility T test

The T-test is widely used to evaluate the ability of team sport athletes to change direction, including acceleration, deceleration, and lateral movement. The T-test is quite reliable and evaluates various aspects, including leg speed, leg power, and agility[15]. The IKDC test is a patient-oriented questionnaire that evaluates symptoms and functions in daily activities. It is a reliable and valid instrument that can be administered for a wide range of patients[16,21]. On the initial evaluation after the surgery, the IKDC score was 18.3% and the agility t-test score was 13.50 seconds. We reviewed the lower extremity and observed that it had progressed. After 16 weeks, the patient's agility, leg power, and leg speed had improved. The patient had achieved full ROM, and the pain and swelling had reduced. He could walk, run, and jog independently. The patient cleared the agility T-test with a score of 9.50 seconds, and the IKDC score was 83.9%. A patient follow-up was done at 32 weeks. The patient reported that he could carry on his daily activities without any difficulty. The T-test score was 7.90 seconds, and the IKDC score was 91.9%.

DISCUSSION

This report describes the pre- and post-surgical conditions, as well as the therapeutic strategy used, of a person who suffered from snapping knee syndrome. Muscle strength and coordination are intertwined. Reduced strength indicates a change in coordination, which might make it difficult to regain balance[22,23]. As a result, rehabilitation is required following knee surgery for a patient to return to a self-sufficient lifestyle. The literature relating to rehabilitation plans for LKS is limited. We followed the rehabilitation procedure described previously after ACL surgery in this study.

Rehab is highly beneficial to patients. After rehab, the power of the muscles of the lower extremities and balance are improved[13,14,24-26]. The physiological effects of exercise are muscle fiber type conversion, increased muscle cross-section area, increased muscle fiber peak power, increased voluntary activation of muscle, increased motor unit sychronization, and decreased co-activation of antagonist muscle[27]. Exercise also maintains muscle tissue, increases strength, improves bone health, controls body fat, prevents injuries[28], improves the mind–body connection, improves balance and co-ordination, and improves recovery time[29]. So research shows that rehabilitation after knee surgery is effective for patients in ADL and sports activities.

According to the T-test and IKDC scores, the pain and stiffness decreased after surgery, the ROM increased, and the functional and sports activities improved as a result of the rehabilitation regimen. Hence, the study showed that a rehabilitation protocol results in great improvement after biceps femoris tendon reinsertion surgery in an individual.

CONCLUSION

This study showed that after biceps femoris tendon surgery, a rehabilitation strategy is effective in reducing pain and stiffness and that it enhances the range of motion, functional ability, and sports performance of an individual.

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