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ARTHROSCOPIC RECONSTRUCTION FOR CHRONIC ANTERIOR CRUCIATE LIGAMENT TEAR CAUSING PERSISTENT KNEE INSTABILITY: A CASE REPORT

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ABSTRACT

Anterior cruciate ligament (ACL) injuries are a frequent cause of knee instability in young adults following traumatic events. Delayed presentation may lead to persistent pain, recurrent swelling, and progressive functional impairment. We present the case of a 34-year-old female who developed chronic pain and instability of the left knee after a slip-and-fall injury. Clinical evaluation, supported by magnetic resonance imaging, confirmed a complete tear of the ACL. The patient was successfully managed with arthroscopic ACL reconstruction using a quadrupled hamstring tendon autograft. Postoperatively, the patient demonstrated significant improvement in knee stability and functional outcome Lysholm knee scoring scale and IKDC scale following a structured rehabilitation program.

Keywords: Anterior Cruciate Ligament, Knee Instability, Arthroscopic Reconstruction, Hamstring Graft, Lysholm Knee Scoring Scale and IKDC Scale

Learning Points of the Article

- Chronic anterior cruciate ligament (ACL) tears can present with persistent knee pain, instability, and functional limitation even after minor trauma.
- Detailed clinical examination combined with MRI is essential for accurate diagnosis of chronic ACL injuries.
- Arthroscopic ACL reconstruction using a hamstring autograft is a reliable and effective treatment for restoring knee stability.
- Early surgical intervention in symptomatic chronic ACL tears helps prevent secondary meniscal injuries and early osteoarthritic changes.
- Structured postoperative rehabilitation plays a crucial role in achieving good functional outcomes after ACL reconstruction.

1. INTRODUCTION

The anterior cruciate ligament (ACL) is a critical stabilizing structure of the knee joint, playing a central role in controlling anterior translation of the tibia and contributing significantly to rotational stability(1,2). Injury to the ACL results in functional instability of the knee, predisposing patients to recurrent episodes of giving way, pain, swelling, and limitation in daily living activities(3). Although sports-related injuries account for a large proportion of ACL tears, non-sporting mechanisms such as domestic slip-and-fall accidents can also lead to significant ligamentous disruption(4). Such low-energy injuries may be underestimated and, when not promptly recognized or adequately treated, can result in

delayed presentation with chronic symptoms including persistent knee pain, recurrent effusions, and subjective instability(5).

Chronic ACL deficiency may further lead to secondary injuries such as meniscal tears and early degenerative changes, thereby adversely affecting long-term joint health(6,7). In symptomatic patients with functional instability who do not respond to conservative management, arthroscopic ACL reconstruction is considered the treatment of choice to restore knee stability and function(8). Among various graft options, hamstring tendon autografts are widely used due to their favorable biomechanical properties, lower donor-site morbidity, and reduced incidence of anterior knee pain compared to patellar tendon grafts(9,10).

The present case highlights a young female patient who developed chronic knee instability following a domestic slip-and-fall injury, diagnosed as a complete ACL tear. This report aims to emphasize the clinical significance of timely diagnosis and appropriate surgical management of ACL injuries resulting from low-energy trauma, as well as to demonstrate the effectiveness of arthroscopic ACL reconstruction using a hamstring tendon autograft in achieving satisfactory functional recovery(10).

2. CASE PRESENTATION

A 34-year-old female presented with a one-month history of left knee pain following a slip-and-fall injury at home. The patient reported that she slipped on a wet floor and fell with a twisting mechanism of the left knee, during which the knee was forced into partial flexion and valgus stress. She experienced immediate onset of pain over the anterior and medial aspects of the left knee, accompanied by mild swelling within a few hours of the injury. Since the incident, the patient has complained of recurrent episodes of knee instability described as “giving way,” particularly while walking on uneven surfaces, turning, and during stair climbing. She also reported intermittent swelling that worsened after prolonged standing or activity. Mechanical symptoms such as locking and clicking of the knee were noted, especially during knee flexion and extension, occasionally associated with transient restriction of movement. The pain was described as moderate in intensity, dull aching at rest with occasional sharp exacerbations during movement, and aggravated by activities such as squatting, stair negotiation, and prolonged walking. There was no history of prior trauma to the knee, no previous episodes of similar symptoms, and no history suggestive of inflammatory joint disease. She had not received any formal medical treatment immediately after the fall except for intermittent use of analgesics and local application of ice.

3. CLINICAL EXAMINATION

On local examination, there was no visible swelling, scar, or sinus. Tenderness was present over the medial joint line. Patellar tap test was positive. Range of motion of the knee was restricted and painful. Distal neurovascular status was intact.

Special tests performed showing:

- Lachman test – Positive
- Anterior drawer test – Positive
- McMurray test – Negative
- Valgus and varus stress tests – Negative

4. INVESTIGATIONS

Plain radiographs of the knee showed no significant bony abnormality. MRI of the left knee revealed a high-grade tear of the anterior cruciate ligament near its femoral attachment with anterior translation of the tibia. Posterior cruciate ligament and menisci were intact.

Figure 1

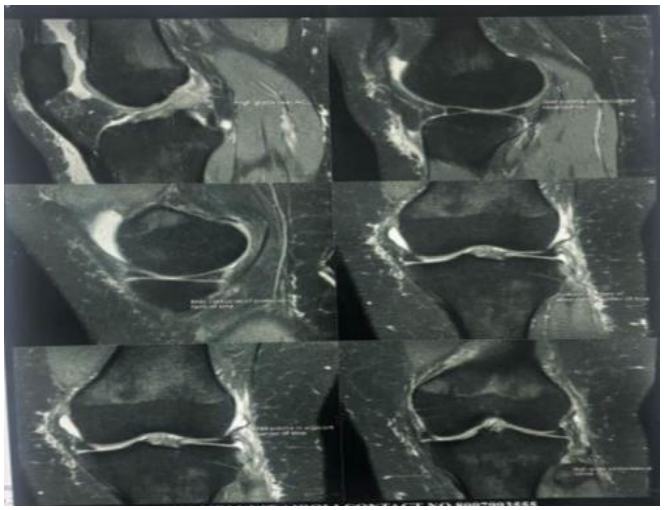

Figure 1 MRI of the Left Knee Joint Showing ACL Injury

5. SURGICAL TECHNIQUE

Patient positioning- The patient was positioned supine on the operating table under spinal anesthesia with a pneumatic tourniquet applied to the proximal thigh. The affected limb was prepared and draped in a sterile manner. Standard anterolateral and anteromedial arthroscopic portals were established.

Graft Harvesting and Preparation- A small longitudinal incision over the pes anserinus, the semitendinosus and gracilis tendons were identified, harvested using a tendon stripper.

Tibial Tunnel preparation- An ACL tibial guide was introduced through the anteromedial portal and positioned at the center of the native ACL tibial footprint, just anterior to the posterior cruciate ligament. A guide wire was drilled from the anteromedial tibial cortex into the joint. Sequential reaming was performed over the guide wire to create a tibial tunnel corresponding to the measured graft diameter. The tunnel aperture was visualized arthroscopically, and any debris was removed.

Femoral Tunnel Preparation- With the knee placed in hyperflexion, a femoral offset guide was positioned at the anatomic femoral footprint of the ACL on the medial wall of the lateral femoral condyle via the anteromedial portal. A guide pin was drilled through the lateral femoral cortex. The femoral tunnel was reamed to the predetermined depth and diameter suitable for the graft. The tunnel walls were inspected arthroscopically to confirm correct placement and to avoid posterior wall blowout. Tunnel length was measured to ensure adequate Endobutton seating on the lateral femoral cortex.

Graft Passage and Femoral Fixation- The prepared hamstring graft was passed through the tibial tunnel into the femoral tunnel using shuttle sutures. The Endobutton was advanced through the femoral tunnel and flipped over the lateral femoral cortex to achieve secure cortical suspension fixation, as confirmed by tactile feedback and arthroscopic visualization.

Tibial Fixation- With the knee positioned in near full extension and appropriate graft tension applied, tibial fixation was achieved using an interference screw.

Graft tension, position, and impingement were assessed arthroscopically through a full range of knee motion. The stability of the reconstruction was confirmed with a negative Lachman test intraoperatively. The portals and graft harvest site were closed in layers, and a sterile dressing was applied. Post-operative dressing was done at POD 2, POD 5, and POD 12, and suture removal was done on a post-operative day 12. According to the post-operative protocol for the ACL rehabilitation protocol, the patient was started on physiotherapy such as static quadriceps strengthening exercises, hamstring and quadriceps strengthening, and knee range of movements gradually. The patient in immediate postoperative period was made to walk partial weight-bearing with the walker with an extension knee brace and complete weight bearing with extension knee brace following suture removal. After 3 weeks, close chain exercises were started. Moreover, at the end of 6 weeks, the patient was able to walk independently.

Follow up- The total follow-up period was of 6 months postoperatively. At the final follow-up, the patient had a satisfactory range of movement in the operated knee. In addition to walking, climbing stairs, squatting, and sitting cross-legged, she is able to perform activities of daily living and is able to return to her occupational role as a labourer. There were no complications seen in the immediate post-operative and late post-operative period.

Figure 2

Figure 2 Torn ACL

Figure 3

Figure 3 Femoral Tunnel Preparation

Figure 4

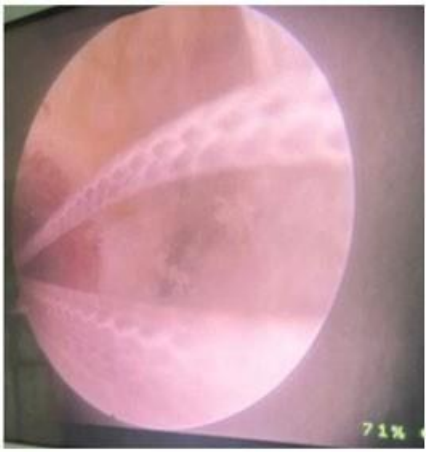

Figure 4 Graft Passage though Tunnel

Figure 5

Figure 5 Harvesting of Hamstring

Figure 6

Figure 6 Hamstring Graft Measurement

Figure 7

Figure 7 Femoral Cortical Suspension Using

6. OUTCOME MEASURES

Lysholm knee scoring scale

International Knee Documentation Committee score syste(IKDC)

Figure 8

Figure 8 Post Operative Knee Range of Motion During Follow Up after 6 Months.

7. DISCUSSION

Anterior cruciate ligament (ACL) injury is a common cause of knee instability and functional impairment, not only in athletes but also in individuals sustaining low-energy trauma such as slip-and-fall injuries, as seen in the present case(11,12).

Arthroscopic ACL reconstruction remains the gold standard for restoring knee stability in patients with symptomatic ACL deficiency who fail conservative management(13).

In the present case, functional outcomes were assessed using the Lysholm Knee Scoring Scale and the IKDC subjective knee evaluation form, both of which are widely accepted, validated tools for assessing patient-reported knee function following ACL reconstruction(14). The marked improvement in postoperative scores reflects significant symptomatic relief and functional recovery following surgical intervention(15).

The improvement in Lysholm score from a preoperative poor/fair category to an excellent category at 6 months postoperatively highlights the effectiveness of arthroscopic ACL reconstruction using hamstring tendon autograft in restoring knee stability and reducing symptoms such as pain, instability, and swelling(16).

Similarly, the substantial improvement in IKDC scores postoperatively reflects enhanced subjective knee function, improved confidence in knee stability, and the ability to resume routine daily activities without functional limitations(17). The use of hamstring tendon autograft for ACL reconstruction is well documented to provide good functional outcomes with lower donor-site morbidity compared to patellar tendon grafts, particularly with reduced incidence of anterior knee pain and kneeling discomfort(18,19). The minimally invasive arthroscopic technique further contributes to reduced postoperative pain, faster rehabilitation, and early restoration of range of motion. In the present case, the patient achieved satisfactory functional recovery within 6 months, emphasizing the benefits of combining arthroscopic reconstruction with a structured rehabilitation protocol(20).

The present report represents a single case, the observed improvement in functional outcome scores is consistent with existing literature reporting significant postoperative improvements in Lysholm and IKDC scores following ACL reconstruction.

8. CONCLUSION

Arthroscopic reconstruction of the anterior cruciate ligament using a hamstring tendon autograft resulted in substantial functional recovery and restoration of knee stability, as evidenced by significant postoperative improvements in Lysholm and IKDC scores. These findings underscore the effectiveness of surgical intervention in patients with chronic, symptomatic ACL injury.

CONFLICT OF INTERESTS

None.

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