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Original Article

Functional Outcome of Combined Anterior Cruciate Ligament Reconstruction and Illiotibial Band Tendoesis: A Prospective Interventional Study

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ABSTRACT

Introduction: Anterior cruciate ligament (ACL) injuries are one of the common causes of knee instability and functional disability in young active individuals. The incidence of ACL injuries has increased over recent years due to increased participation in recreational and competitive sports activities.
AIM: To evaluate functional outcomes of combined ACL reconstruction with iliotibial band tenodesis.
Methodology: This prospective interventional study was conducted in the Department of Orthopaedics at Dr. S.P. Medical College and Associated Hospitals from January 2024 to December 2025. A sample size of 40 patients with anterior cruciate ligament (ACL) tear along with high-grade pivot shift were included in the study.
Result: Combined ACL reconstruction with iliotibial band tenodesis resulted in significant improvement in IKDC, Lysholm, and Tegner activity scores along with marked reduction in pivot shift grade, indicating improved knee function and rotational stability. The majority of patients achieved excellent to good functional outcomes with minimal postoperative complications and no graft failure during follow-up.
Conclusion: Combined ACL reconstruction with iliotibial band tenodesis is an effective surgical procedure for improving functional outcome, knee stability, and rotational control in patients with ACL deficiency and high-grade pivot shift. The procedure demonstrated satisfactory postoperative recovery with excellent to good functional outcomes and minimal complications.

Keywords*: ACL reconstruction, ITB tenodesis, knee instability, orthopaedics.*

INTRODUCTION

Anterior cruciate ligament (ACL) injuries are one of the common causes of knee instability and functional disability in young active individuals.[1] The incidence of ACL injuries has increased over recent years due to increased participation in recreational and competitive sports activities. ACL tears often lead to knee instability, recurrent giving-way episodes, pain, functional impairment, and limitation of physical activities. If left untreated, chronic ACL deficiency leads to secondary meniscal injuries, chondral damage, and early osteoarthritic changes, thereby significantly affecting quality of life and long-term knee function[2,3].The anterior cruciate ligament plays an important role in maintaining both anteroposterior and rotational stability of the knee joint by preventing anterior translation of the tibia and controlling rotational movements during dynamic activities[4-5]. Although arthroscopic ACL reconstruction has now become the gold standard treatment for symptomatic ACL-deficient knees, residual rotational instability remains a major concern following isolated intra-articular reconstruction. Chronic pivot shift and rotational laxity have been associated with inferior functional outcomes, delayed return to sports, reduced patient satisfaction, and increased risk of graft failure[6]. Among various lateral augmentation procedures, iliotibial band (ITB) tenodesis or lateral extra-articular tenodesis (LET) is the most preferred. As it reinforces the anterolateral structures of the knee and acts as a secondary restraint to internal tibial rotation, thereby reducing stress on the reconstructed ACL graft[7]. Clinical studies have shown that addition of LET to ACL reconstruction lowers graft

rupture rates and improves postoperative knee stability, particularly in high-risk patients such as young athletes, individuals with generalized ligamentous laxity, high-grade pivot shift, revision ACL surgery, and patients returning to high-demand physical activities.Functional outcome assessment following ACL reconstruction is commonly done by using validated scoring systems such as the International Knee Documentation Committee (IKDC) score, Lysholm knee score, and Tegner activity scale, which help evaluate knee function, symptoms, activity level, and return to sports[8,9-10]. Clinical stability is assessed by using Lachman test, anterior drawer test, and pivot shift test.[11] Considering the increasing interest in combined ACL reconstruction and ITB tenodesis procedures, the present study was conducted to evaluate the functional outcomes, rotational stability, and postoperative complications following arthroscopic single-bundle ACL reconstruction with iliotibial band tenodesis in patients with ACL deficiency associated with high-grade pivot shift.[12] The study also aimed to assess improvement in functional scores following surgical intervention over the follow-up period.

AIM

To evaluate functional outcomes of combined ACL reconstruction with iliotibial band tenodesis.

METHODOLOGY

This prospective interventional study was conducted in the Department of Orthopaedics at Dr. S.P. Medical College and Associated Hospitals from January 2024 to December 2025. A sample size of 40 patients with anterior cruciate ligament (ACL) tear along with high-grade pivot shift were included in the study. Patients Age 18–45 years, ACL tear, high-grade pivot shift were involved .Patients with Multiligament injuries, osteoarthritis, prior surgery were excluded from the study.Institutional Ethics Committee approval obtained.All patients underwent detailed clinical evaluation, radiological assessment, and preoperative functional scoring. Arthroscopic ACL reconstruction using hamstring autograft was performed. Femoral and tibial tunnels were created anatomically. ITB tenodesis was performed using the modified Lemaire technique to augment rotational stability. Later , all patients followed a rehabilitation protocol.Early mobilization with a range of motion exercises initiated on day 1. Progressive weight-bearing allowed. Strengthening exercises introduced gradually. Return to sports permitted after 6–9 months.

RESULT

Table 1: Baseline Characteristics of Patients (n = 40)

Age Group (Years)		
18–25 years	15	38%
26–35 years	18	45%
36–45 years	7	17%
Male	32	80%
Female	8	20%
Sports injury	24	60%
Road traffic accident	10	25%
Fall/twisting injury	6	15%
Right knee	23	57.5%
Left knee	17	42.5%

The present study included 40 patients, with the majority belonging to the 26–35 years age group (45%), followed by 18–25 years (38%) and 36–45 years (17%). Male patients predominated the study population, accounting for 80% of cases.Sports-related trauma was the most common mode of injury (60%), followed by road traffic accidents (25%) and fall/twisting injuries (15%). Right knee involvement was observed in 57.5% of patients, while 42.5% had left knee involvement.

Table 2: Comparison of Functional Outcome Scores Before and After Surgery

Functional Score	Preoperative Mean	Postoperative Mean
IKDC Score	46.2	86.5

Lysholm Score	52.4	91.2
Tegner Activity Level	3.1	6.5

Significant improvement was observed in all functional outcome scores following combined ACL reconstruction with ITB tenodesis. The mean IKDC score improved from 46.2 preoperatively to 86.5 postoperatively, while the Lysholm score increased from 52.4 to 91.2 and the Tegner activity level improved from 3.1 to 6.5.

Table 3: Pivot Shift Test Outcome

Pivot Shift Grade	Pre-op n (%)	Post-op n (%)
Grade 0	0	31
Grade 1	8	9
Grade 2	22	0
Grade 3	10	0

A marked reduction in pivot shift grade was observed postoperatively following combined ACL reconstruction with ITB tenodesis. Preoperatively, most patients had Grade 2 and Grade 3 pivot shift, whereas postoperatively 31 patients achieved Grade 0 stability and none demonstrated Grade 2 or Grade 3 pivot shift.

Table 4: Functional Outcome Based on Lysholm Knee Score

Outcome Grade	Score Range	N(%)
Excellent	95-100	18(45%)
Good	84-94	16(40%)
Fair	65–83	5(12.5%)
Poor	<65	1(2.5%)

Based on Lysholm knee scoring, the majority of patients achieved excellent to good functional outcomes following combined ACL reconstruction with ITB tenodesis. Excellent results were observed in 45% of patients, good in 40%, fair in 12.5%, and poor outcome in only 2.5% of cases.

Table 5: Postoperative Complications

Complication	Number of Patients	Percentage (%)
Knee stiffness	2	5%
Superficial infection	1	2.5%
Persistent instability	2	5%
Graft failure	0	0%
No complications	35	87.5%

Postoperative complications were minimal in the present study, with most patients (87.5%) having an uneventful recovery following combined ACL reconstruction with ITB tenodesis. Knee stiffness and persistent instability were observed in 5% of patients each, superficial infection in 2.5% of cases, while no graft failure was reported during follow-up.

DISCUSSION

The mean age in our study was 27.5 years. 80% of total cases were male, while females were 20% of patients. 60% of patients had Sports-related injuries , while Road traffic accidents were seen in 25% of cases, fall or twisting injuries contributed to 15% of cases.57.5% of patients had Right knee involvement , while left knee involvement was in 42.5% of patients. This is inconsistent with the study by Arora M et al[13] who reported the mean age of the study population was 22.4 ± 2.7 years and 84% were males.

The mean IKDC score improved from pre operative 46.2 to 86.5 postoperatively.Similarly, the mean Lysholm score increased from 52.4 to 91.2 after surgery. The Tegner activity level also improved from 3.1 preoperatively to 6.5 postoperatively,indicating marked improvement in knee function and stability..Similarly Lutz C, et al[14] reported a mean follow-up of 43.1 months, the subjective IKDC, Lysholm, ACL-RSI and objective IKDC scores were significantly improved (59.8 vs. 94.5 $p < 0.0001$, 75 vs. 99 $p < 0.0001$, 60 vs. 93 $p < 0.0001$, IKDC A 0% vs. 72%, B 12% vs. 27%, C 60% vs. 1% D 28% vs. 0% $p < 0.0001$). The Tegner activity level was 9 (3–10) before the accident and 9 (3–10) at the last review.

Improvement was observed in rotational knee stability following combined ACL reconstruction with ITB tenodesis which was assessed by the pivot shift test. Preoperatively, none of the patients had Grade 0 pivot shift, while Grade 2 pivot shift was present in 22 patients and Grade 3 in 10 patients, indicating severe rotational instability. Grade 1 pivot shift was observed in 8 patients before surgery. Postoperatively, 31 patients achieved Grade 0 pivot shift, which showed restoration of rotational stability. The remaining 9 patients showed only Grade 1 pivot shift, while no patient had Grade 2 or Grade 3 instability after surgery..Hassan et al[15] reported that preoperatively, in group A 18 (90%) patients were grade III (gross), one (5%) patient was grade II (clunk), and one (5%) patient was grade I (smooth gliding). In group B, 16 (80%) patients were grade III (gross), three (15%) patients were grade II (clunk) and one (5%) patient was grade I (smooth gliding). P value more than 0.05. Postoperatively, in group A all patients were normal (grade 0), while in group B 15 (75%) patients were grade I (smooth gliding) and five (25%) patients were grade II (clunk) and the difference between the two groups was statistically significant ($P<0.05$

Functional outcome was assessed based on the Lysholm knee scoring system demonstrating favorable postoperative results in the majority of patients. Excellent outcomes were achieved in 18 patients (45%). Good outcomes were in 16 patients (40%). Fair results were in 5 patients (12.5%) with scores between 65–83. Only one patient (2.5%) had a poor functional outcome with a score below 65. Bezawada PR et al[19] Among 30 patients included in this study, 20 (66.6%) were males and 10 (33.3%) were females. The indications for LEAT were young, high-demand sports activity in 6 (20%) cases, hyperextension of the knee >10° in 12 (40%) cases, chronic ACL injuries (>3 months) in 8 (26.66%) cases, and revision ACLR in 4 (13.33%) patients.All the patients returned to their normal preinjury level with a Tegner Lysholm knee function score of 94.73 ± 3.79 (maximum score 100; score >90 = excellent function) at a mean follow-up of 3 ± 1.2 years.

Postoperative complications were minimal in the present study. 87.5%, did not develop any postoperative complication and had satisfactory recovery during follow-up. Knee stiffness was in 2 patients (5%), while persistent instability was also noted in 2 patients (5%).1 patient (2.5%) have Superficial surgical site infection and was managed successfully with appropriate treatment. No case of graft failure was reported during the study period. The procedure demonstrated a favorable safety profile with low complication rates and satisfactory postoperative outcomes.Lutz C, et al[14] Ten patients had graft rupture (5.6%). Four (2.4%) patients had a contralateral ACL rupture, and seven (4%) underwent a reoperation with meniscectomy.

CONCLUSION

Our study showed that combined anterior cruciate ligament (ACL) reconstruction with iliotibial band (ITB) tenodesis provides improvement in functional outcomes, knee stability, and rotational control in patients. Postoperative improvement was observed in IKDC, Lysholm, and Tegner activity scores.A reduction in pivot shift grade was observed postoperatively, confirming the effectiveness of ITB tenodesis in controlling residual rotational instability. The majority of patients achieved excellent to good functional outcomes based on Lysholm knee scoring. In addition, postoperative complications were minimal, and no graft failure was observed during the follow-up period, suggesting that the combined procedure is safe and effective.Combined ACL reconstruction with iliotibial band tenodesis provides superior functional outcomes and rotational stability. It is recommended in patients with high-grade instability and high functional demands

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