

## Functional Outcome of Anterior Cruciate Ligament Reconstruction with Quadrupled Semitendinosus Tendon Autograft

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### Abstract:

**Introduction:** The anterior cruciate ligament tear is the most common severe ligamentous injury to the knee. Arthroscopic ACL reconstruction is indicated, with many graft possibilities including quadrupled semitendinosus and gracilis, doubled peroneus, quadriceps tendon, and bone patellar tendon-bone. So, the current study was conducted to evaluate the functional outcome of anterior cruciate ligament reconstruction with quadrupled semitendinosus autograft.

**Materials and Methods:** The present prospective study comprised 30 patients under the age of 55 years who were referred with ACL deficit to the orthopedic department of a Mallareddy Institute of Medical Sciences in Hyderabad between August 2021 and July 2022 and had arthroscopic ACL Reconstruction. They were examined utilizing the Lysholm and Gilquist knee grading system. Patients were followed up for a minimum of one year.

**Results:** In the present study, out of 30 patients, 23(76.7%) were male and 7(23.3%) were female patients aged between 18 and 50 years were included in this study, with 24 (80%) being younger than 36 years. 19 patients (63%) had knee involvement on the right side, while 11 patients (37%) had knee involvement on the left side.. As per the Lysholm scoring system, 11 (36.7%) patients had an Excellent outcome; 15 (50%) had a Good outcome. complications were seen in only 6 patients

**Conclusion:** In conclusion, quadrupled semitendinosus graft arthroscopic ACL Reconstruction yields excellent functional outcomes with low morbidity.

**Keywords:** Arthroscopy, Anterior Cruciate Ligament Reconstruction, Functional Outcome.

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### Introduction

The knee joint is the most usually injured of all joints, and the anterior cruciate ligament is the most frequently injured ligament.[1,2] The Anterior Cruciate Ligament (ACL) is considered important to the knee's regular function.

The modern world of high-speed motorcycles and vigorous physical sports has resulted in a rise in knee ligament injuries. [3] Anterior knee instability caused by ACL rupture is a problematic clinical condition in general, particularly among athletes. The ACL heals poorly.

The necessity for surgical correction of ACL injuries arises because uncorrected full ligament injury causes growing symptomatic instability, recurrent

injury, and destruction to the meniscus and articular cartilage, resulting in early osteoarthritis.[4-6]

Numerous authors have described effective ACL (ACLR) reconstruction using autografts (e.g., patellar tendon, hamstring tendons, distally based iliotibial band (ITB), fascia late, etc.) and allografts.[7-11]

The bone-patellar tendon-bone autograft is widely recognized as the gold standard for ACL Reconstruction, with a high success rate.[12-14] So, the current study was designed to evaluate the functional outcome of anterior cruciate ligament Reconstruction with quadrupled semitendinosus autograft..

## Materials and Methods

This a prospective study conducted in the department of Orthopaedics, Mallareddy Institute of Medical sciences, Hyderabad, from august 2021 to July 2022. There were 30 patients included in our study.

**Inclusion Criteria:** Patients with MRI-confirmed ACL tears aged 15-55 years, both male and female, History of recurring and episodic knee instability (ACL tear), No previous knee surgery and a normal contralateral knee.

**Exclusion Criteria:** The study excluded patients who were lost in follow-up, unwilling to participate, or had concomitant conditions such as PCL tears, Meniscal injuries, tibial plateau fractures, infection, or bilateral knee injuries. Patients who met the inclusion and exclusion criteria were selected for the study. When the patient was admitted, a complete history was conducted after obtaining informed consent to ascertain the cause of injury and the severity of the trauma. The patients' clinical laxity was measured using the Lachman and Anterior drawer tests, with scoring done using the Lysholm and IKDC knee scoring systems. Prior to surgery, patients underwent an anteroposterior and lateral MRI of their afflicted knee. Sonography was used to check the alignment of the lower extremities.

**Operative technique:** The examination was performed under spinal anesthesia on all individuals. Diagnostic arthroscopy was conducted via an anterolateral portal. ACL tears were detected, and meniscal injuries and cartilage lesions were evaluated if they existed. The Semitendinosus tendon is extracted and prepared for a quadrupled graft by a separate anteromedial incision over the proximal tibia. The graft diameter was measured and noted. The femoral tunnel was created using 1-2mm of the posterior wall and 3mm of the inferior wall, with a diameter that corresponded to the graft's femoral end. The tibial tunnel was created in the center of

the ACL's tibial stump, with a diameter that corresponded to the graft's tibial end. The graft was passed via tunnels, and cycling was performed. The graft was fixed on the femoral side with an endobutton (suspensory fixation), and on the tibial side with an interference screw (aperture fixation). Short grafts on the tibial side were treated with supplemental suspensory fixation.

**Post-operative Period:** Immediate post-operative complications, including post-operative edema, compartment syndrome, and neurological and vascular injury, were evaluated. Patients were hospitalized to the hospital for two days following surgery and then discharged. Rehabilitation began on post-op day one.

**Follow up:** Patients were monitored at regular intervals after surgery for two weeks, six weeks, ten weeks, six months, nine months, and a year. All patients went through an intensive rehabilitation regimen. They were assessed using the International Knee Documentation Score 2000 (IKDC) and the Lysholm-Gilquist knee grading system.

The Lisholm-Gilquist Knee Pain Score System.[15]

It used a scoring system of Excellent-95-100, Good-84-94, Fair-65-83, and Poor-64 and below.

**Statistical Analysis and Methodologies:** Data was entered into a Microsoft Excel spreadsheet and analyzed using IBM SPSS 22.0 version USA. Qualitative data were presented as percentages and proportions.

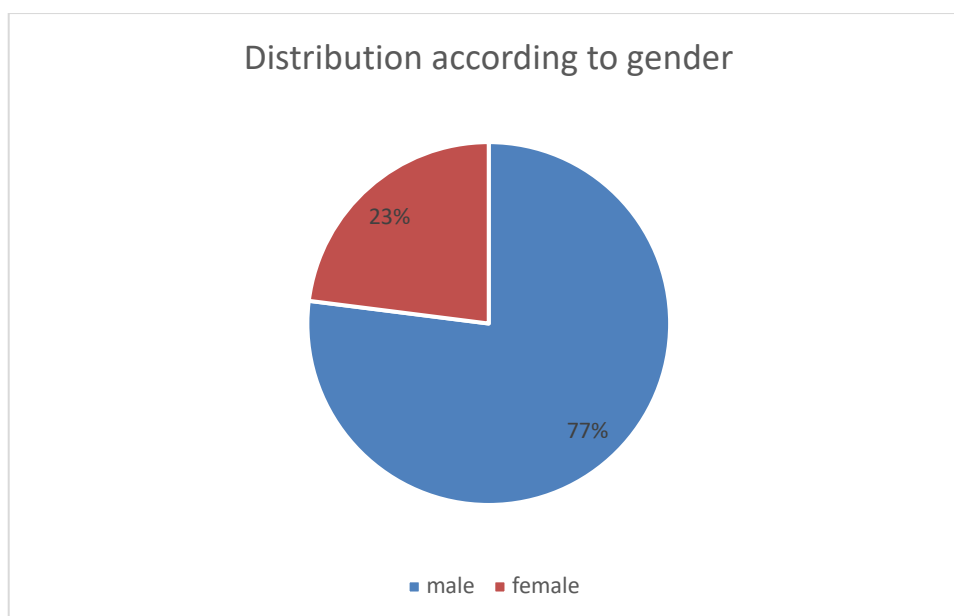
## Results

We included 30 patients in our study based on qualifying criteria. In our study, the majority of the patients, 15 (43.3%), were between the ages of 26 and 35, with 9 (33.3%) from 15 to 25 and 4 (16.7%) from 36 to 45. The lowest proportion was from the 45-55 age range, with only two (6.7%) (Table 1).

**Table 1: Distribution according to age**

Age group	Frequency (n)	Percentage (%)
15-25	9	30
26-35	15	50
36-45	4	13
46-55	2	7

There were 23 (77%) male patients and 7 (23%) female patients (Fig 1)



**Figure 1: Distribution according to gender**

Out of 30 knee injuries, 19 (63%) had right-sided involvement, while 11 (37%) had left-sided involvement (Table 2).

**Table 2: Distribution according to the knee involved**

Knee involved	Frequency (n)	Percentage (%)
Right	19	63
Left	11	37

Sports were the most common mode of injury in 16 patients (53%), followed by road traffic accidents in 11 (37%), and falls in 3 (10%) (Table 3)

**Table 3: Distribution according to the mode of injury**

Mode of injury	Frequency (n)	Percentage (%)
Sports	16	53
RTA	11	37
Fall	3	10

The Lysholm and Gillquist knee rating scale was used to evaluate post-surgical outcomes. The outcome was excellent in 11 (53%), good in 15 (3.3%), and fair in 4 (13.3%) individuals (Table 4).

**Table 4: Outcome assessment**

Outcome assessment	Frequency (n)	Percentage (%)
excellent	11	36.7
Good	15	50
fair	4	13.3

Only six of the 30 individuals who underwent surgery developed complications. In three patients, anterior knee discomfort was a prevalent consequence. Superficial infection, deep infection, and extensor leg were found in one patient each, accounting for 3.3% (Table 5).

**Table 5: Distribution according to the complications**

Complications	Frequency (n)	Percentage (%)
Anterior knee pain	3	10
Superficial infection	1	3
Deep infection	1	3
Extensor leg	1	3

## Discussion

In this study, 30 patients received arthroscopy-assisted anterior cruciate ligament Reconstruction

with quadrupled semitendinosus and gracilis autografts. The ACL is one of the most often torn ligaments in knee injuries, and several ACL recon-

structions are performed. ACL reconstruction surgery is advised for patients who have sustained an ACL damage, as conservative treatment has been linked to poor functional outcomes.

Graft alternatives for reconstruction include both autografts and allografts. Patellar Tendon graft, semitendinosus, and Gracilis autografts are all viable choices for ACL Reconstruction. Semitendinosus post-surgical results were shown to be comparable to patellar tendon grafts, however patellar tendon grafts are linked with donor site morbidity such as anterior knee and kneeling pain.[16-18]

In the current study, male patients account for 77% of all ACL tears. In the Patel et al [19] trial, 75% of the patients were male; in the Jomha et al [20] and Bach et al [21] studies, the percentage of male patients was 73% and 74%, respectively. Out of 30 knee injuries, 19 patients (63%) had right-sided involvement, while 11 patients (37%) had left-sided knee involvement. According to Awasthi et al. [22], 36 patients (56.25%) had right-sided anterior cruciate ligament deficit, whereas 28 (43.75%) had left-sided involvement.

In our investigation, Lysholm and Gilquist scores yielded 'excellent' and 'good' results in 87% of participants. Lysholm and Gilquist [23] investigated 60 instances in all and found excellent or good results in 88% of them.

They had 8% fair results and 4% poor outcomes. In our study, just six of the 30 individuals who underwent surgery experienced problems. Awasthi et al reported that 9.4% of patients experienced pain, 7.8% had an infection, and 6.25% had a stiff knee.[22]

### Conclusion

Males are more likely to experience anterior cruciate ligament injuries. The occurrence of anterior cruciate ligament tears has grown as a result of greater RTA and participation in leisure sports. Arthroscopic ACL Reconstruction with quadrupled semitendinosus graft yields consistent, excellent functional outcomes with minimum morbidity.

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