

# FUNCTIONAL OUTCOME OF ARTHROSCOPIC RECONSTRUCTION OF ANTERIOR CRUCIATE LIGAMENT USING QUADRUPLED SEMITENDINOSUS AUTO GRAFT

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## ABSTRACT

**Objective:** To determine the functional and clinical results of Arthroscopic reconstruction of the anterior cruciate ligament by utilizing quadrupled semitendinosus autograft.

**Methodology:** This Descriptive Prospective study was carried out In Orthopedic Division of Abaseen Medical Centre, Peshawar, and KPK Pakistan from December 2017 to December 2018. After taking permission from Hospital ethical committee and taking an informed consent, a total of forty two Patients included in the study. A comprehensive history regarding the symptoms of injury, its duration, pathogenesis and nature of trauma was properly taken. Any medical comorbidity, details of the primary treatment were also noted. Physical examination was done followed by radiograph-ic investigation. All the patients then underwent surgical treatment of anterior cruciate ligament (ACL) reconstruction and then post operative clinical and functional outcome was obtained using functional knee score. Data was analyzed using SPSS version 21.

**Results:** Of the total 42 Patients included in the project, the mean age was 33.02+11.03years. All were male (100%). Most common injury were caused by road traffic accidents 26(61.9%). Sports injury 11 (26.2%). Fall 5(11.9%) patients. Lachman test was positive in 37 (87.5%) patients and Pivot shift test was found to be positive in 26(62.5 %) in preoper-ative evaluation. After 6 month follow up, Lachman test was found to be negative in all 42pts (100%) with grade 3 ACL injury, while pivot shift test was negative in 34(81.25%) and remained positive in 8 (18.75 %) patient.

**Conclusions:** This study concluded that injuries to the ACL are predominant in younger patients and Arthroscopic Reconstruction of the cruciate ligament of the Knee joint by quadrupled semi-tendinosus auto-graft has good clinical results.

**Key words:** Anterior cruciate ligament, Quadrupled-semitendinosus auto-graft, Arthroscopic reconstruction.

## INTRODUCTION

Knee joint is the largest joint of the body. It is one of the strongest as well as most important joint of the body involved with locomotion. Numerous muscles and ligaments support the knee joint and stabilize. Injuries and age related change of the knee joint are a rather common presentation in clinical practice. The most common damaged ligament of the knee in the human body is ACL.<sup>1</sup> The primary stabilizer of the knee is ACL and this protects the knee from anterior translation.

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It is also common to counteract the stress of rotation and valgus<sup>2</sup>. In previous studies, the estimated frequency of ACL between 0.24-0.34 /1000 population per year. The ACL rupture is the most common serious injury of the knee.<sup>3,4</sup>

There was a lower cumulative incidence of OA among ACL-reconstructed patients (33.1%) than among non-reconstructed patients (40.3%).<sup>5</sup> Rehabilitation has been highlighted as one of the most important factor in ACL injury management, better to surgical reconstruction.<sup>6</sup> ACL rehabilitation does not ensure successful results a recovery of performance is followed.<sup>7</sup> There are minimal differences noted between rehab after reconstruction or rehabilitation alone with regards to function, and re-injury.<sup>8</sup>

ACL reconstruction with autografted tendons (semitendinosus gracilis muscles) is a common and successful practice frequently used now a days.<sup>9</sup> The semitendinosus tendon autograft is becoming the graft of choice in ACL reconstruction. The advantages with semitendinosus graft are availability of a greater cross sectional area and unaffected integrity of the extensor mechanism.<sup>10</sup> ALC reconstruction was carried out with

a donor autograft (hamstring tendon, patellar tendon or quadriceps tendons) and allograft (Achilles, patellar tendon, hamstring tendon or Iliotibial anterior tendons), attempts have been made using synthetic graft. Silver wire, Fascia lata, and Iliotibial band.

This study aimed at evaluation of the post-surgical function and quality of life after ACL reconstruction arthroscopically.

## METHODOLOGY

This was a Descriptive prospective study carried out in Orthopedic Division of Abaseen Medical complex, Peshawar, KPK, Pakistan, conducted from December 2017 to -December 2018.

42 participants were recruited into the study program after taking informed consent and approval from hospital ethical committee.

The patients selected by Consecutive sampling (Non-probability sampling technique) and all those patients were included who had complete grade 3 ACL tear for at least 6 weeks which was confirmed on MRI.

Patients with similar comorbidities were excluded from the study. Joint infection and history of injury to the ligaments in the same knee were also excluded from participating in the study.

Demographic details of patients (name, age) were obtained. History was taken regarding the nature of injury with special emphasis on the mechanism of injury, duration of injury and symptoms associated with it. Any medical comorbidity, details of the primary treatment were also noted. Physical examination was done followed by radiographic investigation. Two team's member performed Lachman and pivot test on all the patients and these test were performed on the basis of the clinical diagnosis and analysis of post-surgical results. The physical evaluation and x-ray were recorded preoperatively. After preoperative optimization for Anesthesia, all the patents underwent surgical intervention, one surgeon with the help of the same operating team and instruments performed all the operations using autologous semitendinosus' tendon autograft. Postoperatively, patients were evaluated for any complication and clinical and functional outcome noted 6 months after surgery. All patients were given a structured postoperative treatment procedure, which was monitored by two personnel and recorded compliance. In the first three weeks after the surgery, knee braces were utilized for controlled mobilization of the patients. Partial weight bearing assistance was permitted in the first three weeks after surgery. During the last follow up of the patients, ROM, stability and knee proprioception were all assessed in comparison with the healthy side. At the last follow-up, ROM, stability and knee proprioception was measured against the healthy side. The collected data was analyzed using SPSS 21.0. Descriptive statistics were used and t test

(paired or unpaired), was appropriately applied to the collected data. Significance was established at  $p < 0.05$ , confidence interval was 95% and margin of error 5%. Quantitative data like age, were presented as means and standard deviation and qualitative data like age groups, pre and postoperative functional outcome was presented as frequency and percentages.

## RESULTS

Out of the total 42 Patients included in this study, the mean age was  $33.02 \pm 11.03$  years. All the 42 patients in the study were male (100%). Most common injury were caused by road traffic accidents 26(61.9%), while sports activities like match, jogging and golf in 11(26.2%) patients, and 5(11.9%) with fall while doing daily activities like slip and climbing upstairs and down stairs. All the patients had acute ACL tear. Left knee was affected in 26(61.9%) and right knee was affected in 16(38.1%). Table 1

**Table 1: Demographic characteristics of patients**

No of Patients	42
Gender	Male
	42(100%)
Mean Age	33.02+11.03
Mechanism of Injury	
Road Traffic Accident	26 (61.9%)
Sports	11 (26.2%)
Fall	5 (11.9%)
Side of Injury	
Left Knee	26(61.9%)
Right Knee	16(38.1%)

**Table 2: Clinical Evaluation of patients**

Clinical test	Result	Preoperative clinical Result	Postoperative Clinical Result
Lachman Test	Positive	37	0 / (0%)
	Negative	5	42/ (100%)
Pivot Test	Positive	26	8 / (18.75%)
	Negative	16	34/ (81.25%)

**Table 3 Postoperative results according to functional knee score**

Scoring	No of patients (%)
Excellent (80-100)	29(69.0%)
Good (70-79)	8(19.05%)
Fair (60-69)	5(11.9%)
Poor (<60)	0

Lachman test was positive in 37(87.5% and negative in 5 (12.5%) patients. Pivot test was found to be positive in 26(62.5% and negative 16 (37.5%) pts by preoperative evaluation. By post-operative evaluation after 6 month follow up ,Lachman test was found to be 100% positive with grade 3 ACL injury , and pivot shift test was negative in 34 81.25% and remained positive in 8( 18.75% )pts. Table 2

About 68.75% patients showed that results as excellent with score (80-100), 18.75% of the patients gained good with score between (70-79) and 12.5% of the patients was fair with score 60-69 and no one patients was gained poor score. Table 3

Paired t test was applied to compare the pre and postoperative knee scoring system. There was significant correlation with p value < 0.05 and mean preoperative score was 44.46 with improved postoperative score of 79.81 after anterior Ligament reconstruction.

## DISCUSSION

With other recent advances & development, ACL reconstruction surgery has made great progress in the last period of ten years. A number of studies have explored many factors that are involved in the various technical aspects of ACL reconstruction. Our study contain 42 cases which have been handled in last one year. We used the Lysholm knee score to measure the results as this is statistically verified and commonly used as a better rating system.

Vikas et al., used combined reconstruction where they utilized semitendinosus tendon for intra articular and illo tibial band for extra articular augmentation. They reported 80% excellent, 32% good, 8% fair results. They had no poor results.<sup>11</sup> They did however use other scoring system. In our study, postoperative scoring system, excellent score was 68.75%, Good score was 18.75% and fair score was 12.5%.

Six month follow up study was also done in 2015. 88% patients preoperatively showed in grade 2 positive pivot shift test while postoperatively 94% patients improved to grade 0 in pivot shift test. Similarly, 84% patients were having grade 2 positive lachman test preoperatively which improved to 86%, showing grade 0 lachman test and only 10% showed grade 2 positive lachman test.<sup>12</sup>

In present study 100% of the patients' recovered postoperative recovery in lachman test and 81.2% improved in pivot shift test. Comparable to another study done in 2017, 92% of the patients graded their postoperatively recovery as normal according to knee society score.<sup>13</sup> Noojin et al published findings with a difference p< 0.05 between the clinical failure in women 23% and men 4% in a group of sixty five participating patients who had undergone anterior cruciate reconstruction with a four strands hamstring auto graft. <sup>14</sup>But in our study all patients were males. Similar Khan et al, reported that

no one female were also came with ACL rehabilitation only male were included.<sup>12</sup>

## CONCLUSION

This conclusion concluded that, among younger generation, ACLinjuries were common. The most common cause among males was road accident, followed by sports injuries. Arthroscopy reconstruction using quadrupled semitendinosus autograft is a very good treatment option in patients with complete ACL tear.

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