



Original Article

## Comparative study of treatment results for anterior cruciate ligament reconstruction with allograft and autograft

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### Abstract

**Background:** Considering high incidence of anterior cruciate ligament (ACL) reconstruction using autograft or allograft for replacement of ACL ruptures, the present study was designed to compare the treatment results of allograft and autograft in ACL reconstruction.

**Methods:** In this cross-sectional study, 58 cases with isolated ACL reconstruction (20 cases with allograft, 38 with autograft) were evaluated using the stability tests of International Knee Documentation Committee (IKDC) and Lysholm knee questionnaire, and mean range of motion (ROM), clinical results for Lachman and pivot-shift tests.

**Results:** Mean ages for allograft group was 27.45(24-38) years and in autograft group 30.21(21-49). There was no statistically significant difference in both groups regarding to performed tests.

**Conclusion:** Based on the achieved results and similar treatment outcomes for autograft and allograft groups, use of allograft for reconstruction of ACL is recommended.

**Keywords:** ACL reconstruction, IKDC score, Lysholm score.

### Introduction

Anterior cruciate ligament (ACL) injury is a common knee ligament injury with unknown exact incidence. The ACL is the main stabilizer in prevention of anterior tibial translation (translocation) and is responsible for 85% of limitation for anterior trans-

fer of tibia in regard to femur. It has also role in tibial rotation limitation and varus-valgus stability in full extension (1).

The ACL reconstruction has become one of the most common procedures in the knee surgery in recent decades. There are two major source of harvested ligament, autograft (from the patient) and allograft (an organ donor) resources (2).

The first choice of graft selection in reconstruction is autograft, but allograft and synthetic grafts are also available. Fewer inflammatory reactions and viral infection transmission are from the advantages of autograft use, and on the other side, no morbidity in donor site, smaller surgical incisions, shorter operation and tourniquet time are of the advantages of the allograft (3-5).

Numerous studies have been conducted to compare the results of allograft and autograft with different and sometimes contradictory results (10-13).

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This study compared the results of the ACL reconstruction with allograft versus autograft.

### Methods

The study was approved by our center ethics board.

All patients with isolated injury of ACL undergoing arthroscopic ACL reconstruction using autograft or allograft from 2008 to 2012 with minimum 12 months follow up were enrolled.

We reviewed the medical records, demographic data, and imaging files and invited the patients for the last follow up. In last visit we evaluated the operated knee using range of motion (ROM), Lachman test (14), pivot-shift test (15), International Knee Documentation Committee (IKDC) form and Lysholm score.

The IKDC has developed a standard assessment tool for knee injuries. It includes 18 items: 7 regards symptoms, 2 general function, and 9 sport activities. It is a 100-point scale with 100 representing the best possible score and highest knee function (16).

The Lysholm scale is based solely on the subjective evaluation of function and has multiple scores with total sum of 100 (16).

All data was collected and analyzed by Statistical Package for Social Sciences (SPSS, Chicago, IL, USA) version 16. T-test was used for comparison of means in two groups and a p-value of less than 0.05 was considered statistically significant.

### Results

Total numbers of the patients was 62 but 58 were attended in clinic for final follow up.

Twenty patients (34.48%) had ACL reconstruction with allograft and the remaining 38 cases (65.52%) by autograft.

Mean age in allograft group was 27.45(24-38) years, and for autograft group it was 30.21(19-39).

In allograft group 19 (95%) patients were male and one (5%) was female. In autograft group 36 (94.7%) patients were male and 2

(5.3%) female. Both groups were similar in regard with sex.

Fifteen patients (25.86%) in allograft group have had the reconstruction in the right side and 5 patients (8.62%) in the left side.

Similarly, in autograft group, 27 patients (46.55%) have had the reconstruction in right side and 11 patients (18.96%) in the left side.

In autograft group the mean ROM was 123.34 degrees while it was 127.56 degrees in allograft group. There was no significant statistical difference between the two groups ( $p=0.128$ ).

The Lachman test for all patients, in both allograft and autograft, showed a negative result. The Pivot shift test was carried out for all patients in allograft and autograft groups and yielded negative results.

The Lysholm scores for allograft, showed that 2 patients (3.44%) had poor results, 13 (22.41%) good and 5 (8.62%) excellent results, while in autograft group 4 (6.89%) had poor results, 23 (39.65%) good and the remaining 11 (18.96%) had excellent results.

The achieved scores of IKDC in allograft and autograft groups were  $88.7\pm 3.41$  and  $89.2\pm 4.29$  respectively, and there was no statistical significant difference between the two groups ( $p=0.341$ ).

### Discussion

The ACL reconstruction is known as a gold standard for treatment of ACL rupture and its use is estimated about 100,000 cases per year in the USA (1).

Although ACL reconstruction is very common by both allograft and autograft, there is no consensus which one is the preferred method (6,10,11,17,18).

According to the study of Mayr et al (19) who used patellar tendon as allograft and autograft for the ACL reconstruction, there is no statistical difference of Lysholm and IKDC scores in the two groups (19).

Study by Guo et al (20) showed no significant difference in the methods of autograft and two types of allograft including Fresh Frozen and Y-Irradiated, in ACL reconstruc-

tion (three groups), using Lysholm knee scoring system (20).

The same results were reported by Barrett et al (12) for both allograft and autograft with patellar tendon in ACL reconstruction in patients older than 40 years using Lysholm scores.

Also in a study by Noh et al (21) Lysholm knee score and IKDC score for patients who had hamstring autograft and free tendon achilles allograft operations were good and excellent, with same results (21).

On the other hand, Mehta et al (22) studied revision rate after ACL reconstruction into two groups of allograft and autograft/ bone-patella tendon-bone and reported higher rate of revision when allograft bone-patella tendon-bone was used for reconstruction (22). Mehta concluded that surgeons should be aware of the higher revision rate with allograft ACL reconstruction when counselling patients on graft options (22).

Poehling et al (23) compared five-year follow-ups of patients undergoing ACL reconstruction with allograft versus autograft (23). Both groups achieved similar long-term outcomes. Their study showed that, the allograft patients reported less pain at 1 and 6 weeks after surgery, better function at 1 week, 3 months, and 1 year, and fewer activity limitations throughout the follow-up period (23).

According to the results of current study, we found no statistically significant difference between the two groups who underwent ACL reconstruction using allograft or autograft in regard to ROM, Lachman and pivot shift tests, Lysholm and IKDC scores. Our findings were in accordance to the results of other studies in the literature (i.e. 20-23).

There were some limitations for our study: it was retrospective and with limited number of patients.

Prospective studies with larger samples are recommended to compare the different aspects of allograft and autograft in ACL reconstruction.

## Conclusion

The current study showed no significant difference in the achieved results through utilization of allograft and autograft in ACL reconstruction methods.

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