

A LONGITUDINAL STUDY TO ASSESS THE TREATMENT OUTCOME FOLLOWING ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION USING BONE – PATELLAR TENDON – BONE GRAFT [BTB]

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ABSTRACT

BACKGROUND

Reconstruction of ACL and restoration of musculoskeletal function is a fundamental goal of orthopaedic treatment.

OBJECTIVES

To assess the outcome of knee function after anterior cruciate Ligament reconstruction.

MATERIALS AND METHODS

This prospective study included 28 patients who underwent ACL reconstruction for two years. The clinical follow-up evaluation was done following the surgery and postoperative rehabilitation. International Knee Documentation Committee (IKDC) and Lysholm Score was used to assess the functional outcome. Results were expressed in terms of percentage, proportion and chi-square test.

RESULTS

According to the IKDC rating scale, 80% of the patients had normal or nearly normal final outcome. The mean Lysholm score was 82. About half of the patients had anterior knee pain, as classified by the IKDC. Patients with early reconstruction had less degenerative changes in the tibiofemoral joint, were subjectively more satisfied to the result, and could return to the pre-injury level of activities.

CONCLUSION

Our results showed that an ACL reconstruction using BTB autograft leads to good ligamentous stability and function of the knee. Those who underwent early reconstruction had better results. Mild anterior knee pain and osteoarthritis after reconstruction was a common finding.

KEYWORDS

Anterior cruciate ligament, Reconstruction, Treatment outcome.

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INTRODUCTION: Disruption of anterior cruciate ligament (ACL) is a common ligamentous injury of the knee.¹ ACL injuries results in significant disability as it is critical for maintaining the normal functioning of the knee. Hence, reconstruction of ACL and restoration of musculoskeletal function is a fundamental goal of orthopaedic treatment. The primary goal of the reconstruction is to restore stability and function of the knee thereby presumably, to restore and allow the patient to return to normal activities.

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Another goal is to prevent early degenerative changes.² Many techniques have been developed for reconstructing the ACL, especially over the last 30 years, using autografts, allografts or synthetic grafts, including through advances in arthroscopic techniques.³

Previously, the methods used for the objective assessment of the success of such reconstructive procedures most often involved evaluation of structural and biochemical parameters such as pain and swelling. However, recently there is more emphasis on the functional outcome following the surgery and many systems have been developed for evaluating the pre and post-operative results from patients who undergo surgical procedures of the knee.⁴

Hence, the present study was conducted to assess the long-term results of the ACL reconstruction using BTB

autograft with special emphasis on the timing of the reconstruction and post-operative problems, such as anterior knee pain and patella-femoral osteoarthritis.

MATERIALS AND METHODS: A prospective study was conducted in 28 patients who underwent ACL reconstruction using BTB autograft with mini-arthrotomy, and arthroscopic assisted ACL reconstruction. During the study period the informed consent was obtained. Following the surgery, patients underwent post-operative rehabilitation for 12 weeks, which included partial and complete weight bearing exercises, passive and active stretching of quadriceps and hamstrings.

The clinical follow-up evaluation was done by an orthopaedic surgeon for the next two years. During the follow up visits, range of motion of knee, knee laxity, isokinetic extension and flexion, strength evaluation of the knees and radiographic analysis was done. Also, the evaluation was performed using the standard knee ligament evaluation form of the international Knee Documentation Committee (IKDC) (AOSSM, ESSKA)⁵ knee scores.

Results were entered in excel spread sheet and data was analysed using SPSS software. Results were expressed in terms of percentage and proportions and chi-square test.

RESULTS: Among the 28 study subjects, 26 were males and 2 were females. Mean age of the study subjects was 30.57. 10 (35.7%) patients underwent ACL reconstruction using mini-arthrotomy technique and 18(64.5%) patients underwent arthroscopic assisted ACL reconstruction using BTB autograft. Range of motion of the knee was normal in 24 patients (Table 1). Mean Lysholm score was 92 (range 45-100) in patients without anterior knee pain, 85 (range 28 to 100) in patients with mild to moderate anterior knee pain (Table 6). According to IKDC stability rating, 21(71.4%) patients were under grade A (Table 7).

Range of Motion	No. of cases	p-value
Normal	24 (85.8)	<0.05
Extension loss <10	02 (7.1)	
Flexion loss <15	02 (7.1)	
<i>Table 1: Distribution of study subjects based on range of motion</i>		

Knee laxity Measurement (KT - 1000 Arthrometer)	No. of cases	p-value
Normal (0-2 mm laxity)	21(75.0)	<0.05
Near normal (3-5 mm laxity)	06(21.4)	
>5 mm laxity	01(03.6)	
<i>Table 2: Distribution of study subjects based on knee laxity</i>		

Defect	No. of cases	p-value
Quadriceps >10% >20%	4(14.3) 0	<0.05
Hamstring >10% >20%	0 0	
Table 3: Distribution of study subjects based on isokinetic muscle strength		

Radiographic Analysis	No. of cases	%
Normal	22	78.6
Mild grade	03	10.7
Moderate grade	03	10.7
Table 4: Distribution of study subjects based on radiographic analysis		

	Anterior Knee Pain N (%)	Arthritis N (%)
Normal	20(71.4)	26(92.9)
Mild	07(25.0)	02(7.1)
Moderate	01(3.6)	0
Table 5: Distribution of study subjects based on post-operative knee pain & arthritis		

Lysholm Score	No. of cases	Percentage
Good (or) Excellent	24	85.7
Fair	4	14.3
Table 6: Distribution of study subjects based on Lysholm Score		

IKDC scoring	No. of cases	Percentage
A	21	71.4
B	06	25
C	01	3.61
D	00	0
Table 7: Distribution of study subjects based on International Knee Documentation Committee (IKDC) scoring		

DISCUSSION: Our results showed that an ACL reconstruction using mini arthrotomy and arthroscopic assisted ACL reconstruction techniques using BTB autograft leads to good ligamentous stability and function of the knee. It may also prevent the later-life degenerative changes of the tibio femoral joint.

In our study, nearly 90% of the patients considered subjectively their knees normal or nearly normal, 2 years after the surgery according to the IKDC standard knee ligament evaluation form. These results are comparable with many previous studies.^{6,7,8} In addition, the range of motion and the stability of the knee of our patients were also good.

One of the major problems with the patellar tendon autograft procedures was postoperative anterior knee pain.^{8,9,10} In our study, 7 patients had mild and 1 patient had moderate anterior knee pain during the follow up visit. Shelbourne and Trumper⁹ suggested that the extension

deficit of the knee is the main reason for the anterior knee pain and recommended that immediately after the surgery full knee extension should be allowed.

In this study, according to the logistic regression analysis of the predicting factors of the anterior knee pain, the extension torque deficit of the ACL-reconstructed knee was the most important factor associated with anterior knee pain. Many previous studies have shown that an ACL reconstructed knee with a BTB autograft often has extension torque deficit.^{8,11}

The Lysholm¹² knee score was significantly lower in patients with anterior knee pain than inpatients without it. Similar results were found in the final evaluation of the IKDC rating scale: These results are in line with previous studies.¹³

In our study, the isokinetic testing showed quadriceps strength deficit of 26% (mean) at the speed of 60 degrees per second in a patient with moderate patella-femoral osteoarthritis, which was similar to the findings in the study conducted by Rosenberg et al⁸ where the quadriceps strength deficit was 18% (mean) in patients with ACL reconstruction.

Our study showed that 2 years after the ACL reconstruction with BTB autograft, clinical and radiological results were almost same, whether the primary ACL injury was combined with other injuries or not.

CONCLUSION: Our results showed that an ACL reconstruction using BTB autograft leads to good ligamentous stability and function of the knee. Those who underwent early reconstruction had better results. Mild anterior knee pain and osteoarthritis was noted.

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