

FIXED VERSUS ADJUSTABLE CORTICAL BUTTON LOOP DEVICE- A COMPARATIVE STUDY ON CLINICAL OUTCOME OF FEMORAL SIDE GRAFT FIXATION IN PRIMARY ACL RECONSTRUCTION

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Abstract

Background: ACL construction is a common orthopaedic procedure present with satisfactory clinical outcomes. This study aims to investigate the clinical outcomes of the two most common types of femoral side fixation in ACL reconstruction. **Materials and Methods:** A total of 40 male patients were divided into two groups (group A: fixed cortical button loop, group B: adjustable cortical button loop) and were operated, and their rehabilitation and clinical outcomes were observed over the course of 4 months which is measured based on the IKDC score. **Result:** The difference between the clinical outcomes of both groups based on the IKDC post op difference was found to be of no significance ($p = 0.9442$). There is no significant difference in clinical outcome in both adjustable and fixed cortical button fixation though bio-mechanical study shows fixed loop is stronger than adjustable loop. There were no cases reported with graft loosening or failure in both group at this period of study after achieving full range of movements and returning to their pre-injury level activities. But adjustable cortical button loop fixation gives an advantage of re-tightening of the graft post cycling and tibial screw fixation intra-operatively.

INTRODUCTION

ACL (anterior cruciate ligament) is one of the most commonly injured ligament and ACL reconstruction is one of the most common arthroscopic procedure widely performed with formidable clinical outcomes.^[1-5] There are multiple graft choices like bone patella tendon bone graft, hamstring graft, quadriceps tendon graft, peroneus longus graft available and are used in ACL reconstruction, but graft fixation choices are always reduced to either interference screw fixation or cortical button fixation. Fixation of femoral side graft is still narrowed down to cortical button fixation by almost every surgeon unless BPTB (bone-patellar tendon-bone) graft is used, where the choice of fixation is interference screw.^[6-10]

Graft of choice for primary ACL reconstruction is usually hamstring graft unless patient is an active highly demanding sports person where the first graft of choice is BPTB.^[11,12]

MATERIALS AND METHODS

A total of 40 male patients who underwent ACL reconstruction over the course of 4 months in the department of arthroscopy and sports injury.

20 patients in each group (who had femoral graft fixed with fixed cortical button loop and adjustable cortical button loop).

Group A: femoral graft fixed with fixed cortical button loop

Group B: adjustable cortical button loop.

All the patients were operated and followed up by the same team of surgeons and assistants with same surgical procedures, post operative care and protocols, even same brand implants were used for the entire study to avoid any kind of variations in the results.

Inclusion Criteria

Only male patients of age between 20-40yrs with isolated ACL tear were included in this study. Patients whose ACL reconstruction done only with hamstring grafts were included. Physically active patients who can able to do all their daily activities

on their own without any assistance/support before injury were only selected for this study.

Exclusion Criteria

Patient with other associated ligament injuries, pts more than 40 years were excluded. Female patients were not included in this study to rule out any kind of gender variations. patients with generalized ligament laxities, physically challenged/assisted daily activities pre injury status were also excluded in this study. ACL reconstructed with other graft choices like peroneus longus, bone patella tendon bone graft, quadriceps tendon graft was excluded. Professional athletes were not included in this study since their post-op protocol is different from non-athletes.

Surgical procedure:

All patients were operated under spinal anesthesia, under tourniquet control and in supine position with knee flexed to 70 degrees on the table. Pivot shift test is done on every patient after anesthesia. Operating side limb kept elevated for minimum of 5mins for exsanguination while painting and draping was done, arthroscopic attachments were connected and checked, followed by tourniquet inflation. Standard anterolateral, anteromedial portal done and diagnostic arthroscopy done. after confirming ACL tear, hamstring graft (semitendinosus and gracilis) is harvested and prepared. Semitendinosus graft is tripled and gracilis is doubled, totally made to 5 strand graft with fixed/adjustable cortical button loop on femur side. Trans-portal femur tunnelling done followed by tibia tunnelling. tunnel lengths measured. Graft is passed and fixed by flipping cortical button on the femur cortex and tibial graft is fixed with appropriate bio composite interference screw after cycling procedure.

RESULTS

Data was entered in Microsoft Excel 2016 and analyzed using IBM statistical package for social sciences (SPSS) version 22. Continuous variables were presented by mean and standard deviation. after determining normality of data obtained using Shapiro–Wilk test, Mann-Whitney U test was used to compare the parameters between both groups.

Graft length, graft diameter, total femur tunnel length (mm), IKDC score post-op – not significant.

Femur tunnel for graft (mm) – p value of 0.03156 – statistically significant.

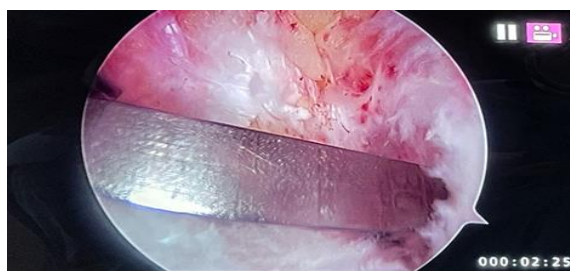


Figure 1: Measurement of the tunnel length of the fixed loop after initial drilling was done with a 4.5mm cannulated drill



Figure 2: Fixed loop tunnel length marked on the graft from the end of the button to graft

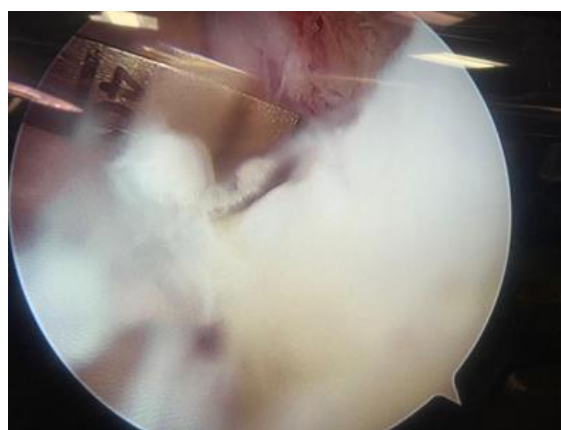


Figure 3: Measurement of the tunnel length of the adjustable loop after initial drilling was done with a 4.5mm cannulated drill



Figure 4: Adjustable loop tunnel length marked on the graft from the endo-button to graft

Table 1: Comparison of both groups and analysis of its significance

Parameter	Group A	Group B	Mann Whitney U Test (p value)
Age	26.55 ± 5.96	27.20 ± 5.76	NA
Graft Length	94.55 ± 4.56	94.75 ± 4.43	0.87288
Graft Diameter (mm)	8.45 ± 0.43	8.52 ± 0.41	0.59612
Total Femur Tunnel Length (mm)	38.10 ± 2.71	37.70 ± 2.27	0.64552
Tunnel Length for Graft (mm)	29.10 ± 3.52	27.00 ± 0.00	0.03156**
IKDC score pre op	59.63 ± 2.33	59.39 ± 3.09	0.87288
IKDC score post op	89.86 ± 2.75	89.55 ± 2.58	0.6672
IKDC score difference post operative	30.22 ± 3.68	30.15 ± 4.25	0.9442

**Statistically significant

DISCUSSION

The advantage of this study is that these cases were done in an arthroscopy centre where all cases were evaluated, operated and followed up by the same team of surgeons, by which the subjective variation in findings are minimal. usual complaint of the patients were instability and pain. patients were advised analgesics, cold therapy and compression bandage in the first three weeks of injury. the patients were clinically examined again after three weeks and radiological investigations was done. no patients were taken up for surgery in the first three weeks post injury period, patients were advised rest and physiotherapy for the inflammation to settle and maintain the full range of movements respectively. once the clinical and radiological diagnosis was confirmed patient was explained about the procedure, informed consent was obtained and operated. Study shows bio-mechanically fixed loop is stronger than adjustable loop.

Fixed loop cortical button: Once the femur tunnelling guide wire was passed, initial drilling was done with 4.5mm cannulated drill crossing the outer cortex of femur and the tunnel length was measured (Photo 1) and the tunnel length is marked on the graft from the end of the button to graft (Photo 2). a minimum of 20mm graft inside the femoral tunnel was maintained. so, in tunnel size measuring less than 40mm, 15 mm loop was used and in tunnel size measuring more than 40mm, 20mm fixed loop was used.

Adjustable loop cortical button: once the tunnel length is measured after 4.5mm drill, femur tunnelling done according to graft size till 27mm, this 7mm extra is used for retightening the graft after cycling and tibial screw fixation. Once the graft is prepared a marking of the tunnel length should be made on the loop from the button (Photo 3) and another mark at 20mm from the tip of the femur side graft should be made (Photo 4). There is no difference in the surgical procedure or duration of both the fixed or adjustable loop.

Post surgery all patients were advised to follow the same protocol for rehabilitation. partial weight bearing with support started immediate post op with static quadriceps exercises along with in bed heel slide upto 30 degrees and patient discharged on the second pod after wound inspection and dressing. Operated patients were followed up on the second week for wound inspection, suture removal and

advised to achieve heel slide till 90degree, third week review to start on full weight bearing walk without support and to inspect how much knee flexion is achieved. sixth week review to see the progress and start on knee flexion above 90 degrees.

After 8 weeks of static cycling and 10 weeks of full regular activities without running, jumping, squatting, post-surgery clinical examination was done after 3 months by the same surgeon who conducted the pre-op exam. Lachman, anterior drawers, range of movements were examined and noted. Pain score and IKDC were followed pre operatively and post operatively once patient returned to complete regular pre injury daily activity level (usually after 3 months post op).

There was no difference in rehabilitation of both the group of patients. all patients have achieved post operative protocol goals at the planned time. We did not encounter any case of graft failure or infection in this period of study.

CONCLUSION

There is no significant difference in clinical outcome in both adjustable and fixed cortical button fixation though bio-mechanical study shows fixed loop is stronger than adjustable loop. Patients of both groups had similar recovery and return to daily activities and no significant difference in the six months post-surgery IKDC score were noted as such. There were no cases reported with graft loosening or failure in both group at this period of study after achieving full range of movements and returning to their pre-injury level activities. But adjustable cortical button loop fixation gives an advantage of re-tightening of the graft post cycling and tibial screw fixation intra-operatively. It helps to remove intra articular slack of the reconstructed graft post tibial screw fixation if any.

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