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Original Research Article

# A COMPARATIVE STUDY OF FUNCTIONAL OUTCOME AFTER ENDOBUTTON VERSUS INTERFERENCE SCREW IN ARTHROSCOPIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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ABSTRACT

**Background:** Anterior cruciate ligament (ACL) tear is one of the most common soft tissue injuries of the knee. Arthroscopic reconstruction using autografts remains the treatment of choice, with various options for femoral fixation. This study compares the functional outcome of femoral fixation using Endobutton and Interference Screw techniques in arthroscopic ACL reconstruction. The objective is to evaluate and compare the functional outcomes of Endobutton and Interference Screw fixation in arthroscopic ACL reconstruction using clinical scoring systems.

**Materials and Methods:** This prospective comparative study was conducted at Aarupadai Veedu Medical College and Hospital, Puducherry, from September 2019 to September 2021. Fifty patients with ACL tears were randomized into two groups: Group I (Endobutton) and Group II (Interference Screw). Functional outcomes were assessed using Lysholm and International Knee Documentation Committee (IKDC) scores, along with Lachman test, at 6 weeks, 3 months, and 6 months postoperatively.

**Results:** The mean IKDC and Lysholm scores showed no statistically significant difference between the two groups. Most patients achieved full range of motion and had negative Lachman tests postoperatively. Postoperative complications were minimal and comparable between groups.

**Conclusion:** Both Endobutton and Interference Screw fixation methods yielded similar functional outcomes in ACL reconstruction. Neither method demonstrated superiority in terms of stability, postoperative rehabilitation, or complication rate. Larger sample sizes and longer follow-up are recommended to validate these findings.

**Keywords:** Endobutton, Interference screw, ACL reconstruction, Functional outcome, Arthroscopy.

## INTRODUCTION

Anterior cruciate ligament (ACL) tears are among the most common knee injuries causing instability and functional impairment, particularly in physically active individuals. Diagnosis is made clinically and confirmed radiographically, primarily by magnetic resonance imaging (MRI). Arthroscopic ACL reconstruction using autografts—either bone-patellar tendon-bone or hamstring tendons—has become the gold standard treatment.[1-5]

Femoral fixation is critical in achieving durable and stable reconstruction. Various fixation methods such as interference screws, endobuttons, adjustable loops, and cross-pins are available, each with specific advantages and limitations. Endobuttons act as suspensory devices fixed to the cortical surface of the femur, while interference screws provide direct graft fixation within the bone tunnel.[6-8]

There is limited comparative data from the Indian population evaluating these two fixation techniques.

This study aimed to analyze and compare their functional outcomes in ACL reconstruction.[9-12]

## MATERIALS AND METHODS

**Study Design and Setting:** A prospective comparative study was conducted at Aarupadai Veedu Medical College and Hospital, Puducherry, between September 2019 and September 2021. The study included 50 patients with ACL tears confirmed clinically and by MRI.

**Inclusion Criteria**

- Patients aged above 18 years
- Clinically and radiologically confirmed ACL tear
- Willingness to participate and follow postoperative rehabilitation

**Exclusion Criteria**

- Multiligamentous injuries
- Previous knee surgery
- Severe osteoarthritis or infection

**Grouping:**

**Participants were randomly divided into two groups:**

- Group I (Endobutton fixation)
- Group II (Interference screw fixation)

**Surgical Technique:** All procedures were performed arthroscopically under spinal anesthesia. Semitendinosus and gracilis tendons were harvested and prepared as quadrupled hamstring grafts. Femoral and tibial tunnels were drilled using standard techniques. In Group I, femoral fixation was done using an Endobutton; in Group II, an interference screw was used. Tibial fixation was performed with an interference screw in both groups. Standardized postoperative rehabilitation was followed for all patients.

**Postoperative Assessment:** Functional outcomes were assessed using IKDC score, Lysholm knee score, and Lachman test. Follow-ups were conducted at 6 weeks, 3 months, and 6 months postoperatively.

**Statistical Analysis:** Descriptive and inferential statistics were used. Differences between groups were analyzed using independent t-tests and chi-square tests. A p-value <0.05 was considered statistically significant.

## RESULTS

Fifty patients were analyzed—25 in each group. Most patients (68%) were aged 21–40 years, and males predominated (54%). The most common mechanism of injury was high-intensity fall (46%), followed by road traffic accident (34%). Right-side injuries were slightly more common (52%).

**Table 1: Distribution of study population according to treatment group**

| SN | Group | Intervention | Number | Percentage |
|---|---|---|---|---|
| 1 | Group I | Conservative (Endo-button) | 25 | 50.0 |
| 2 | Group II | Interference Screw | 25 | 50.0 |
| Total | | | 50 | 100.0 |

**Table 2: Between group comparison of Age**

| SN | Age | Group I (n=25) | | Group II (n=25) | |
|---|---|---|---|---|---|
| | | No. | % | No. | % |
| 1 | <20 | 2 | 8.0 | 0 | 0.0 |
| 2 | 21-30 | 7 | 28.0 | 11 | 44.0 |
| 3 | 31-40 | 7 | 28.0 | 9 | 36.0 |
| 4 | 41-50 | 5 | 20.0 | 4 | 16.0 |
| 5 | 51-60 | 2 | 8.0 | 1 | 4.0 |
| 6 | ≥61 | 2 | 8.0 | 0 | 0.0 |
| $\chi2$=5.583 (df=5); 'p'=0.349 | | | | | |
| | | Mean | SD | Mean | SD |
| | | 37.52 | 13.11 | 33.08 | 8.18 |
| 't'=1.437; p=0.157 | | | | | |

**Table 3: Between group comparison of Gender**

| SN | Gender | Group I (n=25) | | Group II (n=25) | |
|---|---|---|---|---|---|
| | | No. | % | No. | % |
| 1 | Female | 11 | 44.0 | 12 | 48.0 |
| 2 | Male | 14 | 56.0 | 13 | 52.0 |
| $\chi2$=0.081 (df=1); 'p'=0.777 | | | | | |

**Table 4: Between group comparison of mode of injury**

| SN | Mode of Injury | Group I (n=25) | | Group II (n=25) | |
|---|---|---|---|---|---|
| | | No. | % | No. | % |
| 1 | Assault | 1 | 4.0 | 0 | 0.0 |
| 2 | Still Fall | 2 | 8.0 | 7 | 28.0 |
| 3 | High intensity fall | 15 | 60.0 | 8 | 32.0 |
| 4 | RTA | 7 | 28.0 | 10 | 40.0 |
| $\chi2$=6.438 (df=3); 'p'=0.092 | | | | | |

**Table 5: Between group comparison of laterality**

| SN | Laterality | Group I (n=25) | | Group II (n=25) | |
|---|---|---|---|---|---|
| | | No. | % | No. | % |
| 1 | L (Lateral) | 11 | 44.0 | 13 | 52.0 |
| 2 | RT (right Tilt) | 14 | 56.0 | 12 | 48.0 |
| $\chi 2$=0.321 (df=1); 'p'=0.571 | | | | | |

**Table 6: Between group comparison of post-op functional outcomes**

| SN | Outcomes | Group I (n=25) | | Group II (n=25) | | Statistical test | |
|---|---|---|---|---|---|---|---|
| | | Mean | SD | Mean | SD | 't' | 'p' |
| 1 | Immobilization (days) | 7.56 | 4.53 | 6.40 | 1.23 | 1.236 | 0.222 |
| 2 | IKD Score | 91.36 | 1.44 | 91.00 | 1.29 | 0.931 | 0.357 |
| 3 | Lysholm Score | 86.84 | 2.72 | 87.68 | 2.54 | -1.128 | 0.265 |
| 4 | Hospital Stay (days) | 8.88 | 4.28 | 8.76 | 2.66 | 0.119 | 0.906 |
| 5 | ROM (°) | 117.00 | 9.35 | 118.40 | 8.00 | 0-.569 | 0.572 |
| | | No. | % | No. | % | Chi-Sq. Test | |
| 6 | Post-op Lachman Test | | | | | | |
| | Negative | 23 | 92.0 | 25 | 100.0 | $\chi 2$=0.490; 'p'=0.245 | |
| | Positive | 2 | 8.0 | 0 | 0.0 | | |
| 7 | Post-op complications | | | | | | |
| | Infection | 2 | 8.0 | 0 | 0.0 | $\chi 2$=3.021 (df=2); 'p'=0.221 | |
| | Stiffness | 0 | 0.0 | 1 | 4.0 | | |
| | None | 23 | 92.0 | 24 | 96.0 | | |

Though post-op complications like Immobilization, hospital stay, IKD score were lower in Group II, while ROM was higher in Group II. On comparing statistically, no significant difference was observed for any post-op complication between the two groups. Lachman Test: 92% of Group I and 100% of Group II had negative Lachman tests at 6 months. IKDC Scores: Mean IKDC was 91.36 ± 1.44 in Group I and 91.00 ± 1.29 in Group II; the difference was not statistically significant. Lysholm Scores: Mean Lysholm score was 86.84 ± 2.72 in Group I and 87.68 ± 2.54 in Group II; the difference was not statistically significant. Range of Motion: Mean postoperative knee flexion was 117.0° ± 9.35 in Group I and 118.4° ± 8.0 in Group II ($p > 0.05$). The present study suggests that though inference screw (Group II) has marginal better functional outcomes in terms of motion & post-op complications (less infection and stiffness), statistically both the techniques are comparable.

**Table 7: Between group comparison of Clinical outcomes**

| SN | Outcomes | Group I (n=25) | | Group II (n=25) | |
|---|---|---|---|---|---|
| | | No. | % | No. | % |
| 1 | Poor | 2 | 8.0 | 1 | 4.0 |
| 2 | Fair | 12 | 48.0 | 9 | 36.0 |
| 3 | Good | 5 | 20.0 | 9 | 36.0 |
| 4 | Excellent | 6 | 24.0 | 6 | 24.0 |
| $\chi 2$= 1.905 (df=3); 'p'=0.592 | | | | | |

**Complications:** Group I—2 infections (8%); Group II—1 stiffness case (4%). No graft failures occurred.
**Clinical Outcome:** Both groups showed fair to excellent outcomes without statistically significant differences in functional recovery or rehabilitation.

## DISCUSSION

This study compared Endobutton and Interference Screw fixation in ACL reconstruction and found no significant difference in postoperative functional outcomes. Both techniques provided stable fixation, satisfactory range of motion, and minimal complications.[13-15]

Previous studies by Ma et al., Oh et al., and Ping et al. also shown matching results, indicating that both fixation methods achieve equivalent biomechanical and clinical outcomes. Although some biomechanical studies have suggested better tensile strength for Endobutton, this has not translated into superior clinical performance.

The findings support that the choice between Endobutton and Interference Screw fixation can be based on surgeon preference, cost, and institutional resources rather than outcome expectations. Long-term follow-up with larger cohorts must further substantiate these results.

## CONCLUSION

Arthroscopic ACL reconstruction using either Endobutton or Interference Screw fixation yields comparable functional and clinical outcomes. Both are safe, effective, and provide excellent postoperative stability and recovery. Neither method demonstrated superiority in the studied parameters. The selection can therefore be individualized based on patient and surgeon factors.

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