

The Functional Outcome of Simultaneous Anterior Cruciate Ligament Reconstruction with Meniscus Repair

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Abstract

Background: Meniscal repair is performed in an attempt to prevent post-traumatic arthritis resulting from meniscal dysfunction after meniscal tears. The socio-economic implications of premature arthritis are significant in the young patient population. Investigations and techniques focusing on meniscus preservation and healing are now at the forefront of orthopaedic sports medicine. **Methods:** All unilateral primary ACL reconstructions in a prospective cohort who had meniscal repair at the time of ACLR were evaluated. Validated patient oriented outcome instruments were completed preoperatively and then again at follow up. **Results:** 65 unilateral primary ACL reconstructions were performed concomitant meniscal repairs during the study period. Patient follow-up was obtained, allowing confirmation of meniscal repair success (defined as no repeat arthroscopic procedure) or failure. **Conclusions:** Meniscal repair is a successful procedure in conjunction with ACL reconstruction. When confronted with a “repairable” meniscal tear at the time of ACL reconstruction, orthopaedic surgeons can expect an estimated >90% clinical success rate using a variety of methods as shown in our study.

Keywords: Anterior Cruciate Ligament, Meniscal Repair, Reconstruction, Meniscal Tear

1. Introduction

Anterior Cruciate Ligament (ACL) is a ligament of the knee joint. It is the major stabilizer of the knee joint and prevents anterior tibial displacement. The ligament passes from medial part of intercondylar area of tibia upwards, backwards and laterally to insert into the posterior part of medial surfaces of lateral femoral condyle. Anterior Cruciate Ligament injuries remain a common orthopedic problem and are often associated with meniscus pathology¹. Menisci are major structures necessary in load transmission, shock absorption and knee joint stability. Preservation of the menisci is therefore imperative.

Meniscal tears are also amongst the most commonly treated knee injuries².

These tears can occur during initial traumatic event or subsequently over time due to altered biomechanics and ongoing instability it causes. It has been established that standard care for ACL injury is ligament reconstruction and meniscus tears by repairing and preserving as much meniscal tissues that is possible aiming to halt or minimize the instability episodes and prevent early osteoarthritis of the knee joint^{3,4}.

Simultaneous repair of meniscus and reconstruction of ACL rupture is thought to positively influence the

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recovery process. Bone marrow stimulation for meniscal healing is considered to have an impact on the healing process⁵⁻⁷. Also, after ACL stabilization surgery and with a meniscal repair, the knee joint will be protected from biomechanical forces accompanying the subluxation; these factors may play a role in the higher meniscal healing rates observed in ACL-deficient knees where ACL reconstruction is performed⁸. There has been increased emphasis on Meniscus repair over the past 3 decades as this structure is essential in preventing early complications in a younger population at their prime working age. The goal of meniscal repair is to prevent the sequelae of meniscal dysfunction i.e. post-traumatic osteoarthritis⁴. Short-term and mid-term studies comparing the outcome of meniscal tears with intact or ruptured ACL have shown high healing rates with ACL reconstruction⁹⁻¹¹. Thus techniques and investigations focusing on meniscus preservation and healing are now at the forefront of orthopaedics sports medicine. And also investigations evaluating efficiency of specific measures i.e. Anterior Cruciate Ligament reconstruction along with meniscus repair using various different modalities like all-inside ,inside out, outside in and also various newer devices like fast-fix, accupass suture-fix suture materials, to prevent future complications and preserve the knee function are of greater interest today. The current study aimed to evaluate meniscal healing in patients who underwent arthroscopic meniscal repair along with concurrent Anterior Cruciate Ligament reconstruction at a tertiary care centre. This study aims to access the functional outcome of these patients using Tegner Lysholm score and International Knee Documentation Committee-Orthopedic Scores.

2. Aims and Objectives

1. To study the functional outcome of simultaneous Anterior Cruciate Ligament reconstruction with meniscus repair.
2. To study the complications of simultaneous Anterior Cruciate Ligament reconstruction with meniscus repair.

3. Materials and Methods

3.1 Study Settings

Department of Orthopedics of Dr. Vasantrao Pawar Medical College, Hospital and Research Centre, Nashik, Maharashtra, India.

3.2 Study Population

All the patients undergoing Anterior Cruciate Ligament reconstruction simultaneously with meniscus repair.

3.3 Study Design

A prospective, clinical study.

3.4 Sample Size Calculation

Consecutive type of non-probability sampling was followed during the study period. A total of 65 cases of complete Anterior Cruciate Ligament tear along with concurrent Meniscus tear coming to the Department of Orthopaedics of our hospital were included in the study.

3.5 Study Duration

August 2016 to December 2018.

3.6 Inclusion Criteria

- Age group between 18 to 60 years, irrespective of sex.
- Complete Anterior Cruciate Ligament tear with meniscus injury confirmed clinically on MRI.
- Incidental finding of Anterior Cruciate Ligament tear with meniscus tear found during diagnostic arthroscopy.

3.7 Exclusion Criteria

- Any infections or any lesion over the skin.
- Multi ligament injuries.
- Revision of Anterior Cruciate Ligament.
- Any associated lower limb fractures.

3.8 Methodology

The present study was conducted in Department of Orthopedics of Dr. Vasantrao Pawar Medical College,

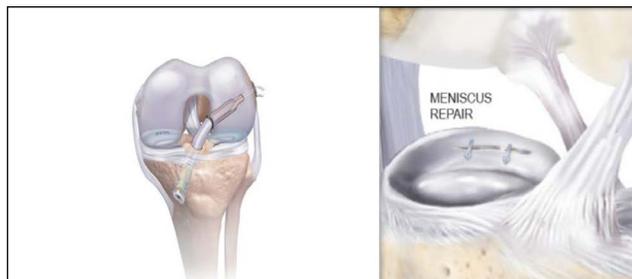


Figure 1. Simultaneous ACL reconstruction and use of fast fix suture for meniscus repair.

Hospital and Research Centre, Nashik, Maharashtra, India. A total of 65 patients were included in this study after satisfying the eligibility criteria and after obtaining the written informed consent.

Detailed clinical history, complete general and systemic and local examination, pre-operative investigations findings were noted in a pre-designed pro forma. After doing simultaneous ACL reconstruction and meniscus repair using fast fix all inside sutures (Figure 1), the patients were assessed for the functional outcome using Tegner-Lysholm score and IKDC score at 3, 6 and 9 months.

To study the post operative complications the patients were assessed immediately after surgery after 24 hours, after 48 hours, 5 days and on subsequent scheduled follow ups.

The study participants were informed to report to health facility as and when required from the scheduled visit.

4. Results

Table 1. Distribution of cases as per age group

Age Group in years	Frequency	Percentage
18-26	28	43.08%
27-34	28	43.08%
35-42	9	13.85%
Total	65	100.00%

Most of our patients were between 20 to 35 years of age group (>80%) with mean age group of 34.12 ± 4.7 years (Table 1).

Male predominance was observed in study subjects with 86.15% males compared to 13.85% female population.

Right side was slightly more commonly involved as compared to left side (53.85% vs. 46.15%).

Most common mechanism of injury for ACL with meniscal injury was sports injury (40%) followed by RTA (32.31%) and domestic injuries (27.69%).

Lateral meniscus showed more incidence of injury in acute ACL injuries compared to medial meniscus (54.84% vs. 46.13%).

Table 2. Distribution of cases as per Lysholm score

Descriptive Statistics			
Variable of repeated measure	Mean	Std. Deviation	N
Lysholm Pre OP	41.89	4.40	65
Lysholm Post OP 3 months	71.89	5.67	65
Lysholm Post OP 6 months	84.12	6.05	65
Lysholm Post OP 9 months	90.17	6.07	65

Lysholm score at baseline was 41.89 which increased progressively to 90.16 at end of 9 months. The mean improvement was significant at each follow up (i.e. at 3, 6 and 9 months) from the last follow up ($p < 0.05$) (Table 2).

The IKDC score at baseline was 32.67 which increased progressively to 78.84 at end of 9 months follow up. The mean improvement was significant at each follow up (i.e. at 3, 6 and 9 months) from the last follow up ($p < 0.05$).

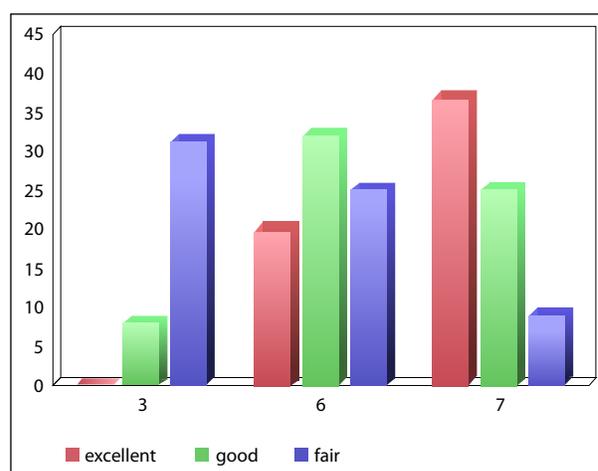


Figure 1. Distribution of cases as per functional outcome 3, 6 and 9 months.

Pre operatively all the patients had poor Lysholm score which subsequently increased and improved post-operatively on every follow-up. A progressive increment was seen from 30% at 3 months to 62% at 6 months. At 9 months (Figure 1).

Table 3. Distribution of cases as per complications

Complications	Frequency	Percentage
Knee Pain	3	4.62%
Laxity +	2	3.08%
None	60	92.31%
Total	65	100.00%

About 4.62% patients had complaints of knee pain and about 3.08% had complaints of laxity post-operatively rest 92% patients had no any complaints (Table 3).

5. Discussion

Menisci have an important role in shock absorption, load transmission and stability of the knee joint. Therefore it is important to preserve the meniscus as much as possible for better functioning of the joint. Meniscal injuries are amongst the most commonly treated knee injuries. Anterior Cruciate Ligament (ACL) tears are the most frequently seen pathologies along with meniscal injuries. When considering meniscal repair, the presence of co-existing conditions such as ACL rupture should be carefully assessed so as to implement a combined management strategy. Anterior Cruciate Ligament reconstruction simultaneously with meniscal repair is thought to have a positive influence on the recovery process. After stabilization of ACL the knee with meniscal repair will be protected from biomechanical forces accompanying the subluxation, these factors play an important role in higher healing of meniscal tissue. Also bone marrow stimulation is said to have an impact positively on meniscus healing after ACL reconstruction surgery. The present study was conducted to access the functional outcome of simultaneous Anterior Cruciate Ligament reconstruction with meniscus repair post operatively using Tegner Lysholm score and International knee Documentation committee orthopaedics score.

5.1 Demography

Most of the subjects were between 21 to 40 years of age (80%) with the mean age between 34.12 ± 4.7 years. Male predominance was observed in study subjects with 86.15% males and 13.85% females.

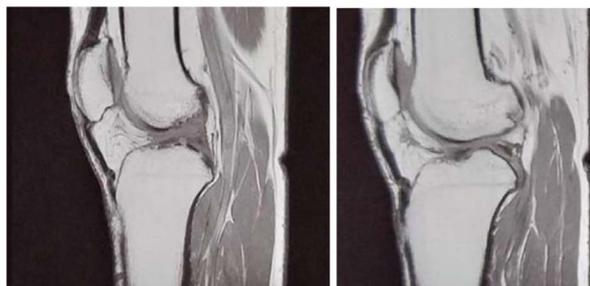


Figure 2. Pre-op MRI suggestive of ACL tear with meniscus tear.

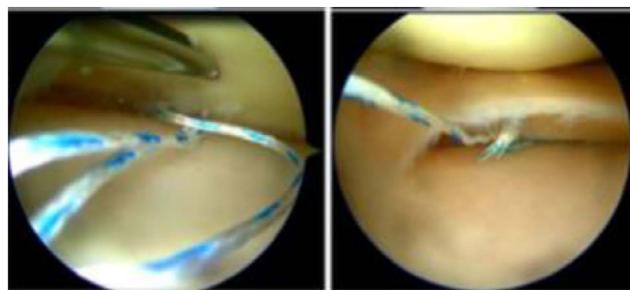


Figure 3. Meniscus repair using fast fix sutures.



Figure 4. Functional outcome at 3 months.

In a large study by Toman, et al. a total of 84 patients of ACL deficits with meniscal injuries (57 medial and 29 lateral) were registered. The average age of the patients was 27 years with 55% patients being males and 45% females¹² in a similar study by Westermann, et al. there were 286 patients available for 6 years follow-up. Of which the median age was 23.6 ± 9.7 years and 60% were males amongst this patients and rest were females¹³.

Our results are also consistent with E. Uzun, et al, who had 97 patients with mean age 27 years and 95% were males and 5% females¹⁴.

These observations can be explained as men and boys are more involved in highly competitive and contact sports games, for example, soccer, basketball, skateboarding and road traffic accidents in India.

5.2 Mechanism of Injury

Most common mechanism of injury for ACL with meniscus tear was sports injury (40%) followed by RTA (32%) and domestic injuries due to fall (28%).

Mei, et al.¹⁵ in their study observed that most of the subjects (77.68%) were injured in sports activities, 8.82% in daily living accidents and 4.66% in traffic accidents. In

a study by Kim, et al.¹⁶ there were 8 females and 25 males with a mean age of 29.8 years (range 17 to 55 years).

National Collegiate Athletic Association also reported that ACL tear mainly occurs during sports activities, especially in basketball, gymnastics rugby and soccer¹⁷.

5.3 Functional Outcome

Simultaneous meniscus repair along with Anterior Cruciate Ligament reconstruction offers a better success rate. It is useful in patients with ligament laxity, small tendons and instability risk factors¹². In present study too at the end of follow up good to excellent results were seen in about 76% patients (Figure 3 & 4).

The functional outcome was measured by Tegner-lysholm scoring scale and international knee documentation committee score. Lysholm score is another scale which gives information as to how the knee problems have affected the patient's ability to manage things in everyday life. In present study baseline Lysholm score was 41.89 which increased progressively to 90.17 at the end of 9 months follow-up. The mean improvement was significant at each follow-up from the last score $p(<0.05)$.

International Knee Documentation Committee (IKDC) score was used for subjective knee evaluation of difficulty in daily activities. It is the standard score used for treatment knee injuries. The IKDC in our study was baseline 32.6 which progressed to 78.41 at the end of 9 months follow-up with significant improvement in each follow-up ($p<0.05$)

5.4 Complications

No superficial infections are observed. Complaint of knee pain, stiffness was given by 4% cases. Lachman was positive in 3% cases. None of the patients developed deep infection. There was no case of failure in our study and no patient needed revision surgery for any complication. Lastly this study was not comparative with any other repair methods but it did compare previous literature.

6. Summary and Conclusion

Present hospital based observational study was conducted at Department of Orthopaedics of a tertiary care centre. The aim was to study the functional outcome

of simultaneous results of Anterior Cruciate Ligament reconstruction with meniscus repair. A total of 65 patients were included in this study.

Following observation was made during the study.

Most of the subjects were between 21-40 years of age (80%) with mean age of 34.12 ± 4.7 years. Male predominance was observed in study subjects with 86.15% males and 13.85% females. Right side was slightly more commonly involved as compared to left side (53.85 vs. 46.15). Most common mechanism of injury was sports injury (40%) followed by RTA (32%) and domestic injuries (28%).

Lysholm score baseline was 41.89 which increased progressively to 90.17 at the end of 9 months. The mean improvement was significant at each follow up (i.e. at 3, 6 and 9 months) from the last follow up ($p<0.05$). The IKDC score at baseline was 32.6 which increased progressively to 78.4 at the end of 9 months. The mean improvement was significant at each follow up (i.e. at 3, 6 and 9 months) from the last follow up ($p<0.05$).

Prior to treatment all cases were in poor grade as per Lysholm score (i.e. significant knee problems). Post treatment the number of patients with significant knee problems reduced to 14.3% at 3 months to 0% at 6 and 9 months. Overall at the end of follow up, excellent results were seen in 71.4% patients while good to fair in 20% and 8.6% patients.

No superficial infections are observed. Complaint of knee pain was 4.62% patients and Lachman test was positive in 3.08% patients.

7. Recommendations

We thus conclude that Meniscus repair is an effective treatment method and can be performed simultaneously with Anterior Cruciate Ligament reconstruction in cases of Anterior Cruciate Ligament and meniscus tears. However red-red zone tear repairs resulted in a significantly higher success rate compared to the red-white zone. Suture type and tear pattern had no impact on outcome. This technique is useful in patients with ligament laxity, small tendons or other risk factors and is highly recommended in indicated patients. Therefore surgeon may expect good success with combined Anterior Cruciate Ligament reconstruction and meniscus repair with follow-up.

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