

A Retrospective Study of Outcomes in Patients Undergoing Meniscus Repair Vs Meniscectomy Including Functional Scores, Pain and Osteoarthritis Progression

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Received: 01-03-2026 / Revised: 15-04-2026 / Accepted: 21-05-2026

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Conflict of interest: Nil

Abstract

Background: The meniscus is vital in the stability of knee joints, load distribution and shock absorption. The surgical treatment of meniscal injuries usually consists of meniscus repair or meniscectomy. Meniscectomy leads to faster symptom relief, but has been associated with an increased risk of degenerative changes in the long-term, including osteoarthritis. Conversely, meniscus repair is intended to preserve the native tissue and retain the joint biomechanics, which may be helpful in the long-term outcomes.

Methods: The Department of Orthopaedics, Patna Medical College & Hospital, Bihar carried out a retrospective observational study that involved 100 patients with their treatment between March 2025 and December 2025. The patients were categorized into two group's patients who were having meniscus repair and those who were having meniscectomy. Data were collected from medical records, surgical notes and follow-up visits. Standardized scoring systems were used to measure functional outcomes, Visual Analog Scale (VAS) to measure pain, and radiological grading to measure osteoarthritis progression.

Results: Meniscus repair patients had higher postoperative ratings of functional scores and reduced pain than those in the meniscectomy group. Moreover, the development of osteoarthritis was also much reduced in the repair group, and a higher percentage of patients in the meniscectomy group exhibited degenerative changes on follow-up.

Conclusion: Meniscus repair has better long-term results than meniscectomy and should be used when possible, in order to maintain knee joint functionality and minimize the chances of osteoarthritis.

Keywords: Knee function, Meniscectomy, Meniscus repair, Osteoarthritis, Retrospective study.

DOI: 10.25258/ijcpr.18.6.193

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Introduction

Menisci are crescent-like fibrocartilaginous structures between the tibial plateau and the femur in the knee joint that attach to the femur and tibia to transmit loads, shock-absorb, provide joint stability, lubricate and proprioception to the joint [1]. Both knees have a medial and a lateral meniscus that help balance the weight evenly on the joint surface and relieve the stress on the articular cartilage.

Meniscus injury is a typical orthopaedic condition, which is often caused by sports injuries, trauma, or degenerative alterations, especially in elderly populations [2]. Pain, swelling, locking, and loss of range of motion are some of the symptoms of meniscal tears, which can severely impact the functional ability and the quality of life of a patient

[3]. The management of the meniscal injuries is dependent on various factors such as the type, location, and severity of the tear, age and activity level of the patient [4]. In general, surgical therapies involve meniscus repair and meniscectomy. Meniscus repair is a procedure that requires the meniscal tissue that has been torn to be preserve to maintain the structure and function of the meniscal tissue, and meniscectomy involves removing the destroyed part, in part, or fully [5,6].

Though meniscectomy has been traditionally preferred owing to its technical simplicity and quicker postoperative recuperation, meniscectomy has been linked to long-term issues like early onset osteoarthritis owing to disrupted knee biomechanics and augmented joint loading [7].

Conversely, meniscus repair is designed to preserve the native meniscal tissue, therefore, preserving the integrity of knee joint and minimizing the degenerative changes [8,9]. However, it is linked to a prolonged recovery and increased chance of re-opening in certain instances. This poses a clinical dilemma on the best way to approach surgery especially in resource constrained environments [10]. Irrespective of all the studies conducted worldwide, there are a few retrospective studies done in hospitals in India that directly compare the functional outcomes, pain levels and progression of osteoarthritis in the two procedures [11].

Thus, this research was conducted in order to fill this gap by assessing patients who were treated in Patna Medical College & Hospital. The objective of the study is to compare the functional outcomes of the meniscus repair and meniscectomy, determine the level of postoperative pain, and determine the course of osteoarthritis in both groups.

Study Objectives

- To compare the functional results between meniscus repair and meniscectomy of the knee on standard knee scoring system.
- To compare and measure the level of postoperative pain in the two groups using the VAS.
- To assess the osteoarthritis development of patients who underwent meniscus repair and meniscectomy in relation to the use of radiological grading techniques.

Materials and Methods

Study Design: This research was carried out as a retrospective observational study that would compare and contrast the results of patients who had meniscus repair and meniscectomy. Retrospective design enabled the analysis of pre-recorded patient data in order to evaluate functional recovery, pain and osteoarthritis progression.

Study Setting: The research was conducted at the Department of Orthopaedics, Patna Medical College and Hospital, Bihar, a teaching hospital with a tertiary care that serves a high number of patients with various orthopaedic cases.

Study Duration: The patients who were treated from March 2025 to December 2025 were included in the study. Hospital records were used to obtain follow-up data to provide sufficient postoperative assessment.

Sample Size: A total of 100 patients were included in the study. These patients were categorized into two groups according to the kind of surgical intervention received. Group A comprised of patients who had meniscus repair, whereas Group B comprised of patients who had meniscectomy.

Inclusion Criteria: The study involved patients who were aged between 18 and 60 years with confirmed diagnosis of meniscal injury. Only patients who had gone through either meniscus repair or meniscectomy during the study period and had a minimum follow-up period of at least six months were eligible to be included in the study.

Exclusion Criteria: Associated ligament tears like Anterior Cruciate Ligament (ACL) or Posterior Cruciate Ligament (PCL) tears were excluded to prevent confounding variables. Moreover, patients who had undergone a previous knee surgery, those having advanced osteoarthritis at baseline, and those with incomplete or missing medical records were not included in the study.

Data Collection: Medical records, operative notes and follow-up records of the Outpatient Department (OPD) of hospitals were identified as retrospective data collection. The pertinent demographic data, clinical observations, surgery, and postoperative data were elicited and tabulated.

Outcome Measures: Functional scores, pain evaluation, and osteoarthritis progression were the key outcome measures. The evaluation of functional outcomes was performed based on standardized scoring systems like the Lysholm Knee Score or the International Knee Documentation Committee (IKDC) score. The level of pain was measured with the VAS. Radiological assessment of the progression of osteoarthritis was done using the Kellgren-Lawrence grading system.

Statistical Analysis: The statistical analysis was done using software like SPSS. Continuous variables were given in the form of mean and standard deviation and categorical variables were in the form of frequencies and percentages. The independent t-test on continuous variables and the chi-square test on the categorical variables were used to compare both groups. The p-value that was below 0.05 was regarded as significant.

Results

Demographic Data: The study involved 100 patients, half of were in the meniscus repair (Group A) group and half of them will be in the meniscectomy (Group B) group. Patients were aged between 18 and 60 years with the majority of the patients aged between 26-40 years. Group A had a mean age of 32.4 $\pm$ 8.2 and Group B had a mean age of 34.1 $\pm$ 9.0 with no statistically significant difference between the two groups. Gender wise, males were a larger percentage of the population of the study. Group A included 34 males (68%) and 16 females (32%), while Group B consisted of 36 males (72%) and 14 females (28%). Majority of the injuries were sports related or as a result of trauma like road accidents. Both groups had a higher

number of medial meniscus tears than lateral meniscus injuries.

Table 1: Demographic and Injury Characteristics

Parameter	Group A (Repair)	Group B (Meniscectomy)
Mean Age (years)	32.4 ± 8.2	34.1 ± 9.0
Male (%)	68%	72%
Female (%)	32%	28%
Medial Meniscus Tears (%)	64%	68%
Lateral Meniscus Tears (%)	36%	32%

Comparison between Groups

Functional Scores: Standardized knee scoring systems were used to determine functional outcomes. The two groups responded positively after surgery but patients in the meniscus repair group had a superior functional outcome in the long

term. The mean functional score in Group A improved from 58.2 ± 6.5 preoperatively to 88.6 ± 5.4 at follow-up, whereas in Group B it improved from 60.1 ± 7.0 to 80.3 ± 6.2. The statistical significance of the improvement was found to be significant in the two groups with higher improvement recorded in the repair group.

Table 2: Functional Score Comparison

Parameter	Group A (Repair)	Group B (Meniscectomy)	p-value
Preoperative Score	58.2 ± 6.5	60.1 ± 7.0	0.21
Postoperative Score	88.6 ± 5.4	80.3 ± 6.2	<0.01

Pain Scores (VAS): The primary outcome of pain measurement by VAS was the significant decrease in pain in the two groups after surgery. Group A, 7.1 ± 1.2 preoperative, and 2.1 ± 0.8, postoperative,

exhibited a decrease whereas Group B, 7.3 ± 1.1, to 2.8 ± 0.9. Even though the two processes worked well in decreasing pain, the meniscus repair group indicated relatively lower pain scores at follow-up.

Table 3: Pain Score (VAS) Comparison

Parameter	Group A (Repair)	Group B (Meniscectomy)	p-value
Preoperative VAS	7.1 ± 1.2	7.3 ± 1.1	0.34
Postoperative VAS	2.1 ± 0.8	2.8 ± 0.9	<0.01

Osteoarthritis Progression: Kellgren-Lawrence grading system of radiological assessment demonstrated a greater progression of osteoarthritic changes in the meniscectomy group. Group A had 8 patients (16% mild progression of the

osteoarthritis) and Group B had 18 patients (36% radiological progression).

It means that there is a much greater risk of degenerative changes in the aftermath of meniscectomy.

Table 4: Osteoarthritis Progression

Parameter	Group A (Repair)	Group B (Meniscectomy)	p-value
OA Progression (%)	16%	36%	0.02
No OA Progression (%)	84%	64%	

Statistical Significance: Statistical analysis revealed that both surgical operations led to great functional outcomes and pain reduction, but meniscus repair had better outcomes in regard to long-term functionality and reduction of osteoarthritis. The functional score and level of pain among the two groups postoperatively were statistically significant ($p < 0.01$). Further, the increased rate of osteoarthritis development in the meniscectomy group was also significantly different ($p = 0.02$), which means that meniscus preservation methods definitely are more beneficial in the appropriate patients than meniscectomy.

Discussion

The current retrospective study was designed to compare the outcomes of meniscus repair and meniscectomy with respect to functional rehabilitation, pain alleviation, and osteoarthritis progression. The results of the given research prove that both surgeries have a significant positive impact on the outcomes of patients, but meniscus repair offers greater long-term benefits, especially in terms of maintaining the function of the knee joint and preventing the occurrence of degenerative alterations. Meniscus repair patients reported greater postoperative functional scores and reduced pain in comparison with meniscectomy patients [12]. Also, there was a significantly increased incidence of osteoarthritis development in the meniscectomy group.

These results can be considered in line with some other past studies that have been documented in the literature, which indicate that meniscus preservation results in improved long-term outcomes. Mendes repair has been linked with favorable knee stability, functional performance and a lower chance of early onset of osteoarthritis [13]. Conversely, meniscectomy despite being effective in the short term, in terms of relieving symptoms, has been associated with progressive degeneration of joints with time. The increased incidence of osteoarthritis in the meniscectomy group of this study is in line with the mounting evidence that the ablation of meniscal tissue has negative effects on the health of the joints.

The biomechanical basis of these results is the knee joint biomechanics. Meniscus is crucial in transferring and distributing loads along the tibiofemoral joint. It assists in transforming the axial loads into circumferential (hoop) stresses, and in this way minimizing the peak stress on the articular cartilage [14]. This load-distributing role is lost when the meniscus is removed, at least partially, and causes more stress on the surfaces of the cartilage. This leads to cartilage degeneration and osteoarthritis development with time due to this augmented mechanical strain.

Conversely, meniscus repair does not alter the normal structure or function of the meniscus, thus ensuring normal joint biomechanics and preventing degenerative changes [15].

Clinically, the findings of this research indicate that it is important to maintain the meniscus, where possible. Repair of meniscus must be viewed as the treatment of choice, particularly in the younger patients, active individuals and when the tear is situated in the vascular zone of the meniscus as it has greater healing capabilities.

Nevertheless, even in such cases meniscectomy can be necessary as a complex, degenerative or irreparable tear may occur in which repair is not technically possible. Partial meniscectomy is normally the choice over total meniscectomy in these situations in order to avoid losing tissues and losing as much of the functioning as possible.

Strength and Limitations: The advantages of this study are that it directly compares two surgical procedures that are regularly practiced in one institutional environment and therefore is consistent in terms of surgical methods and postoperative management. Also, the standardized outcome measures can improve the reliability of the results. Nevertheless, the research also has a number of limitations. Since it is a retrospective study, it is vulnerable to possible biases in terms of data collection and selection. The results are not generalizable because the sample used is relatively

small (100 patients). In addition, the length of the follow-up was quite limited and might not comprehensively represent the long-term osteoarthritis course. These findings must be validated by prospective studies of larger sample sizes and longer follow-ups in the future.

Conclusion

In conclusion, meniscus repair and meniscectomy are both effective in enhancing functional outcomes and decreasing pain among patients with meniscal injuries. However, meniscus repair gives greater benefits in the long term, such as improved functional scores and a much better chance of preventing osteoarthritis development. Such results demonstrate the significance of meniscal tissue preservation to ensure knee joint biomechanics and avoid early degenerative alterations. Thus, when it is possible, meniscus repair can be deemed the optimal treatment method. The results need to be confirmed through further large-scale prospective studies with longer follow-up time to confirm these results and bolster the evidence base on the importance of meniscus preservation strategies.

Recommendations: Early identification and proper treatment of meniscal injuries are very important in order to get the best results for the patients. Meniscus repair ought to be done initially particularly in younger and physically active people, to maintain integrity and functionality of the joint. During surgery, surgeons should strive to preserve as much meniscal tissue as possible. Partial meniscectomy should be used in instances where it is not possible to repair the meniscus. Moreover, the organization of rehabilitation and follow-up should be considered to control recovery and identify early degenerative changes. Multicentric studies that are long-term and have the ability to better understand the process of osteoarthritis progression are recommended to enhance clinical decision-making.

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