Original Article

Functional Outcomes Following Arthroscopic Meniscal Repair and Excision: A Comparative Study

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Abstract

Background: Meniscal tears are common intra-articular knee injuries that can cause pain, mechanical symptoms, and functional limitation. The choice between arthroscopic meniscal repair and excision continues to be debated, especially for traumatic tears in younger adults. Preservation of meniscal tissue may provide better long-term outcomes by maintaining joint biomechanics and delaying osteoarthritis. The aim and objective is to assess and compare the functional outcomes and postoperative complications between arthroscopic meniscal repair and arthroscopic meniscectomy in patients with traumatic meniscal tears. **Material and Methods:** A prospective comparative study was performed on forty patients with traumatic meniscal tears. Twenty underwent arthroscopic meniscal repair, and twenty had arthroscopic meniscectomy. Functional outcome was evaluated using the Lysholm Knee Score (LKS) preoperatively, at 6 weeks, and at 6 months. Data were analysed using paired and unpaired t-tests; $p < 0.05$ was taken as significant. **Results:** In the repair group, mean LKS improved from approximately 44 (pre-op) to 78 at 6 weeks and 97 at 6 months. The excision group improved from 43 to 74 and 90, respectively. Inter-group difference at 6 months was highly significant ($p < 0.001$). Excellent results were achieved in 80% of repaired knees, compared with 25% after excision. Postoperative complications were minimal, with no major reoperations. **Conclusion:** Arthroscopic meniscal repair produced superior early and mid-term functional recovery with minimal complications compared to meniscectomy. The findings support a meniscus-preserving strategy whenever feasible for traumatic tears.

Keywords: Meniscal tear, arthroscopic repair, meniscectomy, Lysholm knee score, functional outcome, arthroscopy.

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Introduction

The meniscus is an important fibrocartilage structure that helps with load sharing, joint lubrication, and knee stability.[1] Once injured, the biomechanics of the knee change, which can lead to early degeneration and pain.[2] Arthroscopy has become the gold standard for managing these injuries as it allows both diagnosis and treatment at the same sitting with less morbidity and early mobilization.[3]

Meniscal tears are common in the young, active population after twisting trauma or a road accident.[4] The medial side is injured more often because it is less mobile and is also associated with ACL tears. Excision of damaged tissue was previously routine, but later found to cause early osteoarthritis due to changes in load transmission.[5] Mordecai et al. reported that partial meniscectomy provides rapid relief but carries a high risk of degenerative arthritis, whereas repair preserves native meniscal function and protects the cartilage.[6]

Recent evidence indicates a shift toward repair whenever possible. Ro et al. analysed multiple studies and found that meniscal repair was associated with higher Lysholm knee scores, fewer reoperations, and slower osteoarthritis progression compared with meniscectomy.[7] Bottomley and Al-Dadah also compared arthroscopic repair and meniscectomy. They found significant improvement in IKDC and Lysholm scores after repair, with lower re-tear and degenerative rates, concluding that preserving the meniscus gives long-term benefit.[8]

In a randomised study, van der Graaff et al. compared partial meniscectomy with physiotherapy for traumatic meniscal tears in young patients and reported no difference in knee function at two years, yet surgical treatment remained necessary for displaced or locked fragments.[9] DePhillipo et al. evaluated ACL reconstruction with ramp repair and found excellent short-term outcomes, with 88% return to sport, supporting concurrent meniscal repair in unstable lesions.[10] Al Habsi et al. later introduced an anterior-portal all-inside ramp repair method that simplified access, reduced risk to neurovascular structures, and made the procedure more reproducible.[11]

Despite global evidence, Indian data focusing purely on traumatic meniscal tears are limited. Most published series mix traumatic and degenerative cases, making interpretation difficult.

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Hence, this study was planned to compare the functional outcome of arthroscopic meniscal repair and excision in traumatic meniscal injuries using the Lysholm Knee Score and to evaluate post-operative complications in both groups.

Materials and Methods

This was a prospective, interventional, comparative study conducted in the Department of Orthopedics at Basaveshwara Teaching and General Hospital, Kalaburagi, and in a few private hospitals in the same city. A total of 40 patients with clinically and radiologically diagnosed meniscal tears were included. Twenty patients underwent arthroscopic meniscal repair, and twenty underwent arthroscopic meniscectomy. Patients were evaluated preoperatively and postoperatively at 6 weeks, 3 months, and 6 months using the Lysholm Knee Scoring Scale (LKS) to assess functional outcome. Only patients with traumatic meniscal tears were included in the study.

Inclusion criteria were all clinically and radiologically proven meniscal tears in patients aged 15 years and above of either sex, including those associated with ACL, PCL, MCL, or LCL injuries resulting from traumatic events. Exclusion criteria were tibial spine avulsion, limb fractures, osteochondral defects or osteoarthritis, systemic arthritis like gout or rheumatoid, tumors, septic arthritis, medically unfit, and pregnant patients.

All patients gave written informed consent in their local language after a detailed explanation of the procedure. Ethical clearance was obtained before the study began.

All surgeries were done under regional anesthesia using standard arthroscopic portals. The repair group underwent all-inside or inside-out suturing, depending on the tear site, while the excision group underwent a partial meniscectomy with maximal preservation of healthy tissue. Postoperative rehabilitation was similar in both groups, with gradual range-of-motion and weight-bearing exercises. Collected data were entered in Excel and analyzed using IBM SPSS version 20.0. Mean and standard deviation were used for quantitative data, analyzed with paired and unpaired t-tests. Qualitative data were assessed with the Chi-square or Fisher's exact test. $p < 0.05$ was taken as statistically significant.

Results

Most patients were young adults between 18 and 44 years with mean age around 29 years. Males dominated the group almost three-fourth, reflecting outdoor trauma pattern. Right knee got injured more than left. Sports injury was commonest, then road traffic and fall from height. Medial meniscus involved in majority cases, ACL tear the usual partner. Both repair and excision groups were nearly equal in size. Few had mild problems like stiffness or infection post-op, no serious issue seen.

Table 1: Demographic Profile of Patients (Traumatic Group)

Parameter	Distribution	Observation
Total cases	37	All traumatic (RTA + Sports + Fall from height)
Age range (yrs)	18 – 44	Mean 29.6 ± 6.8 yrs
Sex	Male = 27 (73%) Female = 10 (27%)	Males dominated
Side involved	Right = 21 (56.7%) Left = 16 (43.3%)	Right side slightly more
Mode of injury	RTA = 11 Sports = 16 Fall = 10	Sports most common
Meniscus involved	Medial = 26 Lateral = 11	Medial more affected
Associated ligament injury	ACL = 28 PCL = 4 Isolated = 5	ACL tear most frequent
Treatment given	Repair = 20 Excision = 17	Groups comparable
Post-op complications	7 (18.9%)	Minor stiffness or infection

Legends: RTA – Road Traffic Accident; ACL – Anterior Cruciate Ligament; PCL – Posterior Cruciate Ligament.

Table 2: Functional Outcome (Lysholm Knee Score) at Pre-op, 6 Weeks and 6 Months

Metric	Meniscal Repair (n = 20)	Meniscal Excision (n = 17)	Significance
Pre-op LKS (mean ± SD)	44.40 ± 12.19	40.53 ± 12.45	t = 0.95 p = 0.34 NS
6-week LKS (mean ± SD)	78.35 ± 6.10	72.41 ± 4.77	t = 3.32 p = 0.002 S
6-month LKS (mean ± SD)	97.25 ± 3.77	89.47 ± 4.72	t = 5.47 p < 0.001 VHS

Pre-operative scores were almost similar in both groups showing equal baseline. At 6 weeks both improved, but repair side jumped higher. By 6 months the gap became wide and clear, mean LKS 97.25 in repair against 89.47 in excision. Statistical test showed very high significance. Effect size large meaning difference is real not by chance. So repair gives stronger early and final function recovery than excision.

Table 3: Functional Gain and Outcome Grades

Parameter	Meniscal Repair (n = 20)	Meniscal Excision (n = 17)
Change in LKS (6 weeks – pre-op) mean ± SD	33.95 ± 13.61	31.88 ± 12.94
Change in LKS (6 months – pre-op) mean ± SD	52.85 ± 12.95	48.94 ± 12.92
Percent improvement at 6 months mean ± SD	138.66 ± 81.79 %	155.18 ± 129.64 %
Excellent (≥ 95)	80.0 %	17.6 %
Good (84 – 94)	20.0 %	76.5 %
Fair (< 84)	0.0 %	5.9 %

Functional gain steady in both, but meniscal repair showed slightly more rise. Percent improvement also higher though

variation wider. At final follow up, 80 percent of repair group reached excellent grade, only 17 percent in excision. Most excision patients stayed in good range, few fair. Repair clearly helped in faster and better knee function restoration.

Table 4: Repair Subgroup Outcome by Associated Injury

Associated Injury	n	Pre-op LKS	6-mo LKS	Gain at 6 mo	Excellent (%)
ACL	12	45.6	97.8	52.3	83.3
PCL	3	25.3	95.0	69.7	66.7
Isolated Meniscal	5	53.0	97.2	44.2	80.0

When repair cases divided by associated injuries, ACL tear subgroup still showed excellent recovery with average 97 final LKS. PCL group improved a bit slower but ended near similar scores. Even isolated meniscal tear patients regained strong function. This shows repair works well across all injury combinations and ligament association does not reduce final outcome much.

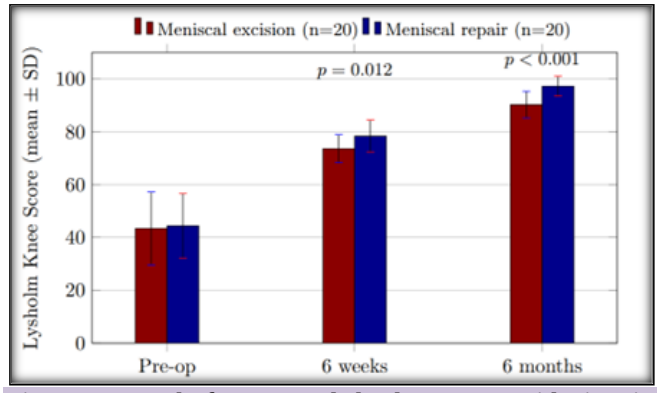

Figure 1: Trend of mean Lysholm knee score with time in meniscal repair and excision patients showing better recovery in repair group.

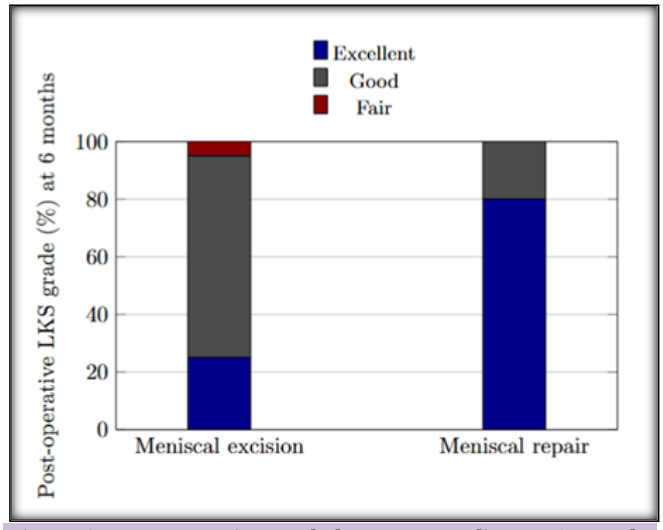

Figure 2: Post-operative Lysholm score grading at 6 months showing more excellent results after meniscal repair compared to excision.

Discussion

Meniscal repair in our traumatic series showed a big functional gain. Lysholm rose from approximately 44 pre-op to about 78 at 6 weeks and to about 97 at 6 months. Meniscal excision improved too, but by less than 74% at 6 weeks and 90% at 6 months. So, the repair was clearly led early and by mid-term.

This pattern aligns with recent evidence showing that repair outperforms resection for knee function and joint preservation.[7] Other clinical series also report higher IKDC and Lysholm scores after repair with fewer re-tears.[8] Long-term reviews show durable results with good to excellent scores beyond seven years, supporting lasting benefit.[12] Large meta-analyses link meniscectomy to higher osteoarthritis and arthroplasty risk, so our early repair advantage likely gives long-term cartilage protection too [Migliorini, 10.1007/s00167-023-07600-y]. Randomised data suggest that some stable tears may respond well to physiotherapy. Still, for true traumatic, symptomatic tears that require surgery, our findings support a repair-first strategy once inside the joint [van der Graaff, 10.1136/bjsports-2021-105059]. Early safety is acceptable for both procedures, with very low 30-day complication rates, so counselling can be balanced while still favouring preservation when repairable [Lai, 10.1007/s00167-023-07507-8].

In our head-to-head comparison, repair clearly led at both early and late checks. By 6 months, the mean Lysholm score was 97.2 in the repair group vs 90.3 in the excision group, a difference that was statistically highly significant in our data ($p < 0.001$). This mirrors meta-analytic work showing that although meniscectomy may give quicker pain relief, it does not preserve knee biomechanics and is linked to higher long-term OA and arthroplasty risk.[12] Ro's meta-analysis also found better functional scores and fewer reoperations after repair compared with partial meniscectomy, supporting our functional advantage.[7] Bottomley reported similar PROM benefit and lower re-tear and degeneration rates with repair.[8]

Older series that warned of higher early failure after repair used older sutures and techniques, so direct comparison is imperfect. With modern all-inside anchors and biologic augmentation, the failure gap narrowed and the functional benefit of repair became clearer. Clinically, this means excision still has a role for complex, non-repairable, degenerative fragments. Still, whenever pattern and tissue quality allow, repair should be preferred for better function and joint preservation.[6]

This low early adverse signal aligns with large registry data showing less than 1% complications within 30 days for both repair and meniscectomy, though minor differences in VTE were observed.[14] Long-term failure after repair is reported variably. Ro found around 14% re-tear, mostly in avascular zones,[7] while Petersen's long-term synthesis reported failures up to 22% but with overall good clinical scores in most patients.[12] In older cohorts, pooled failure rates were about 12%, yet functional gains remained acceptable, showing that age alone is not prohibitive.[15] Technique and tear biology drive much of this risk. Avascular zone tears and poor tissue quality predict non-

healing, while modern all-inside anchors, careful portal selection, and biologic augmentation reduce failure and neurovascular injury.[11,16] Thus, our low complication rate likely reflects strict selection criteria, contemporary technique, and supervised rehab, which together reduce the need for revision despite the known long-term failure spectrum reported in meta-analyses.[13] Many traumatic meniscal tears come with ACL injury, and addressing both together matters. In our cohort, ACL and meniscus repairs went well; patients regained stability and function quickly. DePhillipo showed similar findings with about 88% return to sport and no loss of knee stability when ramp lesions were repaired with ACL reconstruction.[10] Systematic reviews confirm good PROM gains and low early complications after ramp repair done with ACLR, with revision rates modestly around 8–9% in pooled series.[17] Technique choice affects access and safety. Thaunat described the posteromedial portal, which provides a direct view and anatomic suture passage for difficult posterior lesions.[16] At the same time, Al Habsi promoted an anterior-portal all-inside ramp repair that avoids PM dissection and shortens operative time.[16] Reviewers advise a systematic search for ramp lesions during ACLR and repair when unstable, because untreated ramp tears may compromise graft function long term.[18] In short, a combined ACL + meniscal management approach with careful portal strategy provides stability without added risk and likely contributed to our strong subgroup outcomes.

Though our follow-up is short, the clear functional advantage after repair is likely to translate into better long-term cartilage protection. Repair preserves hoop stresses and load distribution, which reduces focal cartilage overload seen after resection. This mechanism was described early and re-emphasised in reviews.[6] Large meta-analyses and systematic reviews now show lower OA progression and fewer conversions to knee replacement after repair versus meniscectomy, supporting the structural benefit beyond PROMs.[6,13] Petersen's long-term synthesis found good to excellent scores even at 7–10 years, with acceptable failure rates, implying that functional gains persist and that degeneration is delayed.[12] A caveat is that RCT data in selected stable tears show that non-operative care can match surgery at 2 years, so preservation is most relevant when the tear is unstable or symptomatic. The tissue is repairable.[9] We must be cautious in calling this chondroprotection definitive until longer MRI and radiographic follow-up are available, but current evidence, together with our results, favours repair for joint health when technically feasible.

This study has limitations, including a small sample, a single centre, a short follow-up, no MRI or second-look arthroscopy to confirm meniscal healing, and no radiographic grading of osteoarthritis. Selection bias is possible as we included primarily traumatic, repairable tears, so results may not apply to degenerative cases. Future work should be multicentric, larger cohorts with longer follow-up, include MRI/MOCART or second-look data, and compare repair techniques (all-inside vs inside-out vs hybrid) and biologic augmentation in randomized or propensity-matched designs. Cost-effectiveness, patient-reported outcome trajectories, and objective cartilage mapping (T2/ dGEMRIC) would strengthen the evidence and clarify long-term chondroprotection.

Conclusion

Meniscal repair provided superior early- and mid-term function, reduced risk to joint health, and low complication rates in our traumatic series. Repair should be the first choice when the tear pattern and tissue allow, excision reserved for irreparable, degenerative fragments. Combine meniscal repair with ACL reconstruction when indicated; inspect for ramp lesions and repair them to protect stability. Longer follow-up with MRI and multicentre data will confirm durability, but current evidence supports a meniscus-saving approach.

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Conflicts of interest

There are no conflicts of interest.

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