Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i5.6108

CLINICAL OUTCOME OF ARTHROSCOPIC REPAIR FOR ISOLATED MENISCUS TEAR IN SPORTS STUDENTS

Dr. Muhammad Adeel[1], Muhammad Ali Usman[2], Babar Shahzad Sadiq[3*], Dr Muhammad Tayab[4]

[1]Assistant Professor Orthopedic, Ayub Medical College and Ayub Teaching Hospital Abbottabad.
[2]Assistant Professor of Orthopaedics, Abbottabad International Medical Institute Abbottabad
[3*]Consultant Orthopedic Surgeon Ayub Teaching Hospital Abbottabad
[4]PGR Orthopaedic B Unit ATH Abbottabad

***Corresponding Author:** Babar Shahzad Sadiq
*Consultant Orthopedic Surgeon Ayub Teaching Hospital Abbottabad. E-mail: Babarshahzad161@yahoo.com

Abstract

Introduction: Isolated meniscus tears represent a common orthopedic injury, particularly among sports students engaged in rigorous physical activities.

Objective: The main objective of the study is to find the clinical outcome of arthroscopic repair for isolated meniscus tear in sports students.

Methodology of the study: This retrospective cohort study was conducted at Orthopedic Unit, Ayub Teaching Hospital Abbottabad Pakistan from 2022 to 2023. Data were collected from 152 participants from different sports departments. Participants' demographic information, including age, gender, sports played, and level of competition, is recorded at baseline. Preoperative assessments, including physical examination findings, imaging studies, and functional scores were documented. Surgical details, such as the type of meniscal tear, tear location, repair technique and concomitant procedures were systematically recorded. Postoperative follow-up visits are scheduled at regular intervals 3 months, 6 months, 1 year to assess clinical outcomes, including pain scores, range of motion, knee stability, functional scores, and return to sports timeline.

Results: Data were collected from 152 participants. Mean age was 21.4 ± 2.3 years and there were 100 male and 52 female participants. Most played sport was football (n=60) and mean lysholm knee score was 62.8 ± 8.5. Participants reported a mean postoperative pain score of 2.1 (VAS ± SD 1.2), suggesting effective pain management following surgery. Significant improvements in range of motion were noted, with mean improvements of 25° (± 5°) in flexion and 10° (± 3°) in extension. The mean time to return to sports activities was 5.6 months (± 1.8), highlighting a relatively rapid recovery period.

Conclusion: It is concluded that arthroscopic repair demonstrates high clinical success rates and favorable outcomes in sports students with isolated meniscus tears. Tear location and repair technique did not significantly impact treatment efficacy, highlighting the versatility of arthroscopic repair in this population.

Introduction

Isolated meniscus tears represent a common orthopedic injury, particularly among sports students engaged in rigorous physical activities. Arthroscopic repair has emerged as a widely utilized surgical

technique aimed at restoring knee function and minimizing long-term complications associated with meniscal injuries [1]. Understanding the clinical outcomes of arthroscopic repair for isolated meniscus tears in sports students is paramount for optimizing treatment strategies and facilitating timely return to athletic participation. As biomechanical studies have suggested, disruption of meniscal tissue affects normal joint function and alters strain on the articular surface [2].

Furthermore, the risk that the joint is prone to early degenerative changes and increased morbidity correlates even with the extent of meniscal loss after injury [3]. Thus, current scientific evidence strongly supports the fact that meniscal lesions lead to early osteoarthritic (OA) changes [4,5]. Meniscectomy is still commonly performed, however, although repair is more beneficial in terms of long-term results [6,7]. Favorable outcomes after partial meniscectomy of the knee have been demonstrated in short-term follow-up, but the long-term risk of progression of OA remains [8].

Praxton et al., performed a metaanalysis that compared outcomes of those two procedures, and concluded that meniscal repair was associated with higher clinical score and less postoperative osteoarthritic progression in the long-term results while reoperation rate was higher after meniscal repair [9]. Other studies also have shown better function and less osteoarthritis for meniscal repair compared with meniscectomy. Meniscal tears make up approximately 66% of all knee injuries and are more common in men than in women.35 Intact menisci are crucial for preserving knee function since the menisci play a role in shock absorption, force distribution, and joint stability [10].

In regard to sports students, the menisci provide proprioceptive feedback related to acceleration, deceleration, velocity, and direction. Partial and especially total meniscectomies can put a patient at high risk for early cartilage degenerative changes, such as narrowing of the joint spaces or osteoarthritis. Therefore, tears that are repairable slow or prevent the progression of arthritic changes. Furthermore, it is less common for athletes to have isolated meniscal repairs; Stein et al reported that 70% to 80% of patients undergoing a meniscal repair also have a concomitant anterior cruciate ligament (ACL) reconstruction and that only 5% of patients receive isolated meniscal repairs [11].

Surgical meniscus repair procedures are being increasingly performed due to accumulated knowledge of the long-term destructive consequences of meniscectomy, the benefits of meniscal preservation, and the ongoing improvements in the repair techniques and devices. Secondary to the findings in the long-term follow-up, a shift in the treatment of isolated meniscus lesions has occurred, with the current gold standard being operative repair as opposed to meniscectomy. While this is widely accepted for the general population [12].

Objective

The main objective of the study is to find the clinical outcome of arthroscopic repair for isolated meniscus tear in sports students.

Methodology of the study

This retrospective cohort study was conducted at Orthopedic Unit, Ayub Teaching Hospital Abbottabad Pakistan from 2022 to 2023. Data were collected from 152 participants from different sports departments.

Inclusion criteria

Sports students actively participating in organized sports activities at the high school or collegiate level, aged 18-25 years, and diagnosed with isolated meniscus tears confirmed by magnetic resonance imaging (MRI) or arthroscopic examination.

Exclusion criteria

Patients with concomitant ligamentous injuries, previous knee surgeries, inflammatory arthropathies, or other significant knee pathologies.

Data Collection

Participants' demographic information, including age, gender, sports played, and level of competition, is recorded at baseline. Preoperative assessments, including physical examination findings, imaging studies, and functional scores were documented. Surgical details, such as the type of meniscal tear, tear location, repair technique and concomitant procedures were systematically recorded. Postoperative follow-up visits are scheduled at regular intervals 3 months, 6 months, 1 year to assess clinical outcomes, including pain scores, range of motion, knee stability, functional scores, and return to sports timeline. Patient-reported outcome measures (PROMs), such as the International Knee Documentation Committee (IKDC) Subjective Knee Evaluation Form and the Knee Injury and Osteoarthritis Outcome Score (KOOS), are administered to evaluate patient satisfaction and quality of life postoperatively.

Statistical Analysis

Data were analyzed using SPSS v26. Multivariable regression analysis was conducted to identify predictors of successful outcomes while adjusting for potential confounding variables.

Results

Data were collected from 152 participants. Mean age was 21.4 ± 2.3 years and there were 100 male and 52 female participants. Most played sport was football (n=60) and mean lysholm knee score was 62.8 ± 8.5.

Table 01: Demographic data of participants

Characteristic	**Value**
Total Number of Participants	152
Mean Age ± SD	21.4 ± 2.3 years
Gender (Male/Female)	100/52
Sports Played (n)	
- Football	60
- Basketball	40
- Soccer	30
- Volleyball	22
Pre-operative Assessment	
Mean Lysholm Knee Score ± SD	62.8 ± 8.5

Regarding repair techniques, 80 cases utilized the inside-out approach, 50 employed the outside-in technique, and 22 utilized the all-inside method. These results indicate a predominance of medial meniscus tears and a higher utilization of the inside-out repair technique.

Table 02: Surgical details in participants

Surgical Detail	**Value**
Tear Location	
- Medial Meniscus	100
- Lateral Meniscus	52
Repair Technique	
- Inside-Out	80
- Outside-In	50
- All-Inside	22

Participants reported a mean postoperative pain score of 2.1 (VAS ± SD 1.2), suggesting effective pain management following surgery. Significant improvements in range of motion were noted, with mean improvements of 25° (± 5°) in flexion and 10° (± 3°) in extension. The mean time to return to sports activities was 5.6 months (± 1.8), highlighting a relatively rapid recovery period. Complications

were infrequent, with 10 cases of re-tears and 2 cases of infection, underscoring the overall safety and efficacy of arthroscopic repair in this population.

Table 03: Post-operative outcomes

Outcome	**Value**
Clinical Success Rate of Repair (%)	90.8
Mean Postoperative Pain Score (VAS ± SD)	2.1 ± 1.2
Mean Range of Motion Improvement (Flexion ± SD)	25° ± 5°
Mean Range of Motion Improvement (Extension ± SD)	10° ± 3°
Mean Time to Return to Sports (months ± SD)	5.6 ± 1.8
Complications	
- Re-tear	10
- Infection	2

Participants achieved a mean IKDC Subjective Knee Evaluation Form score of 83.4 (± 7.6), indicating satisfactory subjective knee function and quality of life. Additionally, mean scores on the Knee Injury and Osteoarthritis Outcome Score (KOOS) domains were as follows: Pain 87.5 (± 9.3), Symptoms 84.2 (± 8.7), Function 88.9 (± 8.1), Sports/Recreation 85.6 (± 7.9), and Quality of Life 86.8 (± 8.4).

Table 04: Patient reported outcomes

Outcome	**Value**
Mean IKDC Subjective Knee Evaluation Form Score ± SD	83.4 ± 7.6
Mean KOOS Scores ± SD	
Pain	87.5 ± 9.3
Symptoms	84.2 ± 8.7
Function	88.9 ± 8.1
Sports/Recreation	85.6 ± 7.9
Quality of Life	86.8 ± 8.4

The analysis revealed that tear location did not significantly influence the clinical success rate of arthroscopic repair, with a p-value of 0.152. Similarly, there was no significant difference in clinical success rates between different repair techniques, with a p-value exceeding 0.05. However, multivariable regression analysis identified predictors of successful outcomes, indicating that younger age and absence of concomitant ligamentous injuries were associated with better treatment outcomes ($p < 0.05$).

Table 05: Correlation analysis

Analysis	**p-value**
Tear Location vs. Clinical Success Rate	0.152
Repair Technique vs. Clinical Success Rate	>0.05
Predictors of Successful Outcomes	<0.05

Discussion

The study demonstrates a high clinical success rate of 90.8% for arthroscopic repair among sports students with isolated meniscus tears. This finding underscores the effectiveness of arthroscopic repair as a treatment modality in this active population, with the majority of participants experiencing significant improvements in pain, function, and return to sports activities. Tear location did not significantly influence the clinical success rate of arthroscopic repair [13]. This suggests that regardless of whether the tear is located in the medial or lateral meniscus, arthroscopic repair remains an effective treatment option for sports students. Similarly, there was no significant difference in outcomes between different repair techniques (inside-out, outside-in, all-inside), indicating that the choice of technique may not substantially impact treatment success [14]. Multivariable regression analysis identified younger age and absence of concomitant ligamentous injuries as predictors of

successful outcomes. This highlights the importance of considering patient-specific factors in treatment decision-making, as younger patients and those without additional ligamentous injuries may achieve better postoperative outcomes following arthroscopic repair [15].

Patient-reported outcome measures (PROMs) provide valuable insights into the subjective experiences and functional outcomes of sports students following arthroscopic repair. High scores on the IKDC Subjective Knee Evaluation Form and the Knee Injury and Osteoarthritis Outcome Score (KOOS) indicate favorable postoperative function, pain relief, and quality of life, further supporting the efficacy of arthroscopic repair in this population [16]. While the overall complication rate was low, a small number of participants experienced re-tears and infections postoperatively. These complications underscore the importance of meticulous surgical technique, appropriate patient selection, and vigilant postoperative care to minimize adverse events and optimize treatment outcomes [17].

Conclusion

It is concluded that arthroscopic repair demonstrates high clinical success rates and favorable outcomes in sports students with isolated meniscus tears. Tear location and repair technique did not significantly impact treatment efficacy, highlighting the versatility of arthroscopic repair in this population. With careful consideration of patient-specific factors and meticulous surgical techniques, arthroscopic repair offers a reliable approach to restoring knee function and facilitating timely returns to sports activities for sports students with meniscal injuries.

References

1. Vrgoč G, Vuletić F, Matolić G, Ivković A, Hudetz D, Bulat S, Bukvić F, Janković S. Clinical Outcome of Arthroscopic Repair for Isolated Meniscus Tear in Athletes. Int J Environ Res Public Health. 2023 Mar 14;20(6):5088. doi: 10.3390/ijerph20065088. PMID: 36981997; PMCID: PMC10049165.
2. Eberbach H., Zwingmann J., Hohloch L., Bode G., Maier D., Niemeyer P., Südkamp N.P., Feucht M.J. Sport-Specific Outcomes after Isolated Meniscal Repair: A Systematic Review. *Knee Surg. Sports Traumatol. Arthrosc.* 2018;**26**:762–771. doi: 10.1007/s00167-017-4463-4
3. Nakayama H., Kanto R., Kambara S., Kurosaka K., Onishi S., Yoshiya S., Yamaguchi M. Clinical Outcome of Meniscus Repair for Isolated Meniscus Tear in Athletes. *Asia Pac. J. Sports Med. Arthrosc. Rehabil. Technol.* 2017;**10**:4–7. doi: 10.1016/j.asmart.2017.05.299.
4. Mosich G.M., Lieu V., Ebramzadeh E., Beck J.J. Operative Treatment of Isolated Meniscus Injuries in Adolescent Patients: A Meta-Analysis and Review. *Sports Health.* 2018;**10**:311–316. doi: 10.1177/1941738118768201
5. Blanchard E.R., Hadley C.J., Wicks E.D., Emper W., Cohen S.B. Return to Play after Isolated Meniscal Repairs in Athletes: A Systematic Review. *Orthop. J. Sports Med.* 2020;**8**:2325967120962093. doi: 10.1177/2325967120962093.
6. Andrade R., Vasta S., Papalia R., Pereira H., Oliveira J.M., Reis R.L., Espregueira-Mendes J. Prevalence of Articular Cartilage Lesions and Surgical Clinical Outcomes in Football (Soccer) Players' Knees: A Systematic Review. *Arthroscopy.* 2016;**32**:1466–1477. doi: 10.1016/j.arthro.2016.01.055.
7. Casp A.J., Bodkin S.G., Gwathmey F.W., Werner B.C., Miller M.D., Diduch D.R., Brockmeier S.F., Hart J.M. Effect of Meniscal Treatment on Functional Outcomes 6 Months after Anterior Cruciate Ligament Reconstruction. *Orthop. J. Sports Med.* 2021;**9**:232596712110312. doi: 10.1177/23259671211031281.
8. Zimmerer A., Sobau C., Nietschke R., Schneider M., Ellermann A. Long-Term Outcome after All inside Meniscal Repair Using the FasT-Fix System. *J. Orthop.* 2018;**15**:602–605. doi: 10.1016/j.jor.2018.05.042.
9. Nakayama H, Kanto R, Kambara S, Kurosaka K, Onishi S, Yoshiya S, Yamaguchi M. Clinical outcome of meniscus repair for isolated meniscus tear in athletes. Asia Pac J Sports Med Arthrosc

Rehabil Technol. 2017 Jun 7;10:4-7. doi: 10.1016/j.asmart.2017.05.299. PMID: 29392109; PMCID: PMC5780295.

10. Blanchard ER, Hadley CJ, Wicks ED, Emper W, Cohen SB. Return to Play After Isolated Meniscal Repairs in Athletes: A Systematic Review. *Orthopaedic Journal of Sports Medicine*. 2020;8(11). doi:10.1177/2325967120962093
11. Zhu, S., Li, X., Lu, Z., Koh, J. L., Wang, C., Wang, P., ... & Wang, J. (2023). Arthroscopic repair of degenerative medial meniscus tears in patients aged over 45 years resulted in favorable clinical outcomes and low clinical failure rates at a minimum 2-year follow-up. *Knee Surgery, Sports Traumatology, Arthroscopy*, *31*(5), 1815-1823.
12. Harput, G., Guney-Deniz, H., Nyland, J., & Kocabey, Y. (2020). Postoperative rehabilitation and outcomes following arthroscopic isolated meniscus repairs: a systematic review. *Physical Therapy in Sport*, *45*, 76-85.
13. Blanchard, E. R., Hadley, C. J., Wicks, E. D., Emper, W., & Cohen, S. B. (2020). Return to play after isolated meniscal repairs in athletes: a systematic review. *Orthopaedic Journal of Sports Medicine*, *8*(11), 2325967120962093.
14. Pathak, S., Bharadwaj, A., Patil, P., Raut, S., & Srikanth, R. V. (2020). Functional outcomes of arthroscopic combined anterior cruciate ligament reconstruction and meniscal repair: a retrospective analysis. *Arthroscopy, Sports Medicine, and Rehabilitation*, *2*(2), e71-e76.
15. Pathak, S., Bharadwaj, A., Patil, P., Raut, S., & Srikanth, R. V. (2020). Functional outcomes of arthroscopic combined anterior cruciate ligament reconstruction and meniscal repair: a retrospective analysis. *Arthroscopy, Sports Medicine, and Rehabilitation*, *2*(2), e71-e76.
16. DePhillipo, N. N., Dornan, G. J., Dekker, T. J., Aman, Z. S., Engebretsen, L., & LaPrade, R. F. (2020). Clinical characteristics and outcomes after primary ACL reconstruction and meniscus ramp repair. *Orthopaedic Journal of Sports Medicine*, *8*(4), 2325967120912427.
17. Ogawa, H., Matsumoto, K., Sengoku, M., Yoshioka, H., & Akiyama, H. (2020). Arthroscopic repair of horizontal cleavage meniscus tears provides good clinical outcomes in spite of poor meniscus healing. *Knee Surgery, Sports Traumatology, Arthroscopy*, *28*, 3474-3480