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Original Research Article

ASSESSING FUNCTIONAL OUTCOMES OF ARTHROSCOPIC PARTIAL MENISCECTOMY IN MIDDLE-AGED ADULTS WITH MENISCAL TEARS

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ABSTRACT

Background: *Meniscal tears are a frequent cause of knee pain and disability in middle-aged adults. Arthroscopic partial meniscectomy (APM) is widely performed, yet its functional outcomes in this age group remain debated. Local evidence is essential to optimize treatment selection and patient counseling.* ***Objective:*** *To determine the functional outcome of arthroscopic partial meniscectomy in middle-aged adults with meniscal tears.* ***Study Design:*** *Descriptive study.* ***Setting:*** *The Orthopedic Surgery Department of Combined Military Hospital, Peshawar, Pakistan.* ***Duration of Study:*** *27-Nov-2024 to 27-May-2025.* ***Methods:*** *A total of 87 patients aged 40–70 years with symptomatic meniscal tears were included. All patients underwent standardized arthroscopic partial meniscectomy. Functional outcomes were assessed 12 weeks postoperatively using the Lysholm knee scoring scale and categorized as excellent (95–100), good (84–94), fair (65–83), or poor (<65). Descriptive statistics (mean ± SD, frequencies, percentages) were computed using SPSS 25.* ***Results:*** *The mean age of participants was 54.31 ± 8.67 years, with a slight male predominance (56.3%). Degenerative tears were more common (71.3%) compared to traumatic tears (28.7%). Postoperative functional outcomes were excellent in 33 (37.9%) patients, good in 31 (35.6%), fair in 21 (24.1%), and poor in 2 (2.3%).* ***Conclusion:*** *Arthroscopic partial meniscectomy demonstrated favorable short-term functional outcomes in middle-aged adults with meniscal tears, with nearly three-quarters achieving good-to-excellent results. Careful patient selection remains key, particularly in degenerative cases.*

Keywords: Arthroscopic Partial Meniscectomy, Meniscal Tear, Middle-Aged Adults, Functional Outcomes, Lysholm Knee Score, Degenerative Tear

INTRODUCTION

Initially considered to be a vestigial structure of leg muscle, recent thorough investigations have established meniscus as an essential component of knee joint, emphasising its anatomical along with functional significance (1-3). The meniscus is considered to play a crucial role in weight-bearing, as its absence disrupts biomechanics of knee joint, which leads to premature degenerative alterations. This resulted in development of meniscus preservation surgical procedures. Historically, preservation has demonstrated an impressive success rate for recovery time and functional outcomes (4, 5). The rate of meniscal injuries is increasing, which can be possibly linked to heightened sports participation as well as developments in imaging technology, particularly MRI. A conservative estimate indicates that rate of meniscal tears is approximately 60 per 100,000, yet actual incidence is likely greatly overestimated (6). Research indicates that knees with identified meniscal injuries show greater cartilage degradation, leading to an earlier onset of osteoarthritis. A study revealed that over 75% of patients suffering from symptomatic osteoarthritis suffer from meniscal injuries (7). Arthroscopic partial meniscectomy (APM) counts among most prevalent orthopaedic procedures performed (8). The primary indication for APM is a degenerative meniscal tear (DMT), different from an acute meniscal injury. DMTs usually appear following low-energy injuries as well as may occur spontaneously, compared to former, which is linked to acute trauma. DMTs are usually considered as atraumatic; pain is initial, while the diagnosis occurs following a clinical evaluation associated with chronic knee pain. The degenerative nature of condition results in a median age of patients receiving APM in typically ranging from 50 -65 years, with two-thirds of meniscectomies conducted in individuals aged 45 and older (9-11). A study recorded the functional outcome of APM among adult middle-aged patients with meniscal tears i.e excellent in (6%), good in (56%), fair (28%) and poor (10%) of patients (12).

Given the lack of local literature on this subject, our study aims to determine the functional outcomes of arthoscopic partial meniscectomy among middle-aged adults with meniscal tears at our hospital setup. These findings can help our clinicians to highlight the functional consequences for middle-aged patients with meniscal tears, refine surgical indications, optimize postoperative rehabilitation protocols, and improve patient counseling regarding expectations. Additionally, this study could provide significant insight into the potential need for adjunctive therapies to enhance recovery and long-term joint health in middle-aged patients.

METHODOLOGY

A descriptive study was conducted at the Orthopedic Surgery Department of Combined Military Hospital, Peshawar. The duration of this study was from 27-Nov-2024 to 27-May-2025. We acquired an ethical approval prior commencing the study. A sample size of 87 participants was determined based on the assumption that 6% (12) of patients achieved an excellent functional outcome, with 5% margin of error and 95% confidence level. Consecutive non-probability sampling was used.

Participants between the ages of 40 and 70 years of either gender and diagnosed with a meniscal tear as confirmed by clinical presentation including pain scoring greater than 3 on the Visual Analogue Scale, localized knee swelling and restricted range of motion along with supportive radiographic findings such as joint space narrowing, subchondral sclerosis or osteophytes were included in the study. Patients with history of proximal tibia fracture within the preceding year, the presence of an ipsilateral ligamentous injury or posterolateral corner tear, any active infective condition in or around the knee joint and pregnancy or lactation were not included.

Consent was obtained from all participants prior to their enrollment. Demographic and clinical data including age, gender, body mass index, socioeconomic status, employment and educational status,

place of residence and a history of diabetes or hypertension were recorded for each participant.

All surgical procedures were performed under general anesthesia. A standardized surgical protocol was rigorously followed for all arthroscopic partial meniscectomy procedures. After the induction of general anesthesia, the patient was positioned supine. A non-sterile tourniquet was applied to the proximal thigh and inflated to 250 mmHg to establish a bloodless field. The affected knee was then prepared and draped in a sterile fashion. Two standard arthroscopic portals were established: an anterolateral portal was created primarily for visualization, serving as the main entry point for the 30-degree arthroscope, while an anteromedial portal was utilized for instrumentation.

Participants diagnosed with meniscal tears underwent arthroscopic partial meniscectomy under general anesthesia. A tourniquet was applied to the thigh at 250 mmHg pressure, and the knee was prepared aseptically with thorough cleansing and sterile draping. Standard portals were established, an anterolateral one for visualization and an anteromedial one for instrumentation. An inflow cannula was initially introduced via the anterolateral portal, succeeded by a 30-degree arthroscope connected to a camera and light system for comprehensive joint inspection. Diagnostic evaluation proceeded systematically, covering the suprapatellar pouch, medial and lateral gutters, medial and lateral compartments, intercondylar notch, and posteromedial and posterolateral areas. A probe inserted through the anteromedial portal facilitated assessment of meniscal tear patterns and stability, as well as palpation of the anterior and posterior cruciate ligaments for laxity or rupture. The lateral compartment was examined with the leg in a figure-four position to probe the lateral meniscus integrity. Based on the identified tear configuration, appropriate intervention was performed in the same operative session, with partial meniscectomy executed to attain a stable peripheral rim. The residual meniscal edge was carefully inspected to rule out additional tears, followed by copious irrigation to clear debris and meniscal fragments, after which a drain was positioned. All procedures occurred under the supervision of a seasoned consultant possessing at least five years of post-fellowship expertise, and comprehensive patient information was documented on a standardized form.

Functional outcome was assessed 12 weeks postoperatively using the Lysholm knee scoring scale a validated tool for evaluating knee function. Scores were categorized as excellent (95–100) good (84–94) fair (65–83) or poor (below 65). Data were entered and analyzed using SPSS 25. Age, height, weight and BMI were reported as mean ± standard deviation. Demographics and clinical data along with functional outcome were presented as frequencies and percentages. Post-stratification analyses were performed using Chi-square where we stratified the functional outcome with demographics and clinical presentations, keeping P value notable at ≤ 0.05.

RESULTS

The study had 87 participants with mean age 54.31 ± 8.67 years. The mean body mass index (BMI) was 24.40 ± 1.25. Among the participants 49 (56.3%) were male and 38 (43.7%) were female.

Concerning meniscal pathology, degenerative tears were more common, occurring in around 62 (71.3%) participants compared to traumatic tears which were present in 25 (28.7%) cases. Comorbid conditions were also documented, 10 (11.5%) participants had diabetes and 15 (17.2%) had hypertension (Table 1).

Functional outcomes following intervention were assessed and categorized. Excellent outcomes were achieved in 33 (37.9%) participants good outcomes in 31 (35.6%) fair outcomes in 21 (24.1%) and poor outcomes in only 2 (2.3%) individuals (Table 2). Table 3 presents the stratifications.

Table 1: Demographics and clinical presentation

Demographics and clinical presentation		n	%
Gender	Male	49	56.3%
	Female	38	43.7%
Education	Educated	40	46.0%
	Uneducated	47	54.0%
Occupation status	Employed	41	47.1%
	Unemployed	46	52.9%
Residence	Urban	45	51.7%
	Rural	42	48.3%
Socioeconomic status	Lower class	26	29.9%
	Middle class	45	51.7%
	Upper class	16	18.4%
Type of meniscal tear	Traumatic	25	28.7%
	Degenerative	62	71.3%
Diabetes	Yes	10	11.5%
	No	77	88.5%
Hypertension	Yes	15	17.2%
	No	72	82.8%

Table 2: Functional outcome

Functional outcome	n	%
Excellent	33	37.9%
Good	31	35.6%
Fair	21	24.1%
Poor	2	2.3%

Table 3: Stratification of functional outcome with demographics and clinical presentation

Demographics and clinical presentation		Functional outcome				P value
		Excellent %	Good %	Fair %	Poor %	
Gender	Male	63.6%	61.3%	38.1%	50.0%	P > 0.05
	Female	36.4%	38.7%	61.9%	50.0%	
Education	Educated	39.4%	45.2%	61.9%	0.0%	P > 0.05
	Uneducated	60.6%	54.8%	38.1%	100.0%	
Occupation status	Employed	42.4%	48.4%	52.4%	50.0%	P > 0.05
	Unemployed	57.6%	51.6%	47.6%	50.0%	
Residence	Urban	48.5%	51.6%	52.4%	100.0%	P > 0.05
	Rural	51.5%	48.4%	47.6%	0.0%	
Socioeconomic status	Lower class	36.4%	22.6%	28.6%	50.0%	P > 0.05
	Middle class	39.4%	61.3%	57.1%	50.0%	
	Upper class	24.2%	16.1%	14.3%	0.0%	
Age groups (Years)	40 to 55	63.6%	58.1%	47.6%	50.0%	P > 0.05
	56 to 70	36.4%	41.9%	52.4%	50.0%	
BMI (Kg/m2)	18 to 24.9	69.7%	61.3%	81.0%	50.0%	P > 0.05

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	> 24.9	30.3%	38.7%	19.0%	50.0%	
Type of meniscal tear	Traumatic	21.2%	29.0%	38.1%	50.0%	P > 0.05
	Degenerative	78.8%	71.0%	61.9%	50.0%	
Diabetes	Yes	12.1%	12.9%	9.5%	0.0%	P > 0.05
	No	87.9%	87.1%	90.5%	100.0%	
Hypertension	Yes	12.1%	22.6%	14.3%	50.0%	P > 0.05
	No	87.9%	77.4%	85.7%	50.0%	

DISCUSSION

The present study evaluated functional outcomes following arthroscopic partial meniscectomy (APM) in a cohort of 87 middle-aged patients using the Lysholm knee score as the primary outcome measure. The results demonstrated a generally favourable postoperative trajectory with 73.5% of patients achieving either excellent/good functional outcomes at the final follow-up. This finding aligns with several studies that support the efficacy of APM in carefully selected patient populations. For instance, Joshi et al. reported similarly positive long-term results with a mean Tegner Lysholm score of 90.05 at a 10-year follow-up and noted that 72% of their patients were asymptomatic (13). The high proportion of successful outcomes in our study characterized by a mean age of 54.31 years reinforces the notion that APM can be a beneficial intervention for middle-aged adults when appropriate indications are met.

A critical observation from our data is the predominance of degenerative meniscal tears which accounted for 71.3% of cases compared to 28.7% that were traumatic in origin. This distribution is consistent with the natural history of meniscal pathology where degenerative changes become increasingly prevalent with age. This pattern was similarly observed by Husain et al. who reported that 76.47% of tears in their middle-aged cohort were degenerative (14). The high frequency of degenerative tears in these studies stands in contrast to the younger cohort evaluated by Burki et al. which had a mean age of 28.32 years and was likely more predisposed to traumatic injuries (15). This demographic and pathological distinction is crucial as it underpins the ongoing debate regarding the comparative effectiveness of APM versus conservative management for degenerative tears.

Our analysis found no significant association between functional outcomes and variables such as gender, BMI or the type of meniscal tear (degenerative vs. traumatic). This finding corresponds with the results of Husain et al. who also concluded that gender, BMI and tear type did not significantly impact short-term functional outcomes after APM (14). However, this perspective is not universally held. The large systematic review and meta-analysis conducted by Migliorini et al. which incorporated level I evidence from 17 randomized controlled trials found no significant difference in patient-reported outcomes between APM and physical therapy or sham surgery for degenerative non-obstructive meniscal tears (16). This high-quality evidence challenges the routine use of APM for degenerative conditions and suggests that a structured physical therapy program may yield equivalent results for many patients.

The discordance between our positive findings and the conclusions of Migliorini et al. (2022) may be partly explained by differences in study design and patient selection. Our study like that of Joshi et al. (2024) was observational and included patients who were deemed optimal surgical candidates potentially those with more clinical symptoms that predict a better response to surgery. Furthermore, the skill and experience of the surgeon as well as the specific rehabilitation protocol followed can significantly influence outcomes a factor highlighted by Joshi et al.[13] In contrast the RCTs analysed by Migliorini et al. are designed to minimize such biases and provide a more rigorous comparison of the interventions themselves (16).

Regarding comorbidities our cohort included a subset of patients with diabetes (11.5%) and hypertension (17.2%). This is a valuable addition to the literature as these common medical conditions are often overlooked in orthopaedic studies but can potentially influence postoperative recovery and outcomes. Future research with larger sample sizes should specifically investigate the impact of such comorbidities on functional recovery after APM.

CONCLUSION

In conclusion, the functional outcome of arthroscopic partial meniscectomy in middle-aged adults with meniscal tears in our study was found to be excellent in 37.9% patients, good in 35.6% and fair in 24.1% patients. APM is an effective technique for the management of meniscal tears in adult patients.

DECLARATIONS

Data Availability Statement
All data generated or analysed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department Concerned. (IRB)
Consent for publication
Approved
Funding
Not applicable

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

SHAH ABDUR RAHIM (Postgraduate Resident)
Conception of Study, Collection of Data, Study Design, Review of manuscript, Manuscript Drafting, and Final Approval of Manuscript
MUHAMMAD EJAZ ASHRAF (Associate Professor)
Study Design,Conception of Study, Critial Input, and Final Approval of Manuscript.

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