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A Study On Functional Outcome Of Arthroscopic Partial Meniscectomy In Mensical Injuries Of Knee

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Abstract:
Background*: Meniscal injuries of the knee commonly occur following sports-related trauma and road traffic accidents. Arthroscopic partial meniscectomy is widely performed due to minimal morbidity, early rehabilitation, and rapid return to work.*
Materials and Methods*: This prospective study was conducted in a tertiary care hospital and included 30 adult patients aged 20–40 years with symptomatic meniscal injuries. All patients underwent arthroscopic partial meniscectomy and were followed for a period of six months. Functional outcome was assessed using the Lysholm knee scoring system.*
Results*: The right knee was involved in 22 cases and the left knee in 8 cases. Longitudinal tears were the most common type of meniscal injury (54%). Associated partial anterior cruciate ligament injury was present in 7 cases. The mean hospital stay was 3.5 days, and the mean time to return to work was 14.35 days. Post-operative Lysholm scores showed statistically significant improvement compared to pre-operative scores, with excellent to good outcomes observed in 90% of patients.*
Conclusion*: Arthroscopic partial meniscectomy is an effective and minimally invasive procedure for the management of symptomatic meniscal injuries, providing significant functional improvement, early rehabilitation, and minimal complications.*
Keywords: *Arthroscopy, Partial meniscectomy, Meniscal injury, Lysholm score*

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I. Introduction

In sportsperson and athletes, meniscal injuries are commonly seen due to increased sporting activities, leading to disabilities in sports and other activities. In others, road traffic accidents leading to rotational knee injuries predispose to tear of the meniscus.[1]Acute symptomatic meniscus tears are reported to occur at a rate of 60 to 70 cases per 100,000 persons. With a male:female ratio of at least 2.5:1, meniscus tears also show a male gender predominance.[2] Due to the obvious minimal morbidity and rapid return of the excellent function to the knee joint, reliability, cost-effectiveness, and high patient acceptance, Arthroscopic -partial meniscectomy is becoming more popular. The accuracy of diagnosing meniscal injuries with an arthroscopic knee procedure has enhanced.[3]The current view is that meniscal tear treatment should preserve meniscal function. Degenerative changes after meniscectomy can be avoided or postponed by preserving the healthy meniscal tissue with minimal meniscus resection.[4]To reduce the number of unsuccessful procedures and support potentially beneficial surgery, further research is urgently needed to support evidence-based practice in meniscal surgery.[5]Assesment of the outcomes of Arthroscopic partial meniscectomy, in patients with clinical suspicion and to diagnose type of meniscal injury and to analyse the results are the objective of the present study.

II. Material And Methods

Study design*:* Prospective follow up study.

Place of study: Study was carried out at tertiary care hospital

Study period**:** August 2019 to June 2021, followed for 16 months.

Selection of the Patients**:** Patients presenting with symptoms of knee pain and swelling, effusion and joint line tenderness after knee injury indicative of injury to the meniscus following detailed clinical examination after -required investigations and imaging with MRI were the study subjects and who underwent diagnostic and therapeutic arthroscopy and after their written informed consent.

Sample size: 30

Inclusion Criteria:
1) Patients aged between 20-40 years.
2) Patients with a recent history of locking of knee or effusion.
3) Patients with knee signs like pain and joint line tenderness.

Exclusion Criteria:
1) Patients aged below 10 years and above 40 years.
2) Patients with symptoms and signs of acute infection.
3) Patients with severe degenerative changes in the knee.
4) Meniscal injuries with associated fractures in and around the knee

Surgical Technique[2,26,30]:
Anaesthesia:

Based on the patient's physical and psychological condition, as well as the surgeon's choice. Likely General, or spinal, epidural anesthetia will be determined.

The anatomical structure affected, according to operation findings listed as:
1) Meniscal tears, whether present or absent or any ligament injury
2) Location of meniscal tear and associated ligament injury
3) Status of the articular cartilage
4) Additional details, when available, were documented in the operation theatre.

After placing patient supine on the operating room table. A tourniquet is applied to the thigh. Varus and valgus stress is applied with a thigh holder or lateral post. The patient may be positioned so that the leg can be draped off the side of the bed if using a lateral post or the end of the bed can be lowered when using a thigh holder.

Standard knee arthroscopic portals were made i.e Antero-lateral and Antero- medial portals. Diagnostic arthroscopy was performed.1) Supra-patellar pouch and patella-femoral joint 2) Medial gutter 3) Medial compartment t4) Inter-condylar notch 5) Postero-medial compartment 6) Lateral compartment 7) Lateral gutter and Postero-lateral compartment

During diagnostic knee arthroscopy, the pathological lesions were identified, and surgery was performed. The menisci should be thoroughly examined for evidence of a tear while inspecting both the medial and lateral compartments. To avoid missing a flipped fragment, an angled probe is used to inspect the whole undersurface and over surface of both menisci. By gently attempting to push the meniscus into the notch with the probe, one can assess the rim's stability

Metcalf[33] described basic principles to adhere to when performing this procedure:
1. Remove all mobile fragments.
2. Do not leave sudden changes in rim contour.
3. Do not try to obtain a perfectly smooth rim as some remodeling may occur.[34]
4. Use the probe often to reevaluate the tear.
5. Protect the meniscus-capsular junction to avoid the loss of hoop stresses.
6. Use both manual and motorized instruments to maximize efficiency.
7. When in doubt about whether or not to resect an area, err on the side of leaving more meniscus intact rather than damaging biomechanical qualities.

Piece-meal resection is preferred in a vertical longitudinal tear that is limited to the posterior portion of the meniscus. Any remaining torn edges are then resected using a motorised shaver. To avoid the sharp edges, the resected area should be contoured to the remaining meniscus.

In displaced bucket-handle tear, to improve visualization first it should be reduced. The torn meniscus anterior horn attachment is then partially transected with a manual cutter until a wisp of tissue connects it. During posterior horn resection, this wisp of tissue prevents the torn piece from flipping into the posterior compartment. An accessory portal may be used to create tension on the anterior horn during this step. The damaged meniscus posterior horn attachment is then removed-The focus is then returned to the anterior horn and the remaining strands can be separated using a manual cutter or by holding the torn fragment and twisting it until the fibres separate. The fragment is then pulled out along the portal, and the resected edges contoured with a motorised shaver.

In oblique tears the torn fragments are removed with either a manual cutter or a motorized shaver. The resection is complete when there is no abrupt changes in meniscus contour. Oblique tears might leads to a large flap that can flip underneath the meniscus and easily be missed.

Radial tears are treated by manually resecting the corner edges. The edges of the tear should be resected back to the tear's depth. To contour the resected area a motorized shaver is used to create a smooth transition.

A horizontal tear is made up of two tissue leaflets and a cleavage plane separates them. Both leaves may be resected back to a stable edge in a shallow cleavage plane. When the cleavage plane reaches the capsule, the two leaves should be compared to see which one appears to be more stable. The leaf that is more stable should be retained, while the leaf that is less stable should be excised. If both leaves are unstable, they should be resected back toward the rim to avoid symptoms recurrence.

III. Discussion

Meniscal injuries of the knee are commonly encountered in young, active individuals and are frequently associated with sports-related trauma and road traffic accidents. Arthroscopic partial meniscectomy has become the preferred treatment for symptomatic meniscal tears not amenable to repair due to its minimally invasive nature and rapid functional recovery.

In the present study, the majority of patients were young males, with sports injuries and motor vehicle accidents being the most common mechanisms of injury. Longitudinal tears were the most frequent type of meniscal injury. Functional outcome assessment using the Lysholm knee scoring system demonstrated significant post-operative improvement, with excellent to good outcomes in 90% of patients.

Short hospital stay, early return to work, and minimal complications highlight the advantages of arthroscopic partial meniscectomy. Although the study is limited by small sample size and lack of long term follow-up, the prospective design and use of a validated scoring system strengthen its clinical relevance.

Statistical analysis

Statistical analysis was performed using SPSS software (version20). Lysholm scores were expressed as mean ± SD. Pre-operative and post-operative scores were compared using paired t-test. A p-value < 0.05 was considered statistically significant.

IV. Result

30 patients with meniscal injuries with either a partial tear or an intact ACL were taken in our study.

One case of lateral meniscal cyst and loose bodies were encountered; Arthroscopic excision of cyst and loose bodies were done.

We used arthroscopic partial meniscectomy to treat the meniscal injuries.

The surgery occurred the next day after the admission.

The procedure took 80 minutes mean duration, ranging from 60 to 100 minutes.

***Complications during Surgery*:** Arthroscopic removal of instrument debris in 1 patient due to instrument breakage.

Post- operative complications: There were no complications such as DVT, infection, or joint effusion.

Time of Discharge: The average time for patients to be discharged was 3.5 days, in a span of 2 to 7 days.

Follow up: At one-week, two-week, and four-week intervals, patients were seen in the outpatient department. After then, once a month for the next six months.

Age distribution: In our series, 20- 40 years is the age range with a mean age of 27.5 years. 20-30 year old age patients had increased occurance of meniscal injuries, commonly found in sportspeople, labourers.

***Sex distribution*:** In our series, 27 patients were male (90%) 3 patients were female (10%) with meniscal injuries. Males are more prone to be affected, which mightbe due to their involvement in more vigorous athletic and man ual activities that lead to rotational knee injuries.

Table 1: Age and sex distribution

AGE	MALES	FEMALES	TOTAL
10-20	1	0	1
21-30	19	2	21
31-40	7	1	8
TOTAL	27	3	30

Chart 1:

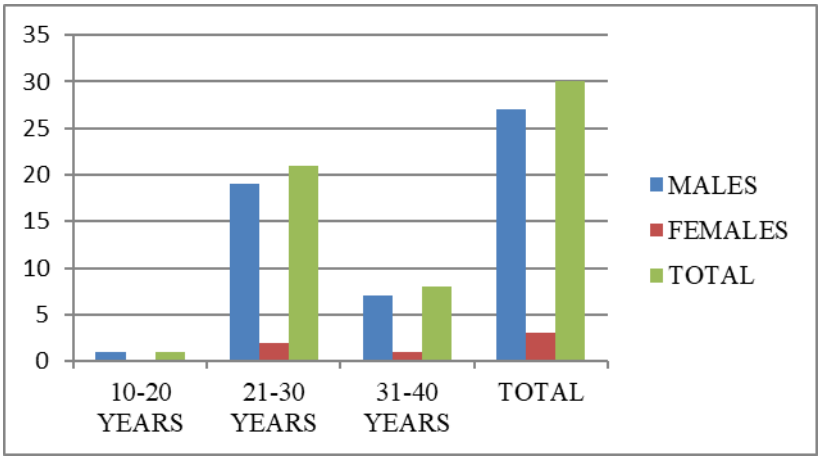

Table 1 and graph 1 Shows distribution of study subjects based on age and sex distribution majority between 21-30 years age group of them males were 27.

Table 2: Side of involvement

SIDE	*MALES*	*FEMALES*	*TOTAL*
RIGHT	20	2	22
LEFT	7	1	8
TOTAL	27	3	30

CHART 2:

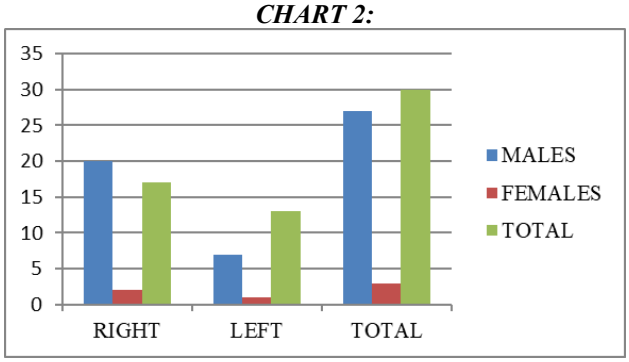

Table 2 and Chart 2 shows distribution of the study subjects based on Side of involvement majority were on Right side i.e 22.

Table 3: Type of injury

MODE OF INJURY	*NUMBER OF CASES*	*PERCENTAGE*
SPORT'S INJURY	11	37
MOTOR VEHICLE ACCIDENT	10	33
OTHER INJURIES	9	30
TOTAL	30	100

CHART 3:

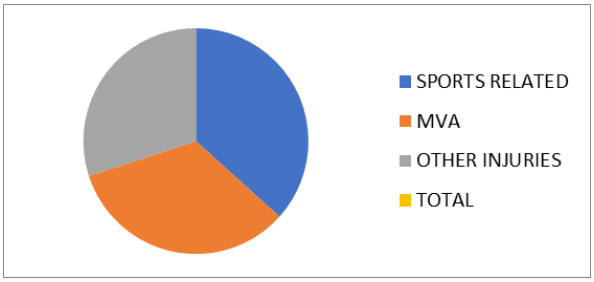

Table 3 and Chart 3 shows the distribution of subjects based on the type of injury majority of them were sports injuries and MVA.

TABLE 4: Meniscal injuries with associated partial tear of ACL

MENISCAL TEARS	*ISOLATED MENISCAL TEARS*	*ASSOCIATED WITH PARTIAL ACL INJURY*	*OTHER CYST AND LOOSE BODIES*	*TOTAL*
MEDIAL MENISCUS	11	6		17
LATERAL MENISCUS	11	1	1	13
TOTAL	22	7	1	30

CHART 4:

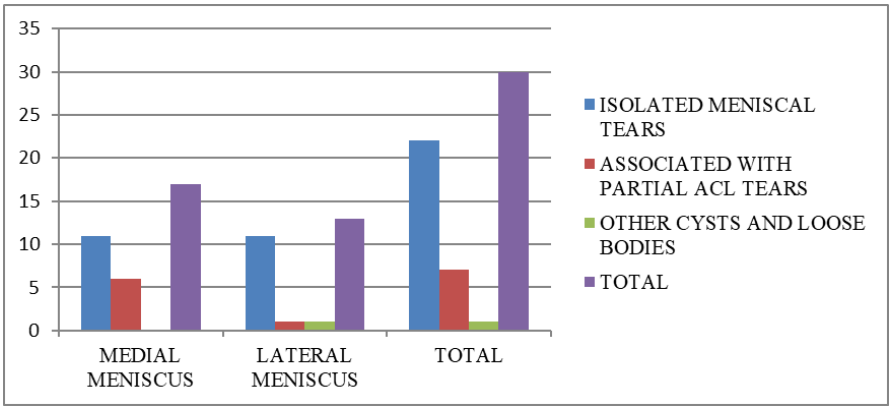

Table 4 and Chart 4 shows the isolated meniscal injuries of them medial meniscus were 11 and lateral meniscus were 11, 7 were associated with Partial ACL TEAR, 1 case associated with Cysts and loose bodies.

Table 5: Types of meniscal tears

TYPE	*NO*	*ASSOCIATED WITH ACL*	*ISOLATED MENISCAL TEARS*	*PERCENTAGE*
LONGITUDINAL TEAR(BUCKET HANDLE TEAR)	16	5	11	54%
OBLIQUE- TEAR	12	2	10	40%
RADIAL -TEAR	1	-	-	3%
HORIZONTAL TEAR	-	-	-	-
COMPLEX (OTHERS LIKE CYSTS AND FLAPS)	1	-	-	3%

Chart 5:

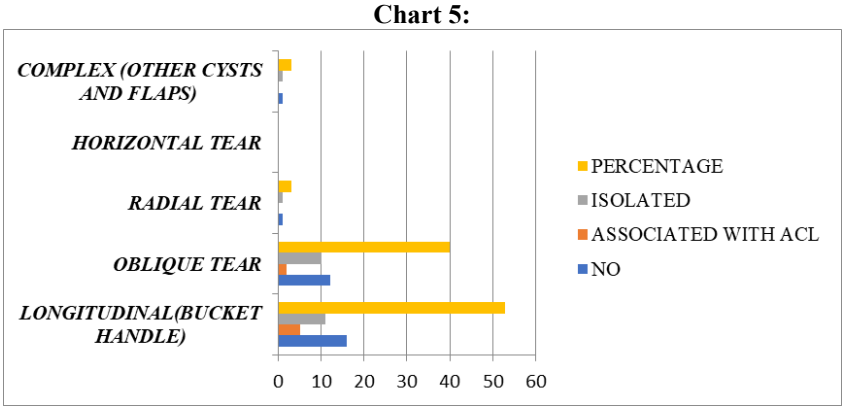

Table 5 and Chart 5 shows the types of meniscal tears of them longitudinal meniscal tears are most common and contributes to 54**%.** The Lysholm knee scoring system was used to quantify patient complaints and physical examination findings, and the Tapper and Hoover system was used to score them.[12]

TABLE 6: Lysholm's knee scoring system[12]

1	Limp (5 points)	
	None	5
	Slight or Periodical	3
	Severe or constant	0
2	Support (5 points)	
	None	5
	Stick or crutch	2
	Weight bearing impossible	0
3	Locking (15 points)	
	No locking and no catching sensation	15
	Catching sensation but no locking	10
	Locking occasionally	6
	Locking frequently	2
	Locked joint on examination	0
4.	Instability (25 points)	
	Never giving way	25
	Rarely during athletics or other severe exertion	15
	Occasionally in daily activities	10
	Often in daily activities	5
	Every Step	0
5	Pain (25 points)	
	None	25
	Inconsistent and slight during severe exertion	20
	Marked during severe exertion	15
	Marked on or after walking more than 2 km	10
	Marked on or after walking less than 2 km	5
	Constant	0
6	Swelling (10 points)	
	None	10
	On Severe exertion	6
	On ordinary exertion	2
	Constant	0
7	Stair climbing (10 points)	
	No Problem	10
	Slight impaired	6
	One step at a time	2
	Impossible	0
8	Squatting (5 points)	
	No problem	5
	Slight impaired	4
	Not beyond 90 degrees	2
	Impossible	0

TABLE 7: Tegners actvity scale[12]

Excellent	The patient had no symptom's and no disability related to his knee
Good	The patient had minimum symptom , such as aching or weakness after heavy use / exertion but there was essentially no disability
Fair	The patient had a symptom s , which had become enough of a problem to interfere some what with daily activities and though active , could not participate in vigorous sports
Poor	The symptoms were severe and included pain at rest , limited motion and locking . He was disabled , and all activities including walking were definitely limited because of his knee

TABLE 8: RESULTS

Score	Group
81-100	Excellent
71-80	Good
61-70	Fair
< 60	Poor

TABLE 9: POST-OPERATIVE EVALUATION:

SCORE	*No. OF PATIENTS*	*PERCENTAGE*
EXCELLENT	18	60%
GOOD	9	30%
FAIR	3	10%
POOR	O	O%

CHART 9: POST OPERATIVE RESULTS

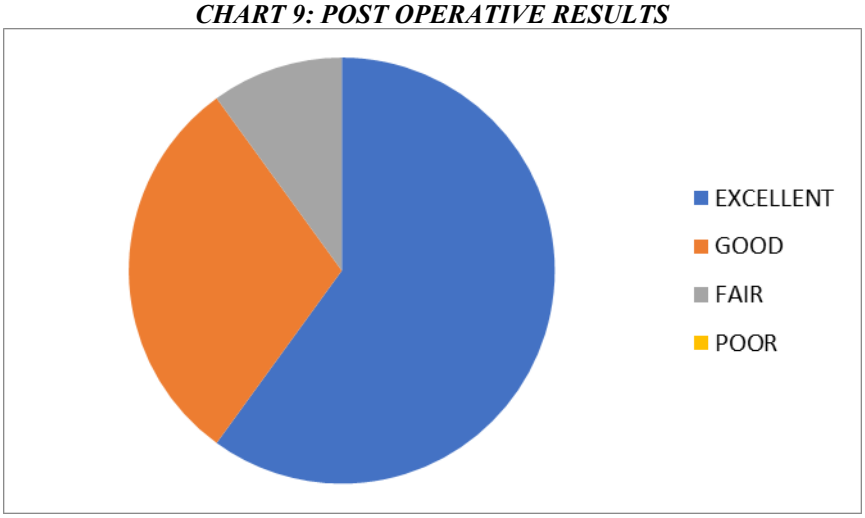

Table 9 and Chart 9 shows the Post operative results of them Excellent to Good contributes 90%.

V. Conclusion

Arthroscopic partial meniscectomy is a minimally invasive and reliable procedure for symptomatic meniscal injuries. It provides significant functional improvement as assessed by Lysholm knee scoring, enables early rehabilitation, shortens hospital stay, and allows early return to work with minimal complications

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