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Outcomes of Arthroscopic Repair Vs Meniscectomy of Radial Meniscal Tears: *A Systematic Review*

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Abstract

Background: The menisci are essential for optimal performance and durability of the knee joint. The main purpose of their function is to enhance congruency to transfer load across the tibiofemoral joint and thus reduce the stress exerted on the articular cartilage.

Aim of Study: To conduct a systematic review demonstrating the clinical and MRI outcomes of using arthroscopic repair versus meniscectomy in radial meniscal tears.

Patients and Methods: An initial search of PubMed, Embase, and Scopus databases from 2005-2021 with keywords: meniscus, Meniscus tear, radial tear, meniscectomy, and meniscus repair yielded 1170 articles. This systematic review compared the two treatment techniques arthroscopic repair and arthroscopic meniscectomy in terms of clinical and radiological benefits in subjects with radial meniscus tears.

Results: This review included 11 studies. 235 patients were included with radial meniscal tears. 180 patients underwent arthroscopic repair, and 55 patients underwent meniscectomy. Patient-reported outcomes after repair and partial meniscectomy in radial meniscal tears were promising, with high self-reported outcomes (IKCD and Tegner) at the final postoperative follow-up in comparison to the preoperative scores. Healing rate assessment by Arthroscopy and MRI revealed that most patients demonstrated complete and partial healing at the final follow-up, with a low failure rate.

Conclusion: Short- and long-term follow-up revealed that sparing the meniscus either by repair or partial meniscectomy in radial tears has excellent outcomes.

Key Words: *Meniscus – Meniscus tear – Radial tear – Meniscectomy – Meniscus.*

Introduction

THE primary role of the menisci is to guarantee optimal performance and longevity of the knee joint, this occurs by increasing congruency, thus transmitting load across the tibiofemoral joint and minimize the resultant stress on the articular cartilage **[1-4].**

Owing to the complex meniscal characteristics (biomechanical, anatomical, and functional), they are prone to damage and injury, especially in contact sports. Therefore, meniscal injuries are a leading cause of musculoskeletal morbidity **[5-8].**

Vertical tears called radial tears occur at the junction of the posterior and middle thirds. They extend from the inner free margin towards the periphery and can occur in other regions as well. This effectively divides the region into two non-functional units **[9].**

Its incidence is approximately 14-15%. They may also occur in the midbody portion of the lateral meniscus in younger patients **[9].**

Radial tears are usually seen in younger individuals, particularly in men between the ages of 11 and 20. They are often caused by trauma and occur mainly (79%) in the posterior horn of the meniscus. Additionally, they may be accompanied by ACL rupture **[10].**

Magnetic Resonance Imaging is a valuable imaging method for diagnosing meniscal tears, with an accuracy range of 82–95% **[11].**

Restoring anatomic function after a meniscal injury can be challenging. Arthroscopic interventions are commonly used to help repair the meniscus and can involve partial or complete removal. Despite medical literature evidence showing that the avascular zones can heal if properly approximated, some surgeons still attribute poor healing to a lack of blood supply **[12].**

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Aim of the work:

To conduct a systematic review demonstrating the clinical and MRI outcomes when using arthroscopic repair versus meniscectomy in radial meniscal tears.

Patients and Methods

An initial search of PubMed, Embase, and Scopus databases from 2005-2021 with keywords: Meniscus, Meniscus tear, radial tear, meniscectomy, and meniscus repair yielded 1170 articles. After screening and full-text analysis, 11 papers met our inclusion criteria.

To answer the question of whether meniscus repair or Meniscectomy of radial tears improve clinical and radiological outcomes.

Inclusion criteria: Type of studies: Randomized control trials (RCT), Cohort studies, case-control studies, and any studies with level evidence 1-4 Type of subjects: Particular with radial meniscal injury of any gender and age under 50 years. Type of surgery: Arthroscopic repair and arthroscopic meniscectomy. Duration of follow-up: Equal or more than one year. English literature only.

Exclusion criteria: Irrelevance to study questions and radial root tears, non-clinical, case report, systematic reviews and meta-analysis studies, surgical techniques articles without reported outcomes, same author's duplicate publications, unless they have lengthier follow-up, biomechanical studies, cadaveric studies, and conference abstract.

Types of outcome measures:

1- Clinical outcomes "IKDC and Tegner "scores.

2- Imaging outcomes "MRI ".

Methods of review:

1- *Studies location and selection:* Articles included using the search terms mentioned above and eligibility screening was concluded in a two-step manner (title / abstract screening and full-text screening) When there was any disagreement, a second reviewer evaluated the papers, and a decision was made. Papers that seemed to meet the inclusion criteria were included.

2- *Data extraction:* Data was independently extracted and cross-checked.

3- *Statistical considerations:* The outcomes from the included studies were combined using systematic review manager software and manually screened for eligibility. A PRISMA flow chart was created based on the search results and the inclusion/exclusion criteria.

After combining the data gathered from the desired search articles, the outcome measures of interest were calculated to define the clinical and radiological results.

Statistical analysis of the data: Data were analyzed using MedCalc software package version 15.8. Confidence interval (CI) was established at 95% and *p*-values of less than or equal to 0.05 were considered statistically significant. Statistical heterogeneity was assessed using I^2 (observed variance for heterogeneity) and Q (Total variance for heterogeneity). Quantitative data was reported as Mean and standard deviation.

Results

This review included 11 studies on radial meniscus tears being suitable for inclusion criteria according to the illustrated PRISMA (Fig. 1).

235 patients with radial meniscal tears were included in the study. 180 patients underwent arthroscopic repair, and 55 patients underwent meniscectomy, out of the total population, there were 160 males (67.7%) and 75 females (32.3%). It can be observed that males had a higher representation in the population. The radial tear commonly occurs in middle-aged patients, with a mean age of 30.25±9.98 years and a mean follow-up of 28.7 months As shown in Tables (1,2,3).

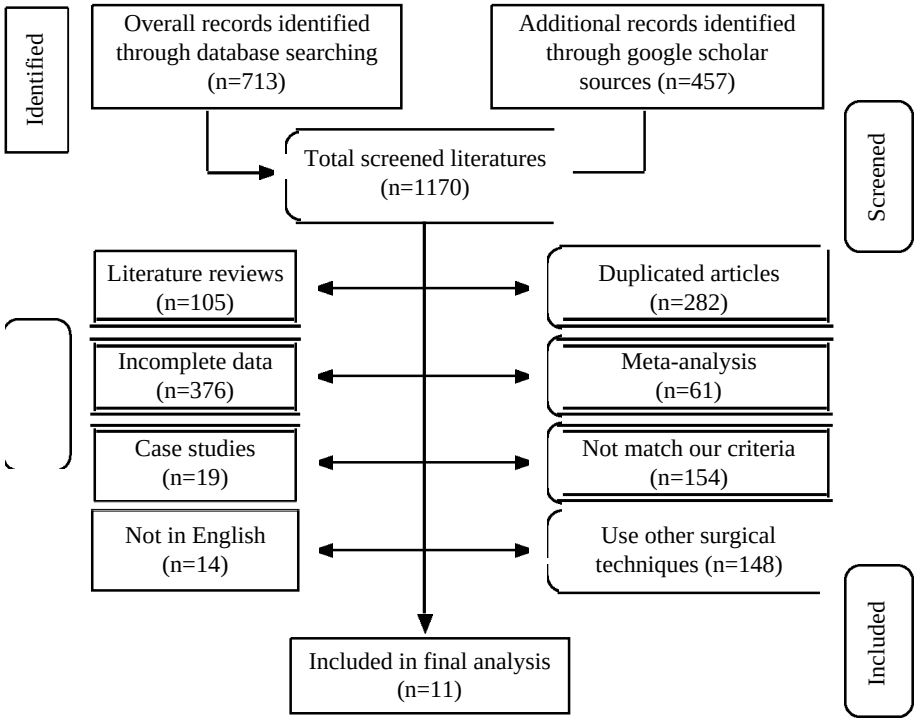

Fig. (1): PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) search strategy for our study selection.

Table (1): Study Design.

Study	Year	Journal	Study Design (Level of Evidence)	Preoperative Diagnosis	Postoperative Diagnosis
Haklar et al. **[13]**	2008	The knee journal	Prospective case series (Level IV)	Clinical, MRI	Clinical, MRI
Choi et al. **[14]**	2010	American Journal of Sports Medicine	Retrospective case series (Level IV)	Clinical, MRI, arthroscopy	Clinical, MRI, arthroscopy
Ra et al. **[15]**	2014	Knee Surgery, Sports, Traumatology, Arthroscopy	Retrospective case series (Level IV)	Clinical, arthroscopy	Clinical, MRI, arthroscopic
Song et al. **[16]**	2014	The knee journal	Retrospective case series (Level IV)	Clinical, arthroscopy	Clinical, arthroscopy
G. Lucas et al. **[17]**	2015	Elsevier Masson SAS	Retrospective case series (Level IV)	Clinical, MRI, arthroscopy	Clinical, MRI, arthroscopy
Cinque et al. **[18]**	2017	American Journal of Sports Medicine	Retrospective cohort (Level III)	Clinical, MRI	Clinical
Wu et al. **[19]**	2018	American Journal of Sports Medicine	Retrospective cohort (Level III)	Clinical, arthroscopy	Clinical MRI
Lee et al. **[20]**	2019	Journal of Orthopaedic Surgery	Retrospective case series (Level IV)	Clinical, arthroscopy	Clinical
Tsujii et al. **[21]**	2019	American Journal or Sports Medicine	Retrospective Case series; Level 4.	Clinical, MRI, arthroscopy	Clinical, MRI, arthroscopy
Gan et al. **[22]**	2020	Journal of Orthopaedic Surgery (Hong Kong)	Retrospective cohort (Level III)	Clinical, arthroscopy	Clinical
Duethman et al. **[23]**	2021	Orthop J Sports Med	Retrospective cohort (Level III)	Clinical, arthroscopy	Clinical, MRI arthroscopy

Table (2): Summary of demographics in screened literature.

Authors	Year	Total		Males		Females		Mean age (yrs)
		G1	G2	No.	%	No.	%	
Haklar et al. [13]	2008	5	-	5	100	-	0	28.6
Choi et al. [14]	2010	14	-	11	78.6	3	21.4	29.9
Ra et al. [15]	2012	12	-	11	91.7	1	8.33	-
Song et al. [16]	2014	15	-	12	80.0	3	20.0	34.5
Lucas et al. [17]	2015	2	-	2	100	-	0	14
Cinque et al. [18]	2017	27	-	19	70.4	8	29.6	34
Wu et al. [19]	2018	24	-	18	75.0	6	25.0	22.8
Lee et al. [20]	2019	14	8	9+5	64.3/62.5	3+5	35.7/37.5	42.2/ 41.1
Tsujii et al. [21]	2019	41	-	19	46.3	22	53.7	28.3
Gan et al. [22]	2020	15	14	9+8	60.0/57.1	6+6	40.0/42.9	42/ 40.9
Duethman et al. [23]	2021	11	33	9+23	81.8/69.7	10 3	18.2/30.3	17.7/17.3
Total	235	180	55	160	68.1	75	31.9	30.25ℓ9.98

G1: Group (1) with arthroscopic repair. G2: group (2) with meniscectomy.

Table (3): Comparison of preoperative patients' characteristics between the two treatment groups in the studied literature.

Item	Total	Total		Males		p-value by χ^2
		No.	%	No.	%	
Total number	235	180	76.6	55	23.4	0.000*
Males	160	124	77.5	36	22.5	0.000*
Females	75	56	74.7	19	25.3	
	Avg	Mean	ℓSD	Mean	ℓSD	p by "t"
Age (years)	31.25	29.4	9.37	33.1	13.7	0.092
BMI (Kg/m^2)	26.5	25.98	1.92	27.1	0.71	0.109
Time from injury till operation (w)	15.5	5.67	2.61	25.4	0.00	0.000*
Follow-up (m)	28.7	29.8	9.35	27.6	0.00	0.371

χ^2: Chi-square. *p*>0.05: Non-significant. *BMI: Body mass index.* *SD: Standard deviation.*
t : Unpaired t-test. *p*<0.05: Significant. *Avg : Average.*

The time from injury to operation was shorter in the repair group than in meniscectomy (p<0.001).

Both treatment modalities had comparable results in complete healing (p>0.05), while partial healing and failure rates were statistically higher in the meniscectomy group than in the arthroscopic repair group (p=0.39 and 0.031), respectively.

Table (4): Comparison of the mean postoperative radiological outcome between the two treatment modalities in the studied literature.

	Repair	Meniscectomy	t	p
Complete:				
Range	35.7 – 100	38.3 – 100	0.216	0.318
Mean ℓ SD	69.48ℓ26.2	67.5ℓ19.8		
Partial:				
Range	8.33 – 57.1	8.46 – 49.7	1.163	0.039*
Mean ℓ SD	30.5ℓ20.1	37.8ℓ12.5		
Failure:				
Range	7.1 – 27	7.5 – 32.1	1.215	0.031*
Mean ℓ SD	14.35ℓ8.8	18.3ℓ9.34		

t: Unpaired t-test. ***p*<0.05: Significant. *p*>0.05 : Non-significant.

As regards the International Knee Documentation Committee score (IKDC), the comparison between the two treatment groups was statistically insignificant preoperatively and postoperatively. In*tergroup studies of both groups showed statistically* highly significant differences between pre-and post*operative scores (p<0.01).*

Table (5): Comparison of the mean preoperative and postoperative International Knee Documentation Committee score (IKDC) between the two treatment groups in the studied literature.

IKDC	Repair	Meniscectomy	t	p
Preoperative:				
Range	39.8 – 69.5	45.2 – 75.7	0.387	0.112
Mean ℓ SD	50.66ℓ12.5	55.8ℓ17.2		
Postoperative:				
Range	83.4 – 97.4	81.7 – 97.3	0.098	0.421
Mean ℓ SD	89.24ℓ5.74	87.17ℓ8.78		
Significance:				
t-test	5.049	1.866		
p-value	0.002*	0.009*		

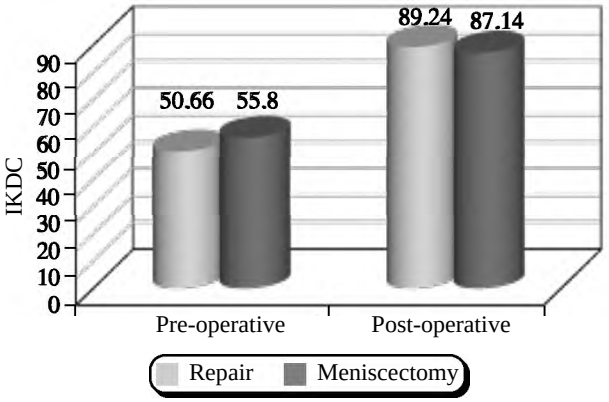

Chart (1): IKDC pre and postoperatively in the two treatment groups.

As regards the Tegner score, the comparison between the two treatment groups was statistically insignificant preoperatively, while postoperatively, the repair group showed an increase in Tegner score compared to the meniscectomy group with a statistically significant difference (p=0.041). Intergroup studies of both groups showed statistically highly significant differences between pre-and post-operative scores (p<0.01), however, the arthroscopic repair group showed more significance (p=0.001) than the meniscectomy group (p=0.008).

Table (6): Comparison of the mean preoperative and postoperative Tegner score between the two treatment groups in the studied literature.

Tegner score	Repair	Meniscectomy	*t*	*p*
Preoperative:				
Range	1 – 4	2.9 – 3	0.052	0.723
Mean ± SD	2.81±1.01	2.95±0.07		
Postoperative:				
Range	4.7 – 7.1	5 – 5.1	0.099	0.041*
Mean ± SD	5.93±0.93	5.05±0.07		
Significance:				
t-test	0.001*	0.008*		
p-value				

t: Unpaired *t*-test. IMN: Intramedullary nail.
*p<0.05: Significant. SE : Standard error.

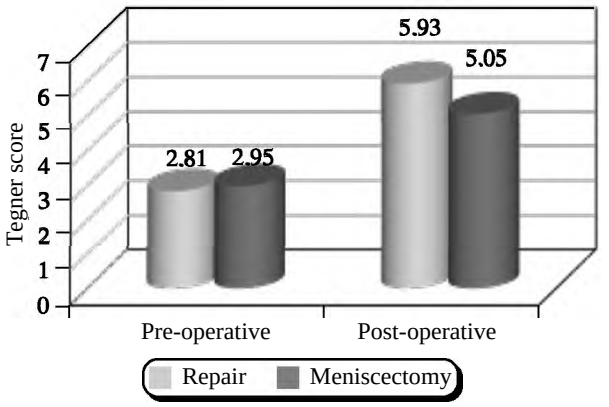

Chart (2): Pre and postoperative Tegner scores in the two treatment groups.

Table (7): Meta-analysis for complete healing after treatment of the two studied techniques.

Healing	Meniscectomy		Repair	
Mean ± SD	67.5±19.8		69.48±26.2	
OR	0.568		4.599	
95% CI	LB	UB	LB	UB
Intercept	–0.723	1.858	3.246	5.952
Significance	r = 0.0748		p = 0.062	

OR: Odds ratio. UB: Upper bond.
CI : Confidence interval. *r*: Correlation coefficient.
SD: Standard deviation. *p*: Probability of error.
LB: Lower bond. p>0.05: Non-significant.

This table shows meta-analysis of postoperative complete healing in the two studied techniques. A comparison between arthroscopic repair and meniscectomy showed a statistically non-significant difference (p=0.062) between the two techniques.

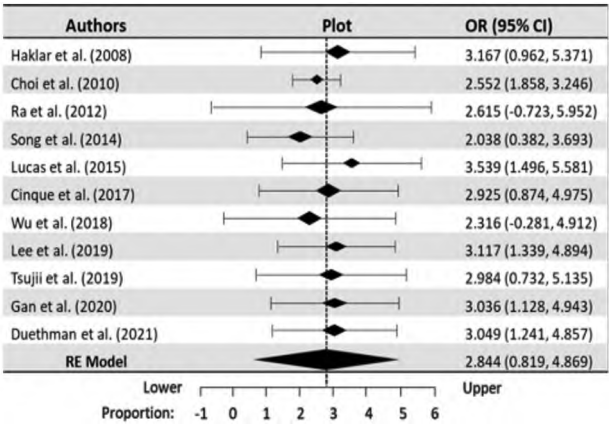

Fig. (2): Forest plot for postoperative complete healing in the two studied techniques. Pooling of studies using random-effects method (REM) with 95% CI. There is a mild heterogeneity (I^2 = 47.7%) with a statistically non-significant difference (p>0.05) in the longitudinal comparison of the eleven literatures.

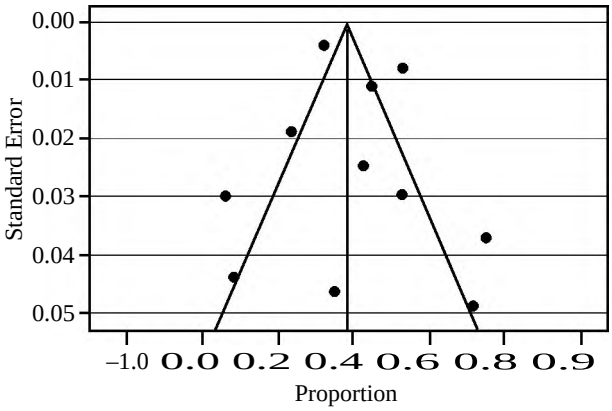

Fig. (3): Funnel plot for postoperative complete healing in the two studied techniques. There is no evidence of publication bias with a symmetrical funnel plot. Rank correlation test and regression analysis for funnel plot asymmetry was statistically significant (r = 0.0748, p = 0.062) for transverse comparison of the studied literature.

Table (8): Meta-analysis for postoperative IKDC score (International Knee Documentation Committee) after treatment of the two studied techniques.

IKDC	Meniscectomy		Repair	
Mean ± SD	87.17±8.78		89.24±5.74	
OR	1.260		4.315	
95% CI	LB	UB	LB	UB
Intercept	0.549	1.971	2.899	5.731
Significance	r = 0.008		p = 0.421	

OR: Odds ratio. UB: Upper bond.
CI : Confidence interval. *r*: Pearson correlation
SD: Standard deviation. *p*: Probability of error.
LB: Lower bond. *p*>0.05: Non-significant.

This table shows meta-analysis of IKDC score after treatment. Comparison between the repair and meniscectomy group showed a statistically non-significant difference between the two techniques (p= 0.421).

Table (9): Meta-analysis for postoperative Tegner score after treatment of the two studied techniques.

IKDC	Meniscectomy		Repair	
Mean ± SD	87.17±8.78		89.24±5.74	
OR	0.3745		4.384	
95% CI	LB	UB	LB	UB
Intercept	–0.508	1.257	2.921	5.847
Significance	r = 0.3231		p = 0.4041*	

OR: Odds ratio. UB: Upper bond.
CI : Confidence interval. *r*: Pearson correlation
SD: Standard deviation. *p*: Probability of error.
LB: Lower bond. **p*<0.05: Non-significant.

This table showed meta-analysis of Tegner score after treatment. Comparison between repair and meniscectomy groups showed a statistically significant difference between the two techniques (p=0.041).

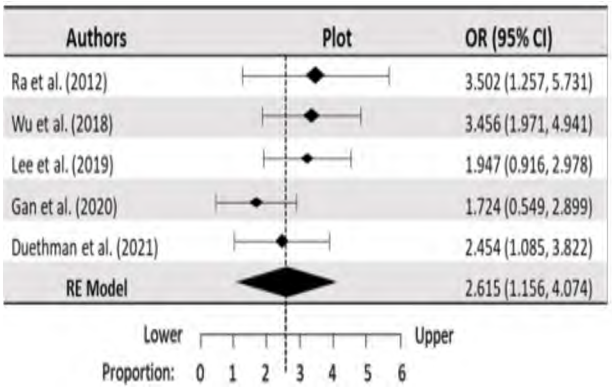

Fig. (4): Forest plot for IKDC score after treatment. Pooling of studies using random-effects method (REM) with 95% CI. There is a mild heterogeneity (I^2=44.8%) with a statistically insignificant difference (p>0.05) in comparison to the studied literature.

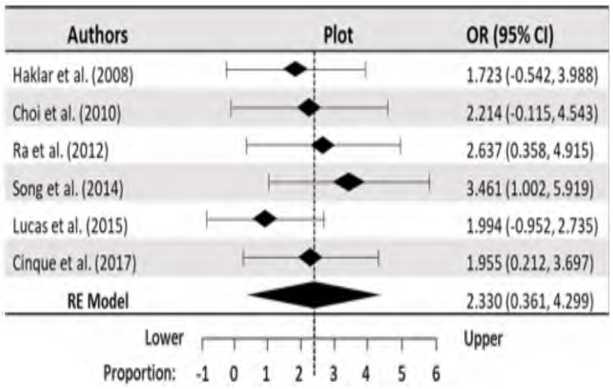

Fig. (6): Forest plot for Tegner score after treatment. Pooling of studies using random-effects method (REM) with 95% CI. There is considerable heterogeneity (I^2=74.1%) with a statistically insignificant difference (p<0.05) in comparison of the studied literature

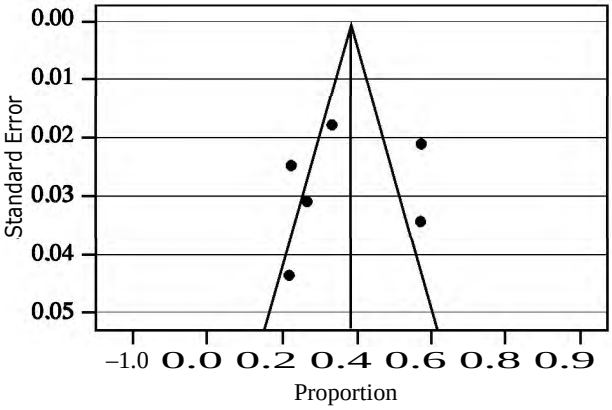

Fig. (5): Funnel plot for IKDC score after treatment. There is no evidence of publication bias with a symmetrical funnel plot. Rank correlation test and regression analysis for funnel plot asymmetry was statistically significant (r=0.008, p=0.421) for transverse comparison of the studied literature.

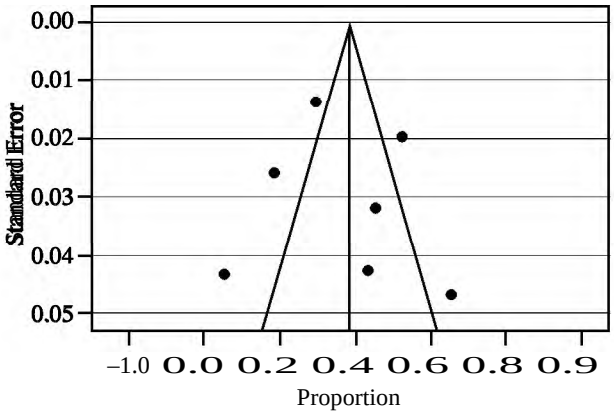

Fig. (7): Funnel plot for Tegner score after treatment. There is no evidence of publication bias with a symmetrical funnel plot. Rank correlation test and regression analysis for funnel plot asymmetry was statistically significant (r=0.3231, p=0.041) for transverse comparison of the studied literature.

Discussion

Recently, different kinds of meniscal sutures involving the meniscus's radial lesions have been evolved. It is thought that these repairs might lower the patient's risk of developing osteoarthritis in the future **[24,25]**.

This systematic review was performed to evaluate the clinical outcomes, IKCD, and Tegner score scale, healing rates, and return to sports of patients with radial meniscal tears after Arthroscopic management with repair or partial meniscectomy.

The main results of this study were as follows:

Regarding patients' characteristics, the radial tear affects middle-aged patients with a mean age of 30.25±9.98 years. The mean duration of symptoms was 3 days up to 6 months and the mean time to surgery was two weeks up to 6 months.

Our results are supported by the study of Pioger et al., in 2021, who reported that the condition (meniscal tear) occurred most often in young patients (mean age, 25.6 years), males (20/22 cases; 91%), and participating in high-intensity sports (19/22 cases; 86.4%) **[26]**.

Regarding the Patient-reported outcomes among the studied patients, we found that.

The mean IKDC score improved from 55.8±17.2 to 87.17±8.78 in meniscectomy and improved from 50.66±12.5 to 89.24±5.74 in arthroscopic repair post-operation. Comparison between the two treatment groups was statistically insignificant preoperatively and postoperatively. Intergroup studies of both groups showed a statistically highly significant difference between pre-and post-operative scores (p<0.01). Table (5).

The mean Tegner activity score improved from 2.95±0.07 to 5.05±0.07 in meniscectomy and improved from 2.81±1.01 to 5.93±0.93 in arthroscopic repair post-operation, comparison between the two treatment groups was statistically insignificant preoperatively, while postoperatively, repair group showed an increase in Tegner score compared to meniscectomy group with statistically significant difference (p=0.041). Intergroup studies of both groups showed statistically highly significant differences between pre-and post-operative scores (p<0.01), however, the arthroscopic repair group showed more significance (p=0.001) than the meniscectomy group (p=0.008). Table (6).

In comparison with other systematic reviews:

In a systematic review conducted by Moulton et al., in 2016, 6 studies with 55 patients were included in the analysis of radial tear repair, their findings support our own, as they reported a mean improvement in postoperative Tegner activity scores from 1 to 6.7 across 4 articles. Most of the studies concluded that their procedures resulted in acceptable healing of radial tears, with no major complications reported **[27]**.

Similarly, a systematic review conducted by Eric M. Milliron in 2021 included 12 studies with a total of 241 patients. Their results also support our findings, as they reported an improvement in Tegner activity scores from 2.5±3.1 preoperatively to 4.7±6.7 postoperatively **[28]**.

As regards patient healing rates we found that both treatment methods showed similar results in complete healing after being evaluated through MRI or second-look arthroscopy (p>0.05). However, the meniscectomy group showed higher rates of partial healing and failure compared to the arthroscopic repair group (p=0.039 and 0.031), respectively.

The findings we have presented align with the research conducted by Milliron et al., their study involved evaluating healing rates through MRI and second-look arthroscopy. Out of the cases where the latter was performed, 62.0% showed complete healing, 30.0% showed partial healing and 8.0% did not show any signs of healing **[28]**.

Limitations:

Limitations of this review included a small number of patients and non-randomized studies. For the best results, prioritize studies that are large, comparative, and supported by a high level of evidence.

Conclusion:

Patient-reported outcomes after repair and partial meniscectomy in radial meniscal tears are promoting, with high patient-reported outcomes (IKCD and Tegner) at the final postoperative follow-up compared with the preoperative scores. Healing rate assessment by Arthroscopy and MRI revealed that most patients demonstrated complete and partial healing at the final follow-up, with a low rate of failure. Short- and long-term follow-up revealed that sparing the meniscus either by repair or partial meniscectomy in radial tears has excellent reported outcomes.

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مراجعة منهجية لما تم نشره من أبحاث لمعرفة النتائج الإكلينيكية والاشعاعية في حالات القطع القطرى للغضروف الهلالى مقارنة ما بين استئصال جزئى للغضروف أو اصلاح الغضروف

من المعروف أن الغضروف الهلالى حيوى للعمل الطبيعى وطول عمر مفصل الركبة، وتتمثل وظيفته الأساسية فى نقل الحمل عبر المفصل الركبة عن طريق زيادة التطابق، وبالتالى تقليل الضغط الناتج على الغضروف المفصلى.

يلعب الغضروف الهلالى أيضًا دورًا ثانويًا فى امتصاص الصدمات، والاستقرار، والتشحيم، والتغذية، واستقبال الحس العميق لمفصل الركبة.

يتم التعرف على إصابات الغضروف الهلالى كسبب للاعتلال العضلي الهيكلي الكبير، نتيجة لخصائصه التشريحية والميكانيكية الحيوية والوظيفية المعقدة، فإن الغضروف المفصلى عرضة للتلف والإصابة، لا سيما فى الأنشطة الرياضية الاحتكاكية.

هدفت دراستنا إلى إجراء مراجعة منهجية توضح النتائج السريرية والإشعاعية عند استخدام الإصلاح بالمنظار مقابل استئصال القطع في تمزق الغضروف الهلالى القطرى.

فيما يتعلق بخصائص الدراسات بين المرضى الخاضعين للدراسة، وجدنا أن أحدى عشر دراسة تم تضمينها ثمانية دراسات كانت عن اصلاح القطع القطرى و ثلاث دراسات مقارنة بين الاصلاح و الاستئصال الجزئى للقطع بالمنظار.

فيما يتعلق بخصائص المريض بين المرضى الخاضعين للدراسة وكانت ٢٣٥ حالة مع التشخيص قبل وبعد الجراحة عن طريق الفحص، التصوير بالرنين المغناطيسى وتنظير المفاصل، وجدنا أن متوسط العمر كان ٣١,٢٥ سنة، متوسط المتابعة ٢٨,٧ شهرًا، الذكور أكثر من الإناث فى معدل الاصابة، ومتوسط الوقت من الاصابة للتدخل الجراحى ثمانية أشهر.

فيما يتعلق بالنتائج التي أبلغ عنها المريض بين المرضى الخاضعين للدراسة، وجدنا :

- تحسن متوسط درجة نشاط Tegner من ٢,٩٥ ± ٠,٠٧ إلى ٥,٠٥ ± ٠,٠٧ بعد استئصال القطع القطرى بالمنظار. وتحسنت من ٢,٨١ ± ١,٠١ إلى ٥,٩٣ ± ٠,٩٣ بعد اصلاح القطع القطرى بالمنظار
- تحسن متوسط IKDC من ٥٥,٨ ± ١٧,٢ إلى ٨٧,١٧ ± ٨,٧٨ بعد استئصال القطع القطرى بالمنظار و تحسن المتوسط من ٥٠,٦٦ ± ١٢,٥ إلى ٨٩,٢٤ ± ٥,٧٤ بعد اصلاح القطع القطرى بالمنظار.
- تحسن متوسط Lysholm من ٦٢,٠٥ ± ٩,٥٥ إلى ٩٢,٤٨ ± ٣,٨٠ بعد اصلاح القطع القطرى بالمنظار.

العودة إلى الرياضة متوسط ٤–٦ اشهر بعد اصلاح القطع القطرى بالمنظار.

فيما يتعلق بمعدلات الشفاء بين المرضى الخاضعين للدراسة، بالتقييم عن طريق التصوير بالرنين المغناطيسى أو التنظير الثانى للمفصل فى حالات القطع القطرى وجدنا:

- متوسط الشفاء الكامل فى حالات الاصلاح بالمنظار ٦٩,٤٨ ± ٢٦,٢ اكبر من متوسط الشفاء الكامل فى حالات الاستئصال الجزئى بالمنظار ٦٧,٥ ± ١٩,٨
- متوسط الشفاء الجزئى فى حالات الاصلاح بالمنظار ٣٠,٥ ± ٢٠,١ اقل من متوسط الشفاء الجزئى فى حالات الاستئصال الجزئى بالمنظار ٣٧,٨ ± ١٢,٥
- متوسط الفشل فى حالات الاصلاح بالمنظار ١٤,٣٥ ± ٨,٨ اقل من متوسط الفشل فى حالات الاستئصال الجزئى بالمنظار ١٨,٣ ± ٩,٣٤

الحفاظ على الغضروف الهلالى فى حالة القطع القطرى عن طريق اصلاح القطع او الاستئصال الجزئي بالمنظار الجراحى يحسن النتائج السريرية والاشاعية على المدى القريب والبعيد فى المتابعة بالرنين المغناطيسى او التنظير الثانى للمنظار.