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ORIGINAL ARTICLE

Arthroscopic Repair of Meniscal Tear by All-inside Technique

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ABSTRACT:

Background: Meniscal injury is one of the most common knee injuries. It is known that loss of meniscus increases the risk of subsequent development of degenerative changes in the knee This research aimed to evaluate the clinical and functional outcomes of arthroscopic treatment of meniscal tear using the All-inside technique. **Methods:** This prospective study was conducted on 18 patients with meniscal tears admitted to the Orthopedic Surgery Department, at Zagazig University hospitals. The patients treated with the all-inside repair technique, the range of the patient ages from 18 to 40 years old (mean 26.50 years), with the majority being male (77.8%) and female (22.2%). **Results:** The mean operative time of all cases was 73.33 ± 26.67 (range 40-100 minutes). The mean operative time of isolated meniscal repair cases was 41.42 ± 5.56 (40-45 minutes). The mean operative time of associated ACL reconstruction cases was 93.63 ± 5.04 (90 – 100 minutes). Fifteen (83.3%) cases had moderate pre-operative pain and three (16.7%) cases had severe pain. while post-operative, 11 cases (61.1%) had no pain, five cases (27.8%) had mild pain, one had moderate pain, and one had severe pain. the test value is 29.250. there is a highly statistically significant difference between pre-operative and post-operative pain. Eighteen (100.0%) cases had painful limited flexion or extension pre-operative, while postoperative, 14 (77.8%) cases had full range, two (11.1%) cases had less than 20 degrees' loss of flexion, one case (5.6%) had loss of 30degree flexion. and one case had a loss of 40 degrees of flexion. There is a highly statistically significant difference between pre-operative and post-operative IKDC score. There was a highly statistically significant difference between pre-operative and post-operative Lysholm score. According to the post-operative Lysholm score, there were two poor cases (11.1%), three (16.7%) good cases & 13 (72.2%) excellent cases. **Conclusions:** Arthroscopic All-inside meniscal repair could be an effective, safe, rapid surgical management with reliable and predictable outcomes and avoid the risks of nerve and vessel injury.

Keywords Meniscal Tear; Arthroscopic Repair; All-inside Technique.

INTRODUCTION

Menisci are important structures in various functions including; shock absorption, lubrication, increasing congruity, and stability. The menisci can be divided into three zones; the anterior horn, the body, and the posterior horn, and also into thirds; the outer third 'red-red zone' (denoting area of vascularity), the middle third 'red-white zone' (watershed area between vascular and avascular meniscus) and inner third 'white-white zone'

(avascular zone), where minimal to no blood supply reaches the tissue **[1]**.

Meniscal injury is one of the most common knee injuries. It is known that loss of the meniscus increases the risk of subsequent development of degenerative changes in the knee **[2]**. Meniscal injuries may occur in acute knee injuries in younger patients or as part of a degenerative process in older individuals. A common mechanism of injury is a varus or valgus force directed to a flexed knee when the foot is planted and the femur is internally rotated. Valgus force applied to a flexed knee may cause a tear of the medial meniscus. Varus force on a flexed knee with the femur externally rotated may lead to a lateral meniscus lesion **[2]**.

The medial meniscus is attached more firmly than the relatively mobile lateral meniscus, and this may result in a greater incidence of medial meniscus injury **[2]**.

Meniscal tears often present as severe pain, swelling, and possibly catching, clicking, and difficulty with deep knee bending and locking of the knee in partial flexion. The typical meniscal pain profile is localized joint-line pain. Meniscal pain occurs during torsional, weight-bearing knee movements as a sharp stab pain lasting several seconds, often followed by a dull ache for several hours. On examination, there may be joint effusion and joint line tenderness, McMurray and Apley tests are often positive **[3]**.

Magnetic resonance imaging (MRI) is the gold standard, the first choice for the investigation of suspected meniscal tears. Plain radiography is only useful to exclude differentials. On MRI, meniscal tears are evident as a linear signal intensity that extends through the meniscal substance to a free edge **[3]**.

Not all meniscal injuries require surgery; some of them can heal. the decision must be considered by tear pattern, size, vascularity, size, stability, patient age, tissue quality, and associated pathology within the knee joint **[4]**. Although meniscal repair was first reported more than 100 years ago, it did not gain appreciation until the last two decades. This is because the importance of the meniscus for the knee has been well established owing to laboratory and clinical investigations during the last 2 decades. In addition, improvements in arthroscopic techniques and instrumentation in recent years **[5]**.

Several repair techniques have been developed including; inside-out, outside-in, and all-inside methods. All-inside methods using intra-articular suture techniques are characterized by decreased operative time and are less invasive so become popular for the repair of meniscal tears **[4,5]**. So, more studies are needed in the future to investigate and treat meniscal tears.

Therefore, this study aimed to evaluate the clinical and functional outcomes of arthroscopic treatment of meniscal tear using the All-inside technique.

METHODS

Between January 2022 and December 2022, this prospective study was carried out at the Orthopedic Surgery Department, Zagazig University Hospitals 18 patients.

The study was authorized by the research ethical council of Zagazig University's Faculty of Medicine, and all participants provided written informed permission. The research followed the guidelines laid out in the Declaration of Helsinki, which is part of the World Medical Association's Code of Ethics for Research Involving Humans. This study was carried out after the consent of the Institutional Review Board(IRB#8062-15-9-2021).

Cases with the following criteria were included: Patients with grade 3 meniscal tears with a range of age between (18-40). Tear site in the red-red or red-white zone of the meniscus, which may also associated with a cruciate ligament injury

Cases with the following characteristics were excluded: Grade 1-2 tear, tear in the white-white zone of the meniscus. Duration of tear longer than four months. Malalignment of the Lower limb axis, Patient unfit for surgery, body mass index >30.

Preoperative evaluation: All patients were subjected to full history taking, complete physical examination of both knees was made. Stability tests were included. The pre-operative and post-operative examination was compared. On clinical suspicion, an X-ray (standard AP and lateral view of affected knee) and MRI were requested. If a meniscal tear was confirmed, then an arthroscopic operative intervention was planned. As all the meniscal repair sets and implants were routinely standing by in the operative theater, the decision, whether to resect or repair, was usually taken intra-operatively, after probing the tear and examining the tissue quality. The scoring system used for this study was The International Knee Documentation Committee (IKDC) Questionnaire Scoring system and the Lysholm scale.

Surgical Technique: All patients underwent the same surgical technique: Arthroscopic all-inside meniscal repair by using intra-articular sutures technique to repair the meniscal injury. With the patient put in a supine position, the entire

leg is prepared from the level of the midthigh down and draped to isolate it in a sterile fashion. A tourniquet is applied, and then diagnostic arthroscopy is performed through standard anterolateral and anteromedial portals. The diagnosis of meniscal injury is made based on the visualization and confirmation of the tear with an arthroscopic hook probe.

After confirmation of the tear with an arthroscopic hook probe, the edges of the tear were trimmed by a shaver to promote healing, the surgical probe was introduced through the accessory portal and remained there for the duration of fixation. The repair device was introduced through the portal and was directed to the site of fixation. The surgical probe acted as a guide to direct the instrument to the correct position at the repair site. Once in position, the probe can be used to manipulate the meniscal tissue and allow for perpendicular entry of the large-bore repair device. Once the meniscus was provisionally penetrated, the probe acted to reduce the meniscus to its origin. After deployment of the first anchor, the probe again guided the tip of the device around the condyle to a vertical position to allow for either a superior surface or undersurface vertical mattress suture. Next, the second anchor was deployed, and the suture was tightened. Finally, the fixation was secured and the suture was cut **(Figure 1)**.

Postoperative care:

For patients who had meniscal repairs, their knee motion was restricted between 0° and 90° in a hinged knee brace for the first 3 weeks post-surgery with partial weight bearing, followed by another 3 weeks with an increased range of motion (between 0° and 120°), and progression to full-weight-bearing. Squatting was prohibited for the first 3 postoperative months. Return to sport was permitted 6 months after repair. Appropriate antibiotics and analgesics were used. Physical therapy helped regain the motion and strength of the knee. Therapy lasts between three and six months.

Follow up:

The mean follow-up period was 2 years. All patients were followed every week in the first month and every 2-3 weeks for 3 months then monthly till the final visit. The patients were examined clinically and assessed for their range of motion and pain.

Statistical analysis:

Data were entered into the Statistical Package for Social Science (IBM SPSS) version 20. The qualitative data were presented as numbers and percentages while quantitative data were presented as mean, standard deviations, and ranges when their distribution was found parametric. The comparison between two paired groups with qualitative data was done by using the Chi-square test and/or Fisher exact test instead of the Chi-square test when the expected count in any cell was found less than 5. The comparison between two paired groups with quantitative data and parametric distribution was done by using the Paired t-test. The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following: $P > 0.05$ = non-significant (NS), $P < 0.05$ = significant (S), and $P < 0.001$ = highly significant (HS).

RESULTS:

The current study showed that the mean age of the cases was 26.50 ± 6.45 (range: 18-40 years). There were 14 male patients (77.8%) and four female patients (22.2 %). Eighteen cases (100%) had tenderness on joint-line palpation, the McMurray test was positive in all 18 cases (100%), 11 (61.1%) cases complained of knee locking, and 14 (77.8%) cases had knee swelling. According to the side, left-sided cases were eight (44.0%), and right-sided cases were 10 (55.6%). Regarding the site, lateral meniscus tear cases were three (16.7%) and medial meniscus tear cases were 15 (83.3%)**,** tears were in the red-red zone in 12(66.7%) cases, and in the red-white zone in six (33.3%) cases. Posterior horn bucket handle tears were eight cases (44.4%), posterior horn vertical tears were eight cases (44.4%), one case had a body vertical tear (5.6%) and one case had a horizontal tear (5.6%). Fourteen cases were due to sports-related injury (77.8%) and four cases were due to road traffic injury. There were 11 (61.1%) cases combined by arthroscopic ACL reconstruction and seven cases (38.9%) had isolated meniscal tears. degenerative meniscus tears, malalignment of the knee, (varus/valgus knee >5°), inflammatory arthritis, and Crystals-induced arthropathy had been excluded from the study. Time from injury to surgery ranged from 2 to 15 weeks (mean 6.61 weeks) **(Table 1)**.

The mean operative time of all cases was 73.33 ± 26.67 (range 40-100 minutes). The mean operative time of isolated meniscal repair cases was 41.42 ± 5.56 (40-45 minutes). The mean operative time of associated ACL reconstruction cases was 93.63 ± 5.04 (range 90 – 100 minutes) **(Table 2)**.

Eighteen (100.0%) cases had painful limited flexion or extension pre-operative, while postoperative, 14 (77.8%) cases had full range, two (11.1%) cases had less than 20 degrees loss of flexion, one case (5.6%) had a loss of 30degree flexion. and one case had a loss of 40 degrees of flexion **(Table 3)**.

According to the pre-operative IKDC score, there were 13 (72.2%) grade C cases and five (27.8%) grade D cases, while post-operatively; there were 13 (72.2%) grade A cases, three (16.7%) grade B cases and two (11.1%) grade D cases. there is a highly statistically significant difference between pre-operative and post-operative IKDC score **(Figure 2)**.

Pre-operative Lysholm score ranged from 60 to 70 with a mean of 66.0±3.46 while post-operative with a mean of 91.11±10.47. There was a highly statistically significant difference between pre-operative and post-operative Lysholm score. According to Lysholm's score post-operative, there were two poor cases (11.1%), three (16.7%) good cases, and 13 (72.2%) excellent cases **(Table 4)**.

Concerning the correlation between the Postoperative Lysholm score and the different factors; the mean postoperative Lysholm score for the below thirty groups was 93.29 points (SD=8.69), while the above thirty group had a mean score of 83.50 points (SD=13.96). The mean post-operative Lysholm score for the patients who had done their operation within less than 6 weeks since the date of injury was 96.08 points (SD=1), while patients' group; more than 6 weeks had a mean score of 81.17 points (SD=13.88). The mean postoperative Lysholm score for the Red-red zone group was 96.17 points (SD=1.03), while the Red-white zone group had a mean score of 81.00 points (SD=13.65). The mean postoperative Lysholm score for the combined arthroscopic ACL reconstructed group was 93.27 points (SD=9.76), while the isolated meniscal tears group had a mean score of 87.71 points (SD=11.40) **(Table 5)**.

Table (1): Demographic and clinical data of the studied cases

Age (Year)	**Mean ± SD**	26.50 ± 6.45
	Range	18 – 40
	Number = 18	**Percentage**
Gender: Male	14	77.8%
Female	4	22.2%
Clinical manifestations		
Tenderness on joint-line palpation	18	100 %
McMurray test (positive)	18	100 %
Knee Locking	11	61.1%
Knee swelling	14	77.8%
Tear criteria		
a- Side: Left knee	8	44.4%
Right knee	10	55.6%
b- **Site:** Lateral meniscus	3	16.7%
Medial meniscus	15	83.3%
c- **Zone:** Red-red zone	12	66.7%
Red-white zone	6	33.3%
d- **Types:**		
The posterior horn bucket handle tear	8	44.4%
Posterior horn vertical Tear	8	44.4%
Body vertical tear	1	5.6%
Horizontal tear	1	5.6%
Mechanism of injury:		
Sports-related injury	14	77.8%
Road traffic injury	4	22.2%

	Number = 18	Percentage
Associated knee lesions: Combined arthroscopic ACL reconstruction Isolated meniscal tears	 11 7	 61.1% 38.9%
Time from injury to surgery (weeks)	Mean ± SD Range	6.61 ± 3.63 5 – 10

Table(2): Operation time of the studied cases

Operation time	Mean	Range
All cases	73.33 ± 26.67	40-100 minutes
Isolated meniscal repair	41.42 ± 5.56	40-45 minutes
Associated ACL reconstruction	93.63 ± 5.04	90–100 minutes

Table (3): Pre-operative versus post-operative knee range of motion in the studied group

Range of motion		Number	Percentage
Pre-operative	**Painful limited flexion or extension**	18	100%
Post-operative	**Full range**	14	77.8%
	Less than 20 degrees of loss of flexion	2	11.1%
	Loss of 30 degrees of flexion	1	5.6%
	Loss of 40 degrees of flexion	1	5.6%

Table (4): Lysholm score comparative and outcomes in the studied group

Lyshlom score	Pre-operative (n=18)	Post-operative (n=18)	Test value	P-value	Sig.
Mean ± SD Range	66.00 ± 3.46 60 – 70	91.11 ± 10.47 64 – 98	-9.483	0.000	HS

	Grade	Number %
Outcome according to Lyshome score (post-operative)	Excellent	13 (72.2%)
	Good	3 (16.7%)
	Poor	2 (11.1%)

*P-value >0.05: Non significant (NS); P-value <0.05: Significant(S); P-value< 0.01: highly significant (HS) *: Chi-square test, •: Independent t-test*

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Table (5): Correlation between the post-operative Lysholm score and the different factors.

		Postoperative Lysholm Mean ± SD	Test value•	P-value	Sig.
Age (years)	**18 – 30**	95.36 ± 8.69	2.114	0.046	S
	31– 40	83.50 ± 13.96			
Sex	**Female**	88.25 ± 16.21	0.370	0.552	NS
	Male	91.93 ± 8.91			
Site of tear	**Lateral meniscus**	93.33 ± 4.73	0.154	0.700	NS
	Medial meniscus	90.67 ± 11.34			
Time from injury to surgery (Weeks)	**< 6**	96.08 ± 1.00	3.842	0.001	HS
	> 6	81.17 ± 13.88			

Tear zone	**Red-red zone**	96.17 ± 1.03	15.601	0.001	HS
	Red-white zone	81.00 ± 13.65			
Associated ACL reconstruction	**Combined Arthroscopic ACL reconstruction**	93.27 ± 9.76	1.221	0.285	NS
	Isolated meniscal tears	87.71 ± 11.40			

*P-value >0.05: Non significant (NS); P-value <0.05: Significant(S); P-value< 0.01: highly significant (HS) *: Chi-square test*

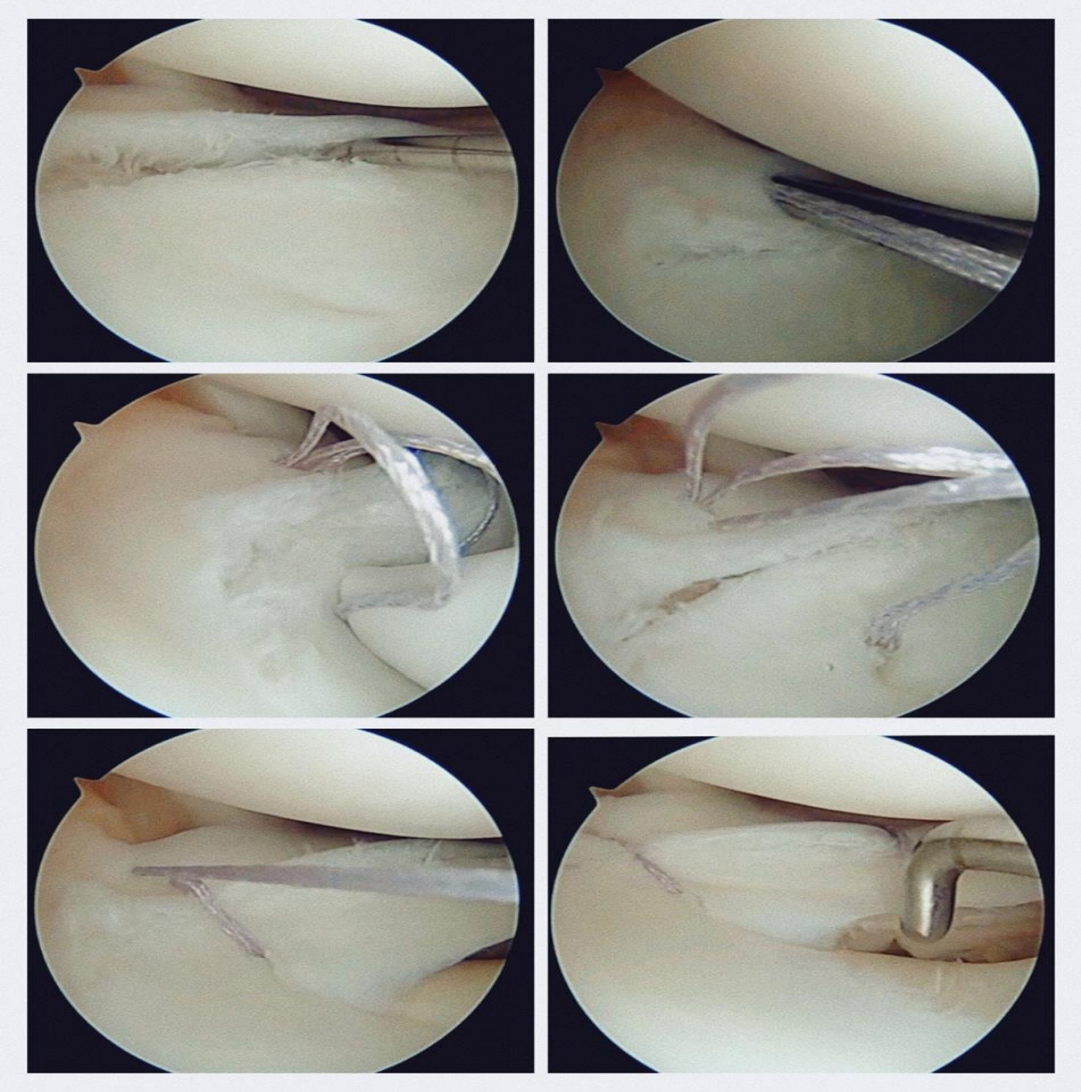

Figure 1: Surgical steps of all inside meniscal repair.

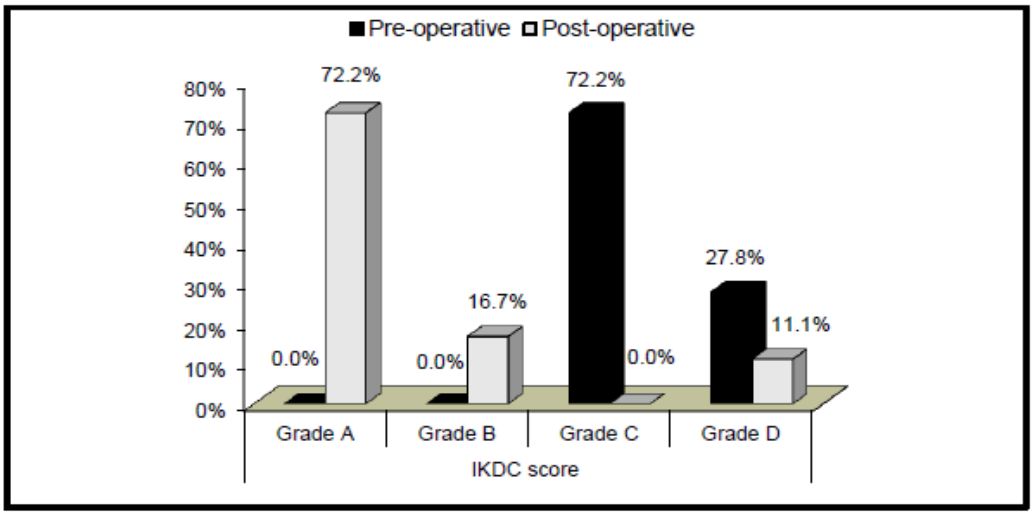

Fig. (2): The difference between pre-operative and post-operative IKDC score.

DISCUSSION:

The menisci are C-shaped fibro-cartilaginous structures lying between the femoral condyles and the tibial plateaus. They provide the function of facilitating weight bearing and contribute to the overall stability of the knee joint **[6]**.

It has been demonstrated that the menisci are very important in knee function, it has also been shown that surgeons should preserve as much meniscal tissue as possible because if a meniscal tear left untreated or aggressive meniscectomy was done, associated with early degenerative osteoarthritis of the knee is a high risk **[7]**.

To preserve function, it is suggested that some meniscal tears can be treated by meniscal repair instead of meniscectomy. There are three arthroscopic meniscal repair techniques: inside-out, outside-in, and all-inside. The inside-out technique has a possibility of damaging the peroneal nerve and vessels over the lateral side, and the saphenous nerve over the medial side. So, most of the time, a posteromedial or posterolateral incision must be made for the suture relay. the outside-in technique was initially designed to decrease such neurovascular risks but was limited to repairing the anterior horn of the meniscus **[8]**.To avoid the risk of neurovascular injury and additional wounds, different types of all-inside meniscal repair with biodegradable products were introduced **[9]**.

The work aimed to evaluate the clinical and functional outcomes of arthroscopic treatment of meniscal tears using the All-inside technique.

The current study included 18 patients with meniscal tears who were treated with an all-inside repair technique, the patient ages ranged from 18 to 40 years old (mean 26.50 years), with the majority being male (77.8%) and female (22.2%). The injury was found on the left knee in 44.4% of the cases and the right knee in 55.6 %. Sports-related injury cases were 14 (77.8%) and road traffic injury cases were four (22.2%). The site of the tear was in the lateral meniscus in three (16.7%) of cases and medial meniscus in 15(83.3%) of cases. Regarding the tear zone, there were 12 cases (66.7%) in the red zone and six cases (33.3%) in the red-white zone. The time interval between the onset of the trauma and surgery ranged from 2 to 15 weeks (mean 6.61 weeks), and the follow-up time ranged from 6 to 10 months.

This study is compatible with the previously reported mean annual incidence of meniscal lesions per 10,000 populations was 9.0 for males and 4.2 for females **[1]**.

Baker et al. [10] described 81% medial tears versus 19% lateral meniscal injuries and **Terzidis [11]** indicated that there are differences in the ratio of medial (69.3%) versus lateral (30.7%) meniscal tears associated with sports activities.

In this study, pre-operative main symptoms such as pain were moderate to severe in all cases, all cases had limited flexion or extension, 14 (77.8%) of cases had knee swelling, mechanical locking was in 11 (61.1%) of cases and McMurry test were positive in all cases. which is in agreement with **Majeed [12]** performed a retrospective review on 122 cases and reported that cases had pain (94 %), swelling (68 %), and mechanical locking (38 %). Also, **Doral et al. [13]** reported that patients with meniscal tears had pain, subacute swelling, hearing or sensation of a 'pop' during injury, and

mechanical symptoms such as popping, limitation of range of movement, catching, and locking.

In this study, there were seven (38.9%) cases repaired by one inside suture, seven (38.9%) cases repaired by two sutures, and four (22.2%) cases repaired by three sutures. There were 11 (61.1%) cases combined by arthroscopic ACL reconstruction and seven cases (38.9%) had isolated meniscal tears. which agrees with **Solheim [14]** reported that 82 cases of meniscal tears repaired by all inside techniques had a median of 2 sutures (range from 1-4). and **EL-Din Ali et al. [8]** reported that an average of two sutures were used (range, 1 to 3) per patient.

Regarding the pre-operative IKDC score, our study showed that there were 13 (72.2%) grade C (abnormal) cases and five (27.8%) grade D (severely abnormal) cases, while post-operatively, there were 13 (72.2%) grade A(normal) cases and three (16.7%) grade B (nearly normal) cases and two (11.1%) Grade D cases. There was a highly statistically significant difference between pre-operative and post-operative IKDC score. which is in agreement with **Tucciarone et al. [15]** reported that of 20 cases had meniscal all inside repair, 20 cases 100% were grade D according to IKDC score pre-operative, and after 6 follow-up months postoperatively, grade A cases were 17 (85%) and grade B cases were 3 (15%). Also, **Haas, et al. [16]** reported that subjective IKDC scores improved significantly from an average 58.67 preoperatively to an average 90.92 postoperatively. Thirty-three of 37 patients (89%) had good to excellent results on their postoperative subjective IKDC.

According to the pre-operative Lysholm score, it ranged from 60 to 70 with a mean 66.00 ± 3.46. While post-operatively it ranged from 64 to 98 with a mean 91.11 ± 10.47. there was a highly statistically significant difference between the preoperative and postoperative Lysholm scores, so according to the post-operative Lysholm score, there were two poor cases (11.1), three (16.7%) good cases, and 13 (72.2%) excellent cases. which is in agreement with **Haas et al. [16]** reported that 86% of patients who underwent meniscal repairs by all inside devices showed excellent or good clinical results at a mean of 24.3-month follow-up. at a mean of 22-month follow-up. Also, **Kocabey et al. [17]** reviewed 52 meniscal repairs using all inside techniques, they reported that 96% of patients showed good to excellent clinical results at a mean of 10.3-month follow-up. and agree with **Asik et al. [18]** studied 47 meniscal repairs for a mean of 26 months and reported that 89.4% of patients showed excellent or good clinical results, and 83% of patients who underwent second-look arthroscopy showed healing.

This study is compatible with **EL-Din Ali et al. [8]** reported that the clinical results of 30 repaired menisci cases using all inside meniscal repair systems with an average follow-up of 6 months showed that 26 patients (86.66%) had fair to excellent results, and 4 patients (13.33%) had poor results according to Lysholm scoring system. While **Hantes et al. [19]** reported only 65% of patients showed clinically successful results.

Regarding the complications, there were no intra-operative complications. Post-operative complications occurred in three cases (16.6%). One of them suffered a superficial wound infection which recovered on local care and antibiotics therapy, while meniscal repair failure occurred in two cases (11.1%). the first case was due to early weight bearing, while the second case was due to a second trauma three months postoperatively. both cases were treated by arthroscopic partial meniscectomy. which is in agreement with **Grant et al. et al. [20]** found more nerve symptoms are associated with the inside-out repair, and more implant-related complications are associated with the all-inside techniques. **Kotsovolos et al. [21]** reported that four patients who underwent all-inside meniscal repair with concomitant ACL reconstruction had difficulty in gaining full flexion of the knee joint after operation, one of which required an arthroscopic arthrolysis.

According to the correlation of the results to different factors, our study showed that there was a statically significant correlation between Lysholm and IKDC score postoperatively to age, tear zone, time from injury to surgery, and associated ACL reconstruction, In this study, we found that timing of repair less than six weeks significantly affected the outcome of meniscal repair and the post-operative score was higher for patients younger than 30 years, we found the post-operative mean score was higher for the cases which had concurrent ACL reconstruction operation during their meniscal surgery. This is compatible with **EL-Din Ali et al. [8]** found that results are better when the timing of repair less than a month and in younger patients.

Uzun, et al. [22] and **Kang et al. [23]** investigated the factors that influence the outcome of arthroscopic meniscal repair, including age and the time from injury to surgery. the results showed

that younger age and shorter time from injury to surgery were associated with better outcomes.

Several studies have demonstrated better outcomes when meniscal repair, is done concurrently with ACL reconstruction a prospective study of 42 meniscal tears repaired with the fast-fix with 2-year follow-up revealed success rates of 91% and 80% in patients with and without concurrent ACL reconstruction, respectively. **Haas et al. [16]**, while **Kotsovolos et al. et al. [21]** studied 61 meniscal repairs using the FasT-Fix device with 62% of them undergoing concomitant ACL reconstruction over 18 months. they reported that the success rate was 90.2% and simultaneous ACL reconstruction did not affect the clinical outcomes.

Simultaneous meniscal repair and ACL reconstruction create a more favorable environment for meniscal healing because of greater intra-articular bleeding and fibrin clot formation. **Gallacher [24].**

The Limitations and disadvantages of this study include the small number of cases, the lack of a control group, the limited observation period, and the cost of the all-inside repair device. There were no complications directly associated with the device in the present study such as broken implants, synovitis, or migration of the implants. Inappropriate use of the instrumentation may prolong surgical time and result in iatrogenic meniscal or cartilage injury.

The clues of successful procedures are: 1) without a detailed history, physical examination, and imaging, diagnosing meniscal tear injuries can be difficult. 2) Early treatment is very important. 3) Choosing the patients who fulfill the inclusion criteria and avoid patients who will not benefit from the operation. 4) Commitment to rehabilitation, treatment and instructions, and continuous follow-up.

The advantages of using the all-inside repair technique in our study are ease of use, avoidance of an accessory incision, shorter operating time, and less risk to neurovascular structures.

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CONCLUSIONS:

Arthroscopic All-inside meniscal repair could be an effective, safe, rapid surgical management with reliable and predictable outcomes and avoid the risks of nerves and vessel injury. This technique is suitable for young patients with vertical, longitudinal, and bucket-handle meniscal tears in red-red and red-white zones. The problem is it is a difficult and expensive technique.

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