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Thirteen-Year Clinical Outcomes Following Arthroscopic Resection of Symptomatic Mediopatellar Plica with Cartilage Degeneration

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ABSTRACT

Objective: This study aimed to evaluate the 13-year clinical and functional outcomes of arthroscopic removal of symptomatic mediopatellar plica (MPP) in patients with cartilage degeneration.

Materials and Methods: Seventy-six patients who underwent arthroscopic MPP excision between 2005 and 2006 were retrospectively reviewed. After exclusions and loss to follow-up, 42 patients with a mean age of 51.2±12.1 years were evaluated at a mean of 14 years postoperatively. Clinical outcomes were assessed using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) at baseline, 6 months, and final follow-up. Symptoms, plica types, and coexisting intra-articular pathologies were also recorded.

Results: A total of 42 patients with a mean age of 51.2±12.1 years were evaluated at a mean follow-up of 14.0±0.79 years. Significant improvements in pain and function were observed at 6 months and at final follow-up ($p<0.05$). At 6 months, 97.6% of patients rated their outcome as good or excellent according to WOMAC scores, and 92.9% maintained this rating at final follow-up. Improvements were consistent regardless of the presence of additional intra-articular pathology. No patient reported worsening of symptoms during follow-up. Cartilage degeneration was observed in all cases, predominantly in the medial femoral condyle and medial pole of the patella.

Conclusion: Arthroscopic excision of symptomatic MPP associated with cartilage degeneration provides durable clinical benefits lasting more than a decade. The sustained improvement in pain and function supports arthroscopic plica resection as an effective treatment option when conservative therapies fail, even in patients with coexisting joint pathology.

Keywords: Arthroscopy, cartilage degeneration, knee joint pathology, long-term outcomes, medial plica, synovial plica syndrome.

INTRODUCTION

The medial synovial plica develops from mesenchymal tissue during embryogenesis and remains as a vestigial structure within the knee joint. Epidemiological studies have shown that it is present in approximately 64% to 84% of the general population.[1,2] The plica is a flexible structure in the knee that usually does not restrict movement. Inflammation and swelling may result from various causes, including trauma or noninjury-related factors, often associated with patellofemoral joint function. Loss of plica flexibility may lead to cartilage damage and symptoms of medial plica syndrome (MPS). Many patients with anterior knee pain (AKP) have a thickened medial plica; however, the main contributing factors remain unclear.[3]

The mediopatellar plica (MPP) is the most common synovial plica in the knee and is a frequent cause of pain, particularly in younger patients.[4] A recent study reported an incidence rate of 79.9%, indicating that this condition is common across age groups. Symptomatic cases are more frequent in young and active individuals, with a slightly higher prevalence among males, possibly due to activity-related factors.[5] Nonspecific symptoms, such as edema, instability, a sensation of blocking, false locking, and clicking sounds, may occur, even when pain is intermittent and triggered by activities such as stair climbing.[5] Moreover, previous studies have reported that cartilage degeneration accompanies symptomatic MPP in approximately 24% to 50% of cases, most frequently involving the medial femoral condyle and the medial pole of the patella.[6,7] The initial phase of treatment may be conservative. However, arthroscopic excision of the inflamed plica should be considered if it crosses the medial femoral condyle and has damaged the patellofemoral joint cartilage.[1,8] Multiple studies have supported arthroscopic removal as an effective treatment for persistent MPP symptoms that do not improve with conservative methods.[5,9–11] However, limited information is available on the long-term clinical outcomes after arthroscopic treatment.[6]

This study focused on evaluating the long-term clinical outcomes following MPP excision. The hypothesis was that surgical removal of MPP would result in significant improvements in patient well-being and favorable clinical outcomes.

METHODS

This retrospective cohort study evaluated the long-term clinical outcomes of arthroscopic excision of symptomatic MPP. The long-term findings of a previously published clinical cohort were included in the present study.[5] Arthroscopic plica excision was performed in 76 patients between 2005 and 2006, with a minimum follow-up of 13 years. The study was approved by the Erciyes University Clinical Research Ethics Committee (Approval Number: 2023/206; Date: 29.03.2023), and all included patients provided written informed consent. Eligible patients had symptomatic MPP and MRI-confirmed cartilage deterioration at the medial femoral condyle or medial patella that had not improved after 6 months of conservative treatment (Fig. 1). Patients with osteoarthritis, previous knee surgery, angular deformities, joint laxity, or rheumatological disorders were excluded.[5] During long-term follow-up, patients were re-evaluated by phone and invited to the clinic. Approximately 15 years after surgery, no information could be obtained from the hospital system for 10 patients. After patient selection for long-term follow-up, one patient who had undergone knee replacement surgery after total

KEY MESSAGES

- Arthroscopic mediopatellar plica excision provides durable pain relief and functional improvement over 14 years.
- Favorable outcomes can be achieved even in the presence of concomitant cartilage degeneration and additional intra-articular pathology.
- Plica morphology alone does not appear to determine long-term clinical prognosis after arthroscopic resection.

Figure 1. Preoperative MRI showing the mediopatellar plica.

meniscectomy, one patient who had undergone ipsilateral knee trauma surgery, two patients who subsequently underwent meniscectomy, and 20 patients who were lost to follow-up were excluded. Of the 20 patients lost to follow-up, 13 could not be reached using the phone number registered in the system, and seven were contacted but declined further contact. Finally, 42 patients who underwent arthroscopic resection of MPP of the knee were retrospectively evaluated after at least 13 years.

Surgical Procedures

The patients underwent surgery under either regional or general anesthesia. All arthroscopic procedures were performed by the same surgical team under the supervision of a senior orthopedic surgeon, ensuring a standardized operative technique. Standard anterolateral (AL) and anteromedial (AM) portals were used during the surgical intervention. A thorough examination of all knee compartments, including the MPP and other intra-articular pathologies, was performed, and the intraoperative appearance of the mediopatellar plica was documented during arthroscopy (Fig. 2). First, pathologies other than MPP were evaluated. The mediopatellar plica was classified according to the Dandy classification, which categorizes synovial plicae based on their width relative to the suprapatellar pouch and their structural characteristics.[2]

According to this system, the plica may be absent (Type A), have a width of up to one-quarter of the suprapatellar pouch (Type B), extend between one-quarter and one-third of the pouch (Type C), extend between one-third and two-thirds of the pouch (Type D), or exceed two-thirds of the pouch width (Type E). Additional morphological variants include a complete membrane (Type F), a perforated membrane (Type G), an arch configuration (Type H), a pillar configuration (Type I), and a lateral plica (Type J). This classification was applied intraoperatively to evaluate plica morphology and its potential mechanical impact on the medial femoral condyle. Medial and lateral meniscal tears were repaired, and patients with anterior cruciate ligament (ACL) rupture underwent ACL reconstruction. In this study, no degenerative or diffuse cartilage lesions were observed. Microfracture was performed only for focal full-thickness cartilage defects smaller than 2 cm^2 located in weight-bearing areas. Debridement was performed in patients with synovial and Hoffa hypertrophy. Next, from the perspective of the AL portal, a motorized shaver was inserted through the AM portal. The MPP was then partially excised, leaving a thin, circular margin along its periphery while avoiding injury to the capsule and synovium. A drain was placed at the end of the operation, the incisions were sutured, and the operated extremity was wrapped up to the proximal one-third of the thigh using 15-cm-wide elastic bandages.

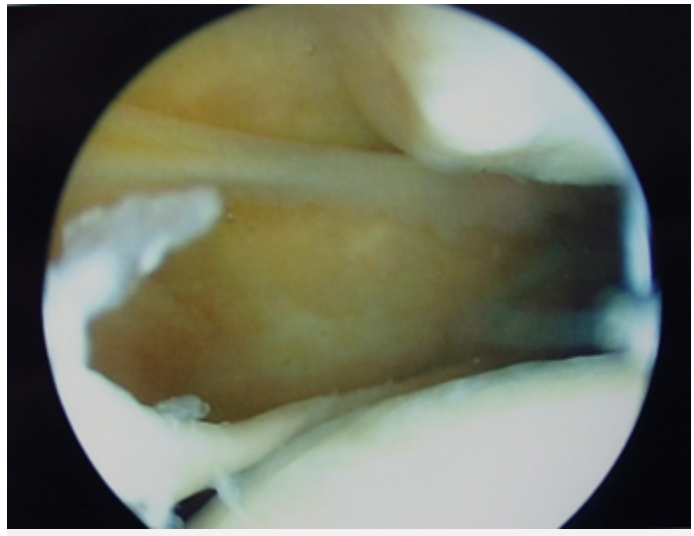

Figure 2. Intraoperative arthroscopic view of the mediopatellar plica.

Follow-up and Rehabilitation

After the procedure, cold compression was applied, and the drains were removed the following day. One week later, the sutures were removed, and patients continued to receive medical care along with an exercise program. For patients with meniscal tears, the postoperative rehabilitation plan depended on the location and severity of the tear. In general, patients were allowed to mobilize without weight-bearing support for 3 weeks. From weeks 3 to 6, patients were allowed partial weight bearing with a brace, and full weight bearing was permitted after 6 weeks. Moderate activities, such as light jogging, were permitted 3 months after surgery, and sports activities were resumed after 6 months. Physical therapy began on postoperative day 1 and included limited range-of-motion exercises: 45° flexion until week 4, followed by 90° flexion until week 6, and then progression to knee-strengthening exercises. Patients who underwent isolated ACL reconstruction began isometric quadriceps, patellar mobilization, and hamstring exercises on day 1. Range-of-motion exercises were started immediately to achieve 0° to 90° knee ROM within the first week. Once patients achieved 0° to 100° ROM and demonstrated muscle control, full weight bearing was permitted. Patients who underwent microfracture were allowed to mobilize without weight bearing for 3 weeks, and exercises to preserve joint range of motion began on the first day after surgery. Partial weight bearing was permitted from weeks 3 to 6, with full weight bearing beginning after week 6. For the remaining patients, ROM exercises began on postoperative day 1 without restrictions, and full weight bearing was permitted.[5]

Assessments

In the initial study, comprehensive patient records were meticulously documented preoperatively, including patient characteristics, detailed medical histories, and findings from thorough physical examinations. In addition, additional pathologies and joint degeneration were recorded during preoperative MRI and arthroscopic surgery. Cartilage degeneration was evaluated and graded according to the Outerbridge classification. Preoperatively, postoperatively, at 6 months, and 13 years later, patients were specifically asked about pain patterns, the relationship between pain and activity, the cinema sign, and false locking. A knee examination was routinely performed, particularly around the medial pole and medial joint space, to assess tenderness. Preoperative conventional radiographs, including anteroposterior and lateral views, and MRI were performed in all patients. Pain levels and physical function during daily activities were assessed using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) questionnaire, which consists of 24 questions. The pain score ranged from 0 to 28, and the physical function score ranged from 0 to 63. The possible mean WOMAC score ranged from 0 to 3.83. The mean WOMAC score was used for the clinical and functional evaluation of patients before and after surgery, and the results were categorized as follows: 0 to 0.75, excellent; 0.75 to 1.75, good; 1.75 to 2.75, moderate; and >2.75, worse.

Statistical Analyses

All statistical analyses were performed using SPSS 22.0 for Windows (SPSS Inc., IL, USA). Descriptive statistics included the mean, standard deviation, median, minimum and maximum values, and frequency ratios. The Kolmogorov-Smirnov test was used to assess the distribution of variables. For independent quantitative variables, either the independent-samples t-test or the Mann-Whitney U test was used, depending on whether the data were normally distributed. The Wilcoxon test was used for paired quantitative data. Because the assumptions of the Pearson chi-square test were violated due to small expected cell frequencies, Fisher's exact test was used for categorical comparisons, including the analysis of plica type distributions between groups. Cochran's Q test was used to compare dependent dichotomous data across multiple time points. The Bonferroni adjustment was applied with the McNemar test to identify differences between time points. The Friedman test was used to compare data across more than 2 time points, followed by Bonferroni-corrected Wilcoxon rank tests for pairwise comparisons. Statistical significance was set at $p<0.05$. Mean±standard deviation values were also reported to facilitate comparison with previous studies.

Table 1. Demographic and clinical characteristics of the patients

Characteristics	Total (n=42)
Age (years)	51.2±12.1
BMI (kg/m^2)	27.5±4.1
Sex, n (%)	
Female	17 (40.5)
Male	25 (59.5)
Side, n (%)	
Right	21 (50.0)
Left	21 (50.0)
Medial meniscal injury, n (%)	
(–)	19 (45.2)
(+)	23 (54.8)
Lateral meniscus injury, n (%)	
(–)	35 (83.3)
(+)	7 (16.7)
ACL rupture, n (%)	
(–)	37 (88.1)
(+)	5 (11.9)
Hoffa hypertrophy, n (%)	
(–)	35 (83.3)
(+)	7 (16.7)
Patellofemoral discordance, n (%)	
(–)	39 (92.9)
(+)	3 (7.1)
Cartilage defect, n (%)	
(–)	34 (81.0)
(+)	8 (19.0)
Synovial hypertrophy, n (%)	
(–)	40 (95.2)
(+)	2 (4.8)
Follow-up duration, median (min–max), years	14 (13–15)
Time from symptom onset to surgery, median (min–max), months	12.5 (7–32)

BMI: body mass index; ACL: anterior cruciate ligament; (+): present; (–): absent.

RESULTS

A total of 42 patients (17 females and 25 males) with a mean age of 51.2±12.1 years were included in the final evaluation. The mean follow-up duration was 14.0±0.79 years. Detailed demographic and clinical characteristics are presented in Table 1. Of all patients, 11 had isolated MPP, whereas the remaining

Table 2. Patient characteristics and plica types according to additional pathology status

Characteristics	Isolated MPP plica (n=11)	MPP + additional pathologies (n=31)	p
Age, mean±SD, years	46.9±13.5	52.7±11.4	0.172
BMI, mean±SD, kg/m²	27.3±4.2	27.2±4.2	0.962
Sex, n (%)			0.746
Female	4 (36.4)	13 (41.9)	
Male	7 (63.6)	18 (58.1)	
Side, n (%)			0.726
Right	5 (45.5)	16 (51.6)	
Left	6 (54.5)	15 (48.4)	
Follow-up duration, median (min–max), years	14 (13–15)	14 (13–15)	0.412
Time from symptom onset to surgery, median (min–max), months	10 (7–32)	13.4 (7–25)	0.592
Plica type, n (%)			
Type B	0 (0)	0 (0)	–
Type C	4 (36.4)	9 (29.0)	0.457
Type D	2 (18.2)	16 (51.6)	0.080
Type E	1 (9.1)	1 (3.2)	0.467
Type F	0 (0)	2 (6.5)	0.545
Type G	0 (0)	0 (0)	–
Type H	4 (36.4)	3 (9.7)	0.063

Data are expressed as n (%), mean±SD, or median (min–max). Plica type comparisons were performed using Fisher's exact test. BMI: Body mass index; MPP: Mediopatellar plica; SD: Standard deviation.

31 had MPP in conjunction with at least one additional condition. According to the Dandy classification, Type D plica appeared to be more frequent in patients with additional pathologies than in those with isolated MPP; however, this difference did not reach statistical significance according to Fisher's exact test (51.6% vs. 18.2%, p=0.080). Similarly, Type H plica appeared to be more frequent in patients with isolated MPP than in those with additional pathologies, but this association was also borderline and not statistically significant (36.4% vs. 9.7%, p=0.063). Therefore, these findings were interpreted with caution and were not considered statistically significant. The demographic and clinical characteristics and plica types according to the presence of additional pathology were comparable between the groups, as shown in Table 2.

Cartilage degeneration of at least grade 1 was present in all patients at both the medial femoral condyle and the medial pole of the patella. Grade ≥2 lesions were observed in 90.5% of medial femoral condyles and 85.7% of medial patellar poles (Table 3). All signs and symptoms showed significant reductions in frequency at both the 6-month and final follow-up evaluations compared with baseline. In addition, the WOMAC total and subgroup scores showed significant improvement at both early and long-term follow-up compared with baseline, with early-term results being significantly superior to long-term outcomes (Table 4).

Table 3. Distribution of cartilage degeneration by grade and location

Grade	Medial femoral condyle n (%)	Medial pole of the patella n (%)
Grade 1	4 (9.5)	6 (14.3)
Grade 2	22 (52.4)	20 (47.6)
Grade 3	15 (35.7)	14 (33.3)
Grade 4	1 (2.4)	2 (4.8)
Total	42 (100.0)	42 (100.0)

Most patients rated their outcomes as good or excellent based on their mean WOMAC scores (97.6% at the 6-month follow-up and 92.9% at the final follow-up). During the follow-up period, none of the patients reported worsening of outcomes. Subgroup analysis showed that signs and symptoms improved similarly in patients with and without additional diseases. At final follow-up, WOMAC pain, physical function, and total

Table 4. Changes in clinical features and WOMAC scores throughout the study

Characteristics	Preoperative	At 6 months	At final follow-up
Pain, n (%)	42 (100)	5 (11.9)[a]	9 (21.4)[b]
Intermittent pain, n (%)	41 (97.6)	3 (7.1)[a]	8 (19.0)[b]
Pain on activity, n (%)	40 (95.2)	4 (9.5)[a]	9 (21.4)[b]
Pain when climbing stairs, n (%)	42 (100)	5 (11.9)[a]	8 (19.0)[b]
Pain when squatting, n (%)	40 (95.2)	4 (9.5)[a]	8 (19.0)[b]
Cinema sign, n (%)	40 (95.2)	1 (2.4)[a]	6 (14.3)[b]
Stiffness during initial steps, n (%)	35 (83.3)	3 (7.1)[a]	5 (11.9)[b]
False locking, n (%)	26 (61.9)	2 (4.8)[a]	7 (16.7)[b]
Swelling, n (%)	22 (52.4)	1 (2.4)[a]	3 (7.1)[b]
Tenderness over the medial pole of the patella, n (%)	30 (71.4)	0 (0)[a]	3 (7.1)[b]
Tenderness over the medial joint space, n (%)	35 (83.3)	2 (4.8)[a]	5 (11.9)[b]
WOMAC scores			
Pain score, mean±SD/median (range)	8.0±3.8 / 8 (0–16)	0.8±2.5[a] / 0 (0–12)	3.7±4.2[bc] / 2 (0–15)
Physical function score, mean±SD/median (range)	25.2±11.3 / 27 (5–52)	2.7±7.9[a] / 0 (0–44)	8.8±11.7[bc] / 3.5 (0–45)
Total score, mean±SD/median (range)	33.5±14.3 / 33 (7–64)	3.6±10.4[a] / 0 (0–55)	15±15.7[bc] / 9 (0–60)
Mean score, mean±SD/median (range)	1.3±0.5 / 1.38 (0.29–2.67)	0.15±0.43[a] / 0 (0–2.29)	0.6±0.62[bc] / 0.36 (0–2.4)
Rating based on the mean WOMAC score			
Excellent, n (%)	–	40 (95.2)	27 (64.3)
Good, n (%)	–	1 (2.4)	12 (28.6)
Moderate, n (%)	–	1 (2.4)	3 (7.1)
Worse, n (%)	–	–	–

a: P<0.017. 6 months versus baseline; b: P<0.017, final follow-up versus baseline; c: P<0.017. 6 months versus last follow-up. Bonferroni correction was used. WOMAC: Western Ontario and McMaster Universities Osteoarthritis Index; SD: Standard deviation.

scores remained significantly improved compared with baseline, although they were slightly higher than the 6-month values. No intraoperative or postoperative complications, including infection, hemarthrosis, instability, progression to patellofemoral osteoarthritis, or reoperation, were observed during long-term follow-up.

DISCUSSION

The key finding of this study was the notable clinical improvement observed over a 13-year follow-up period after surgical removal of MPP compared with the preoperative condition. Furthermore, this study is among those with the longest follow-up periods in this field. Although plicae are frequently detected during arthroscopy, plicae around the knee are rarely considered problematic. However, plica syndrome can significantly reduce a patient's quality of life and cause anterior knee pain. Inflammatory processes may lead to thickening and fibrotic changes in the plica, which may then act as a tightened band and impinge on the surrounding cartilage, contributing to joint damage.[12] Kang et al.[3] reported that the AKP group had a significantly higher frequency of MPP. They concluded that abnormalities in the patellofemoral (PF) joint, particularly MPP and minor irregularities in articular geometry, should be thoroughly assessed in patients with atraumatic AKP.

Dandy et al.[2] reported that MPP is present in most normal knees (64%–84%), but most symptomatic cases, accounting for 84.5% of patients, are associated with Type C and D plicae. Types A and B rarely cause pain, and when they do, conservative treatment and physiotherapy provide better outcomes than those observed for Type C and D plicae.[13,14] In another study, more than 80% of knees were classified as Type C or D.[15] A study of 3,563 patients and 3,889 knees reported a medial synovial plica incidence of 79.9%. Among these cases, Types A, B, C, and D accounted for 35.2%, 22.4%, 12.3%, and 10.0%, respectively.[16] In our study, Type C and D plicae constituted the majority of cases (73.9%), and these patients did not respond to conservative treatment for 6 months. The difference between our study and the study by

Nakayama et al.[16] may be explained by differences in the study populations; the previous study included only patients who underwent arthroscopic knee surgery. In contrast, our study included patients with medial plica syndrome who did not improve after 6 months of conservative treatment. Therefore, we believe that this study supports the existing literature. The symptomatology was consistent with that reported in previous publications. Arthroscopic plica excision was performed in all patients, and positive and significant outcomes were obtained in all cases.

Consistent with existing research, the initial approach usually involves conservative treatment, such as physiotherapy, activity restriction, and physical exercises, which have demonstrated favorable outcomes.[1,17] However, arthroscopic intervention may be necessary in patients with persistent pain. Recent literature has shown excellent outcomes after arthroscopic intervention in such cases; however, there are currently no definitive indications for selecting between conservative and surgical treatment.[1,6,17–20]

Blanke et al.[21] conducted a study in which patient-reported outcomes were evaluated using the Lysholm score, Visual Analog Scale (VAS), and Tegner activity score. The results showed excellent outcomes both in patients who underwent successful conservative treatment and in those who underwent surgery after failed conservative treatment. No statistically significant differences were observed between the two groups. Patients who underwent surgical treatment had a relatively low overall complication rate of 6.5%. In the present study, patients were evaluated using the WOMAC scoring system at 6 months after surgery and after a mean follow-up of 13 years. Nearly all patients reported excellent outcomes at the 6-month follow-up. WOMAC scores differed significantly between 6 months and 13 years. Similar clinical improvement was observed in both patients with isolated MPP and those with additional pathologies. Although WOMAC scores were better at 6 months, long-term follow-up showed excellent scores in 64.3% of patients, followed by good scores in 28.6% and moderate scores in 7.1%. Although our long-term results demonstrated that symptoms did not worsen over time, this interpretation should be made cautiously, as long-term radiological imaging, including MRI or X-ray, was not routinely available for this cohort. Therefore, the stability of symptoms over a 13-year period may reflect clinical improvement rather than documented structural preservation. The observed decline in clinical scores compared with early postoperative outcomes could be attributed to age-related physiological joint degeneration, progression of baseline chondral pathology, and reduced activity levels over time. These factors are likely to influence long-term functional capacity independently of the initial MPP pathology.

Paczesny et al.[6] reported that patients without cartilage abnormalities had better clinical outcomes after arthroscopic plica excision. The authors suggested that impaired neuromuscular control may cause abnormal patellar tracking, irritating the MPP and accelerating cartilage degeneration. They also emphasized the need for more controlled studies to determine whether physiotherapy or plica resection is appropriate at this clinical stage. Christophorakis and Strachan reported that 24.7% of 319 MPP cases among 1,000 patients showed cartilage degeneration in the medial femoral condyle and/or medial pole of the patella.[22] In our study, cartilage degeneration was found in all patients at the medial femoral condyle and medial pole of the patella, with grade ≥2 lesions observed in 90.5% and 85.7% of these sites, respectively. Cultural practices in this group, including activities such as squatting and sitting on the floor, may increase the risk of cartilage degeneration.[5]

A recent meta-analysis found that arthroscopic removal of symptomatic medial knee plica yielded satisfactory clinical outcomes in most cases. Therefore, arthroscopic excision should be considered a treatment option for patients who do not respond to initial nonsurgical interventions.[9]

In many studies, isolated MPP lesions were excised, and favorable outcomes were reported.[6,18] Patients with additional pathological conditions were included in this study, with no differences observed in age, BMI, sex, follow-up duration, or duration of preoperative symptoms between patients with isolated MPP and those with other pathologies. Early results indicated excellent outcomes for nearly all patients, as reflected by WOMAC scores.[5] At the final follow-up, conducted after a mean of 13 years, patients' preoperative scores showed significant improvement. The results of our study are consistent with previous findings reported in studies investigating plica excision.[23–28] Clinical improvements may have resulted from the management of coexisting conditions that responded to treatment. However, patients with isolated plica syndrome showed progress similar to that of patients with additional pathologies, with few exceptions. More controlled studies are needed to assess the long-term decline in clinical scores after a mean follow-up of 13 years.

The strengths of this study include the 13-year follow-up, thorough assessment of plica pathology, and treatment of additional conditions. The findings support the effectiveness of plica excision in improving outcomes in both isolated plica syndrome and other knee conditions. Future research should include controlled studies to investigate the long-term effects of plica excision and the factors influencing the decline in clinical scores over time. However, certain limitations remain. The small sample size limits the generalizability of the findings, primarily

because of the single-center design and the challenges of reaching participants after a mean follow-up of 13 years. In addition, the long follow-up period resulted in significant loss to follow-up, potentially introducing bias. Another key limitation is the absence of a control group, which prevents comparative conclusions. Although subgroup analyses were conducted between patients with isolated MPP and those with additional pathologies, these analyses cannot fully replace a true comparator group. Postoperative rehabilitation protocols also varied among patients who underwent additional procedures, such as meniscal repair, ACL reconstruction, or microfracture; however, the small number of patients in these subgroups made it impossible to statistically evaluate the impact of these differences on outcomes. Furthermore, long-term radiological imaging, including MRI or X-ray, was not available, which limits the interpretation of the finding that symptoms did not worsen over time, particularly in the context of loss to follow-up. The slight decline observed between early and long-term clinical outcomes may be attributed to age-related joint degeneration, progression of underlying chondral pathology, or changes in activity levels over the 13-year period. In addition, only the WOMAC score was used for functional assessment; other widely used functional or quality-of-life measures, such as the Lysholm score, IKDC score, and SF-36, were not available because they were not routinely documented during the original study period. Future studies should address these limitations by conducting multicenter research with larger patient cohorts and an appropriate control group to strengthen the validity and generalizability of the results.

CONCLUSION

When conservative treatments are ineffective, arthroscopic plica excision has demonstrated notable improvements in both the short and long term. This study supports the notion that arthroscopic excision is effective in preventing further damage to the patellofemoral joint and is therefore recommended for patients with symptomatic MPP.

Ethics Committee Approval: Ethics committee approval was obtained from Erciyes University Clinical Research Ethics Committee (Approval Number: 2023/206; Date: 29.03.2023).

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REFERENCES

1. Schindler OS. 'The Sneaky Plica' revisited: morphology, pathophysiology and treatment of synovial plicae of the knee. Knee Surg Sports Traumatol Arthrosc 2014;22(2):247-62. [CrossRef]
2. Dandy DJ. Anatomy of the medial suprapatellar plica and medial synovial shelf. Arthroscopy 1990;6(2):79-85. [CrossRef]
3. Kang S, Park J, Kang SB, Chang CB. MRI findings of young male soldiers with atraumatic anterior knee pain. Scand J Med Sci Sports 2016;26(5):572-8. [CrossRef]
4. Samim M, Smitaman E, Lawrence D, Moukaddam H. MRI of anterior knee pain. Skeletal Radiol 2014;43(7):875-93. [CrossRef]
5. Guney A, Bilal O, Oner M, Halici M, Turk Y, Tuncel M. Short- and mid-term results of plica excision in patients with mediopatellar plica and associated cartilage degeneration. Knee Surg Sports Traumatol Arthrosc 2010;18(11):1526-31. [CrossRef]
6. Paczesny L, Zabrzynski J, Kentzer R, Gryckiewicz S, Lewandowski B, Szwedowski D, et al. A 10-Year Follow-up on Arthroscopic Medial Plica Syndrome Treatments with Special Reference to Related Cartilage Injuries. Cartilage 2021;13(1_suppl):974S-83S. [CrossRef]
7. Christoforakis JJ, Strachan RK. Internal derangements of the knee associated with patellofemoral joint degeneration. Knee Surg Sports Traumatol Arthrosc 2005;13(7):581-4. [CrossRef]
8. Griffith CJ, LaPrade RF. Medial plica irritation: diagnosis and treatment. Curr Rev Musculoskelet Med 2008;1(1):53-60. [CrossRef]
9. Gerrard AD, Charalambous CP. Arthroscopic Excision of Medial Knee Plica: A Meta-Analysis of Outcomes. Knee Surg Relat Res 2018;30(4):356-63. [CrossRef]
10. Prejbeanu R, Poenaru DV, Balanescu AD, Mioc ML. Long term results after arthroscopic resection of medial plicae of the knee-a prospective study. Int Orthop 2017;41(1):121-5. [CrossRef]
11. Weckström M, Niva MH, Lamminen A, Mattila VM, Pihlajamäki HK. Arthroscopic resection of medial plica of the knee in young adults. Knee 2010;17(2):103-7. [CrossRef]

12. Guney A, Kafadar I. The Plica: Is a New Aetiological Factor in the Knee Osteoarthritis?. Osteoarthritis - Diagnosis, Treatment and Surgery. InTech; 2012.p.243-52. [CrossRef]
13. Amatuzzi MM, Fazzi A, Varella MH. Pathologic synovial plica of the knee. Results of conservative treatment. Am J Sports Med 1990;18(5):466-9. [CrossRef]
14. Fulkerson JP. Diagnosis and treatment of patients with patellofemoral pain. Am J Sports Med 2002;30(3):447-56. [CrossRef]
15. Kan H, Arai Y, Nakagawa S, Inoue H, Hara K, Minami G, et al. Characteristics of medial plica syndrome complicated with cartilage damage. Int Orthop 2015;39(12):2489-94. [CrossRef]
16. Nakayama A, Sugita T, Aizawa T, Takahashi A, Honma T. Incidence of medial plica in 3,889 knee joints in the Japanese population. Arthroscopy 2011;27(11):1523-7. [CrossRef]
17. Bellary SS, Lynch G, Housman B, Esmaeili E, Gielecki J, Tubbs RS, et al. Medial plica syndrome: a review of the literature. Clin Anat 2012;25(4):423-8. [CrossRef]
18. Hufeland M, Treder L, Kubo HK, Verde PE, Krauspe R, Patzer T. Symptomatic medial synovial plica of the knee joint: an underestimated pathology in young patients. Arch Orthop Trauma Surg 2019;139(11):1625-31. [CrossRef]
19. Lee PYF, Nixion A, Chandratreya A, Murray JM. Synovial Plica Syndrome of the Knee: A Commonly Overlooked Cause of Anterior Knee Pain. Surg J (NY) 2017;3(1):e9-16. [CrossRef]
20. Sauer S, Karlsen G, Miller L, Storm JO. Medial Plica Syndrome of the Knee: Arthroscopic Plica Resection versus Structured Physiotherapy-A Randomized Controlled Trial. Surg J (NY) 2022;8(3):e249-56. [CrossRef]
21. Blanke F, Oehler N, Al Aidarous H, Tischer T, Vogt S, Lenz R. Predictors for an unsuccessful conservative treatment of patients with medial patellar plica syndrome. Arch Orthop Trauma Surg 2021;141(1):93-8. [CrossRef]
22. Aspden RM, Yarker YE, Hukins DW. Collagen orientations in the meniscus of the knee joint. J Anat 1985;140(Pt 3):371-80.
23. Akyildiz F, Urguden M, Ozdemir H, Gur S, Altinel E. Arthroscopic treatment of symptomatic mediopatellar plica lesions: medium-term follow-up. Acta Orthop Traumatol Turc 1996;30(5):523-5.
24. Hardaker WT, Whipple TL, Bassett FH 3rd. Diagnosis and treatment of the plica syndrome of the knee. J Bone Joint Surg Am 1980;62(2):221-5. [CrossRef]
25. Jackson RW, Marshall DJ, Fujisawa Y. The pathologic medical shelf. Orthop Clin North Am 1982;13(2):307-12. [CrossRef]
26. Munzinger U, Ruckstuhl J, Scherrer H, Gschwend N. Internal derangement of the knee joint due to pathologic synovial folds: the mediopatellar plica syndrome. Clin Orthop Relat Res1981;(155):59-64. [CrossRef]
27. Richmond JC, McGinty JB. Segmental arthroscopic resection of the hypertrophic mediopatellar plica. Clin Orthop Relat Res 1983;(178):185-9. [CrossRef]
28. Vaughan-Lane T, Dandy DJ. The synovial shelf syndrome. J Bone Joint Surg Br 1982;64(4):475-6. [CrossRef]