Systematic Review of the Surgical Outcomes of Elbow Plicae

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Background: Surgical resection is usually required for symptomatic elbow plicae that have failed nonoperative therapy. However, evidence of surgical outcomes has not been presented.

Purpose: To review the surgical outcomes for the treatment of synovial plicae in the radiocapitellar joint.

Study Design: Systematic review; Level of evidence, 4.

Methods: We searched the PubMed, Ovid/MEDLINE, Cochrane Library, Google Scholar, and Embase databases using keywords as well as Medical Subject Headings terms and Emtree ([elbow OR humeroradial joint OR radiohumeral joint] AND [meniscus OR plica]) OR snapping elbow OR snapping triceps OR synovial fold syndrome OR synovial fringe) for English-language studies. We conducted a systematic review using PRISMA ( Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines.

Results: A total of 14 articles comprising four level 5 and ten level 4 studies were identified, including 279 patients (284 elbows). The triggering factors reported for 58 patients were heavy labor (29 patients; 50.0%), sporting activities (17 patients; 29.3%), and non-specific trauma (12 patients; 20.7%). Overall, 92 patients (33.0%) were administered a steroid injection before surgery. Arthroscopic plica resection was performed in 266 patients (95.3%). Intraoperatively, plicae were mostly found in the posterior (44.0%) and posterolateral (28.6%) sites, and chondromalacia of the radial head was observed in 25 patients (9.2%). Of the reported surgical outcomes, 67.7% showed a resolution of symptoms. However, 9.3% of patients had residual symptoms, which were likely associated with pre-existing radial head chondromalacia. The complication rate was reported as 1.8%.

Conclusion: Symptomatic elbow plicae were mostly treated arthroscopically, with most of the results being favorable. Pre-existing chondromalacia and the underestimation of concomitant intra-articular abnormalities may yield an inferior outcome.

Keywords: elbow plicae; synovial plicae; systematic review; surgical outcome

The synovial plica represents an asymptomatic remnant of the synovial membrane from embryological development.13,18 It has been shown to cover 28% of the radiocapitellar joint of the adult radial head.16 The plica is well established and reported in the knee joint rather than in the elbow joint. Normally, the synovial plica is without a function and is asymptomatic.13 The plica becomes symptomatic when it suffers from chronic inflammation secondary to repetitive trauma (sports); it later turns into a thickened fibrotic tissue fold.13,15 Moreover, the plica has been indicated as one of the sources of radiocapitellar joint snapping.6 Radiocapitellar snapping is not a common condition, and owing to its rarity, it is frequently misdiagnosed.2,3,14,24,25 Symptomatic synovial plicae are infrequently encountered as a cause of lateral elbow pain, and this condition has been variously termed as "plica,"2,17,25 "plica syndrome,"5 "synovial fold,"9,14 "synovial fringe,"6 and "elbow synovial fold syndrome."3,21

Surgical treatment is indicated when nonoperative treatment fails to relieve symptoms. The use of surgical treatment for symptomatic synovial plicae has been reported for over 30 years. Although surgical treatment is generally associated with favorable outcomes, studies continue to report on the incomplete resolution of symptoms.2,14,17,24,29 This systematic review primarily aimed to define the functional outcomes of surgical treatment for symptomatic synovial plicae. Secondary objectives included defining intraoperative findings and abnormalities that may be associated with inferior results.

METHODS

Search Strategy and Study Selection

This systematic review was performed according to PRISMA ( Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The PubMed, Embase,
Cochrane Library, Ovid/MEDLINE, and Google Scholar databases were electronically searched using keywords conforming to Medical Subject Headings to find relevant articles. Natural keywords were chosen to increase sensitivity: (elbow OR humeroradial joint OR radiohumeral joint) AND (meniscus OR plica) OR snapping elbow OR snapping triceps OR synovial fold syndrome OR synovial fringes). The number of studies was limited; thus, there were no restrictions on specific surgical procedures, publication status, or study periods. After eliminating duplicate articles, 2 independent reviewers (E.K., A.N.) examined the titles and abstracts to select the first candidates; they then selected the final articles through a full-text review. We also conducted citation tracking in the reference lists of the retrieved studies to identify additional related articles. Any disagreement that arose in the selection process was resolved by a group discussion or intervention by a third reviewer (H.K.). Figure 1 displays the flow of study selection.

Inclusion and Exclusion Criteria

All included studies contained original data published in the English language on patients undergoing surgical procedures for symptomatic synovial plicae. Included studies reported on the type of surgery, intraoperative findings, and outcomes and complications of surgery. Studies on imaging techniques, skeletally immature patients, and cadaveric specimens were excluded.

Quality Appraisal and Risk of Bias

There were 5 reviewers (E.K., H.L., A.N., H.K., and D.M.K.) who independently reviewed each article and decided whether to include or exclude any study based on a discussion and consensus. The level of evidence of each study was determined according to the criteria set by the Oxford Centre for Evidence-Based Medicine.12 The inclusion or exclusion decisions were discussed with 2 expert orthopaedic surgeons (K.H.K. and I.-H.J.) specializing in elbow surgery. The Methodological Index for Non-Randomized Studies (MINORS) tool28 was used to assess the risk of bias of each study. This tool comprises 8 items for comparative studies. Figure 2 shows the distribution of MINORS scores and the range considered high-quality studies with a low risk of bias, exceeding 60% of the total score.2-4,14,17,23-25,29

RESULTS

In the first step, 243 articles were retrieved for initial screening; the titles and abstracts of these articles were examined for duplication. Conference abstracts were excluded from the review. Full-text reviews of 50 articles helped in identifying 14 articles (4 with evidence level 5 and 10 with evidence level 4 studies) for the systematic review.

Study Quality Assessment

The mean MINORS score was 9.9 ± 1.2. There were no comparative studies. Article and Demographic Characteristics

The 14 chosen studies included 279 patients (284 elbows) who had undergone surgery for elbow synovial plicae (Table 1). The study populations included 175 men (62.7%) and 104 women (37.3%). Furthermore, 10 of 14 studies had over 12 months of mean follow-up time.2-4,9,14,17,23,25,29,30

The initial diagnoses were lateral epicondylitis (157 patients; 56.3%)14,23-25 and loose bodies (12 patients;
Preoperative Characteristics

Nearly all patients (90.7%) had pain as the main symptom. Mechanical symptoms such as locking, clicking, catching, popping, and snapping were described for 157 patients (56.3%). However, the type of mechanical symptoms was not specified for 121 patients (77.1%). Preoperative ROM was reported in 149 patients (53.4%). Of the reported studies, ROM was found to be a deficit in 23 patients (15.4%). Standard plain elbow radiographs had been taken for most patients. However, only 70.6% (197/279) of patients had undergone magnetic resonance imaging (MRI); of the 197 patients who underwent MRI, 76 (38.6%) provided details on the MRI examination, including 66 patients (86.8%) with abnormal findings and 10 (13.2%) with normal findings. The abnormal findings were mostly described as thickened plicae, which had been measured in 56 patients (5 studies). A thickness greater than 3 mm was considered a considerable contribution. A local steroid injection was documented in 92 patients (33.0%). Steroid was administered as a single shot in 93.4% of cases and repeated in 6.6% of cases. Table 2 summarizes the preoperative characteristics of these patients. In addition, 2 articles described the causes of failed nonoperative treatment, which were impingement of the plica structure and possible chondral changes involving the adjacent cartilage.

Intraoperative Characteristics

In total, 271 patients (97.1%) underwent surgical interventions. The most common type of surgery was arthroscopic plica resection in approximately 95.3% of cases. Only 1 patient underwent open plica resection. Moreover, 4 patients (1.5%) with arthroscopic plica resection underwent additional procedures; for 3 of them, the additional procedure was concurrently performed and unrelated to snapping plicae. However, 1 patient had a redundant plica despite resection. The redundant plica was then sutured back to the olecranon with a suture anchor. Thickened synovial plicae were described in 271 patients (97.1%). Associated intra-articular abnormalities were described as synovitis (35 patients; 12.9%) and chondromalacia of the radial head (25 patients; 9.2%) and capitellum (9 patients; 3.3%). Overall, 4 studies provided histological findings for 13 patients with

Figure 1. PRISMA (Preferred Reporting Items for Systematic Meta-Analyses) guidelines used for article selection.
resected specimens, which were described as chondroid metaplasia of the synovial fold, synovitis, and fibrous tissue. The intra-articular location of synovial plicae was specified in 84 patients. The locations of synovial plicae in respective order were posterior (44.0%), posterolateral (28.6%), anterolateral (4.8%), anteroposterior (4.8%), and anterior (1.2%). Table 3 summarizes the intraoperative characteristics of these patients.

Postoperative Outcomes

Of 265 patients with postoperative ROM descriptions, 36 (13.6%) reported improvements in ROM. Only 1 patient had a 20° flexion deficit due to pain. The remaining patients showed no changes in ROM after surgery. Overall, 6 studies (247 patients; 88.5%) provided functional outcome scores, ranging from good to excellent. Of 218 patients with descriptions of residual symptoms and recurrences, 26 (11.9%) had residual symptoms, and 1 (0.5%) had a recurrence of symptoms. The residual symptoms were varied and were mainly described as pain and mechanical symptoms. The status of return to activity (sports or work) was described in 140 patients. Most of the patients were able to return to activity (137 patients; 97.9%). Of 109 patients, 70 (64.2%) reported that they were satisfied after surgical treatment. However, 39 patients (35.8%) were dissatisfied after surgical treatment. There were 3 studies that provided the reasons for remaining symptoms: the presence of chondromalacia of the radial head, the underestimation of intra-articular abnormalities during imaging with ultrasonography, and scar formation after previous surgical interventions. Complications were reported in 5 patients (1.8%) as revision surgery (1 patient), posterolateral rotatory instability (1 patient), medial elbow instability (1 patient), and a superficial wound infection resolved by oral antibiotic administration (2 patients). Table 4 summarizes the postoperative outcomes.

DISCUSSION

The most important finding of this study was that surgical resection of symptomatic synovial plicae showed favorable results. This systematic review included 3 components associated with the surgical outcome: misdiagnosis, investigation, and prognosis.

Thickened plicae have been linked to overuse injuries and trauma and introduced as a source of lateral elbow
The lateral aspect of the elbow. However, nessed as lateral epicondylitis because of the similar pain to ignore a history of overuse injuries in this clinical con-
tity, as shown in this review. Therefore, it is not advisable to m sos, which a re m ore provoking in the dominant extremity, as shown in this review. Therefore, it is not advisable to ignore a history of overuse injuries in this clinical condition. Symptomatic synovial plicae can easily be misdiagnosed as lateral epicondylitis because of the similar pain location at the lateral aspect of the elbow. However, tenderness at the posterolateral soft spot may serve as a hint to differentiate plica syndrome from lateral epicondy-
litis. In cases where lateral epicondylitis coexists with symptomatic synovial plicae, the source of lateral elbow pain will be difficult to establish. An anatomic study has shown that the synovial plica is a continuation of the an- enthesis. This systematic review showed that sports activities and heavy labor may serve as triggering factors. Although nonspecific, traumatic events may be responsible for triggering factors. This suggests that an injury, including repetitive microtrauma from overuse, can cause symptomatic synovial plica syn-
drome. As a result of repetitive microtrauma, the plica may become inflamed, which explains thickening of the structure. Thickened plicae are most likely compressed between adjacent articular surfaces (capitellum and radial head); these illustrate pain and snapping as symp-
toms, which are more provoking in the dominant extremity, as shown in this review. Therefore, it is not advisable to ignore a history of overuse injuries in this clinical condition. Symptomatic synovial plicae can easily be misdiagnosed as lateral epicondylitis because of the similar pain location at the lateral aspect of the elbow. However, treatment has always been the preferred method of treatment of symptomatic synovial plicae. Some studies suggest nonoperative therapy for at least 2 or 3 months before trying surgical interventions. However, the exact cutoff period of nonoperative treatment remains inconclusive. This systematic review showed that most studies tend to proceed with operative treatment when
nonoperative methods fail to show an improvement in 6 months. A history of steroid injections is perhaps the most interesting issue to be discussed. Although most studies did not clarify the protocol for steroid injection use, it was indicated as a diagnostic tool for the treatment of lateral epicondylitis by Ruch et al.²⁵ and as nonoperative treatment of lateral epicondylitis by Antuna and O’Driscoll.² Snappl extending snapping synovial plicae, except that they are used predominantly to describe this condition because of the existence of a spectrum of symptoms.³,²¹ Preoperative imaging has been helpful as a diagnostic tool.

Snapping synovial plicae can be misdiagnosed as lateral epicondylitis, intra-articular loose bodies, and snapping of the triceps tendon.²³ This review showed that 3 main symptoms describe snapping synovial plicae: (1) lateral elbow pain; (2) mechanical symptoms; and (3) ROM deficit, particularly extension. The first 2 symptoms are motion dependent. Lateral elbow pain presented in all cases can be explained by the presence of nerve fibers in the folds as well as the release of cytokines and other inflammatory mediators.⁶ Therefore, the term “elbow synovial fold syndrome” or “plica syndrome of the elbow” may be appropriate to describe this condition because of the existence of a spectrum of symptoms.²,²¹ Preoperative imaging has shown that plain radiographs are not very helpful in diagnosing snapping synovial plicae, except that they are used to exclude intra-articular loose bodies.¹,²,⁶,¹⁴,¹⁷,²¹,²⁹,³⁰

Snappl synovial plicae can be considered internal derangement of the elbow joint; therefore, MRI will be very helpful as a diagnostic tool.⁶ MRI is an excellent tool to detect the structure of synovial plicae; however, it cannot distinguish pathological plicae from normal plicae. In their

TABLE 2
Preoperative Characteristics²⁶

| Author (Year) | Pain | Mechanical Symptoms | Description of Mechanical Symptoms | Preoperative ROM | Radiological Examination | Radiological Findings | Previous Steroid Injection or Surgery |
|---------------|------|---------------------|------------------------------------|------------------|--------------------------|-----------------------|--------------------------------------|
| Clarke⁵ (1988) | Yes | Yes | Locking | Clicking, reproducible locking | Full | Radiography | Radiography | Normal | Loose body in anterior compartment |
| Antuna² (2001) | Yes | Yes | Snapping | (7 [50.0%] were reproducible) | Within normal limits | Radiography | Radiograph, MRI | Normal | Radiography: normal; pneumoarthrography: intra-articular cord in radiohumeral joint |
| Clarke⁶ (1988) | Yes | Yes | Locking | Clicking, reproducible locking | Full | Radiography | Radiography | Normal | Radiography: normal; MRI: normal in 5 patients and mild edema of annular ligament in 1 patient |
| Awaya³ (2001) | No | Yes | Locking | NA | MRI | Synovial plicae with thickness of 3.1 mm (range, 2-5 mm), projecting focal fat pad superoposterior to olecranon recess |
| Rush²⁴ (2006) | Yes | Yes | Snapping | 7 (70.0% had full, 3 (30.0% had extension deficit of 7-20°) | NA | MRI | Synovial plicae with thickness of 3.1 mm (range, 2-5 mm), projecting focal fat pad superoposterior to olecranon recess |
| Kim¹⁴ (2006) | Yes | Yes | Snapping, clicking, catching | Extension-flexion: 6°-138°; pronation-supination: 55°-85° | Radiography, MRI | MRI: 5 (41.7%) | Radiography: NA; MRI: 9 (75.0%) with abnormal plicae (>3 mm in thickness, irregular or nodular in appearance) |
| Tatsihi²⁸ (2006) | Yes | Yes | Snapping | Extension-flexion: 0°-135°; pronation-supination: 90°-90° | Right elbow: radiography, MRI, RCL, left elbow: NA | Radiography: normal; MRI: triangular tissue extruding from articular capsule at anterior portion of radiohumeral joint; MRA: protruding shadow whose location matched with MRI result |
| Steinaer²⁹ (2010) | Yes | Yes | Snapping | Full | Radiography, MRI | Radiography: normal; MRI: thickened synovial plicae (>3 mm in thickness) in 2 patients |
| Rajeev²⁵ (2015) | Yes | Not described | NA | MRI (No. of patients not specified) | Radiography, MRI | Radiography: normal; MRI: meniscus-like synovial plicae |
| Brada Pedersten²⁸ (2017) | Yes | Yes | Catching, snapping | 7 (11.7%) had decreased ROM (not specified) | US | None |
| Natwa²⁷ (2018) | Yes | No | NA | Full | Radiography, MRI, MRA | Radiography: MRI: normal; MRA: posterolateral joint capsule tear and adjacent synovial hypertrophy |
| Feller²⁸ (2018) | Yes | Yes | Snapping | Full | MRI, US | Radiography, MRI | Radiography: normal; MRI: meniscus-like synovial plicae (mean thickness, 3.7 ± 1.0 mm; mean mediolateral length, 9.4 ± 1.6 mm; mean anteroposterior length, 8.2 ± 1.7 mm) |
| Lee²⁵ (2018) | Yes | 10 (50.0%) | Catching, snapping | 6 (30.0%) had mild extension deficit of 5°-20° | MRI | Radiography, MRI | Radiography: NA; MRI: meniscus-like synovial plicae (mean thickness, 3.7 ± 1.0 mm; mean mediolateral length, 9.4 ± 1.6 mm; mean anteroposterior length, 8.2 ± 1.7 mm) |
| Park²¹ (2019) | 6 (25.0%) | 9 (37.5%) | Catching, snapping | 6 (25.0%) had extension deficit of 12°-20° | MRI | Synovial plicae with thickness of 3.1 mm (range, 2-5 mm), projecting focal fat pad superoposterior to olecranon recess |

²ECRB, extensor carpi radialis brevis; LE, lateral epicondylitis; MRA, magnetic resonance arthrography; MRI, magnetic resonance imaging; NA, not available; PIN, posterior intersosseus nerve; RCL, radial collateral ligament; ROM, range of motion; US, ultrasonography.

References 2, 3, 9, 14, 17, 21, 23, 24, 29, 30.
study on the value of MRI in establishing symptomatic plica,

Lee et al.27 found that the mean thickness of a patholog-

cica was 3.7 mm. However, Ruiz de Luzuriaga et al.26 re-
ported that a plica would be considered pathological when it was thicker than 2.6 mm, which was compared with a control group with an average of 1.8 mm.23 Hence, given the inconclusive findings, the cutoff thickness of a pathological plica is yet to be defined. MRI is also valuable to locate the position of plicae vis-à-vis the radial head quadrant. No consensus exists on the position of plicae and whether they can be considered symptomatic. However, considering the findings of this systematic review and the thickness of plicae, we can argue that plicae located in the posterior to lateral quadrant, which constituted up to 89.3% of the symptomatic plica, may be related to symptoms. MRI plays a major role in preoperative imaging, mainly because of its ability to detect the structures, dimensions, and positions of plicae in their relative coverage area to the radial head. It can also detect the secondary signs of concurrent abnormalities by assessing synovitis and possible chondral changes,14 which may be suggestive of snapping plicae. Considering its noninvasive nature, MRI is helpful as an initial examination vis-à-vis arthroscopic surgery as a gold standard of diagnostic tools.

Most of the surgical resection procedures of symptomatic plicae were arthroscopically performed owing to its for diagnosing intra-articular abnormalities. Histological descriptions of pathological plicae are rare, as reported by only 4 studies1,3,6,30; they resemble the medial plica presented in the knee joint, which also showed the presence of synovitis, deep fibrosis, and metaplasia of plicae.8,27 A history of blunt trauma may cause metaplasia of plicae,8,27 which was reported by 5 studies.2,6,17,23,29 We postulate that elastic synovial plicae turn into a thickened inelastic structure because of fibrotic and metaplastic changes; hence, these should be considered a precursor of plica syndrome, which is also shown in the knee joint.27

This systematic review illustrates the necessity of establishing a standard outcome measurement tool. Interestingly, although several outcome measurement tools were used, only the modified elbow scoring system included mechanical symptoms as one of the measured parameters.
### TABLE 4
Postoperative Outcomes a

| Author (Year) | Outcome Measurement Tool | Functional Score | Postoperative ROM | Symptom Resolution | Recurrent/Residual Symptoms | Return to Work/Sports | Satisfaction | Complications or Revision Surgery | Reason for Partial Improvement |
|---------------|--------------------------|------------------|-------------------|--------------------|----------------------------|-----------------------|-------------|----------------------------------|------------------------------|
| Clarke a (1988) | DASH, MEPS | DASH preoperative: 36.6, DASH not available; NR, not reported | NA | Yes | 1 (33.3%); NR for 2 (66.7%) | NA | No | – | – |
| Akagi1 (1998) | None | NA | NA | Yes | 2 (66.7%) | NA | No | – | – |
| Antuna2 (2001) | None | NA | No | Same as preoperative (within normal limits) | No | 4 (28.6%); 2 with residual mild pain with strenuous use of elbow, 1 with mild PLRI, 1 with recurrence of symptoms | NA | No | – | – |
| Feller9 (2018) | None | NA | Yes | 10 (71.4%) | Yes (at 3 mo) | 9 (64.3%) much better, 3 (21.4%) better, 2 (14.3%) same | NA | No | – | – |
| Rajeev24 (2015) | Modified elbow scoring system | Full | Extension- flexion: 2°-130°; pronation- supination: 80° -88° | 6 (50.0%) | 2 (16.7%); 1 with residual snapping, 4 (33.3%) with residual pain | 11 (91.7%) | All satisfied | 1 (8.3%) with UCL reconstruction due to medial elbow instability | – |
| Steinert29 (2010) | None | NA | NA | Full | 2 (66.7%) | 1 (33.3%) with residual pain | Yes | NA | All satisfied | – |
| Aways1 (2001) | None | Full | Full | 118 (97.5%) | 3 (2.5%) with residual pain | Mostly | NA | 2 (1.7%) with superficial wound infection resolved with oral antibiotics | – |
| Kim14 (2006) | MEPS | 92.5 (75-100) – excellent | Extention- flexion: 3°-135° (130°); full pronation- supination | 1 (7.7%) with 20° flexion deficit (due to pain) | NA | NA | NA | 27 (45.0%) | – |
| Tateishi28 (2006) | None | NA | NA | Full | 8 (40.0%) | 12 (60.0%) | NA | 7 (35.0%) | No | – |
| Brahe Pedersen4 (2017) | OES Preoperative: 19 (17-20), postoperative: 35 (32-38) | 1 (1.7%) with 20° flexion deficit (due to pain) | NA | NA | NA | 27 (45.0%) | – | – |
| Natwa3 (2018) | None | NA | NA | Extension deficit | NA | 8 (40.0%) | Yes | Yes (at 3 mo) | NA | No | – |
| Feller9 (2018) | None | None | None | Extension deficit | NA | 8 (40.0%) | Yes | Yes (at 3 mo) | NA | No | – |
| Lee17 (2018) | MEPI, VAS, DASH | MEPI preoperative: 89 – good; DASH preoperative: 26, DASH postoperative: 14.1; VAS preoperative: 6.3; VAS postoperative: 1 | Extension deficit | 20 (83.3%) | 1 (4.2%); with intermittent snapping | 20 (83.3%) | NA | No | – |

aDASH, Disabilities of the Arm, Shoulder and Hand; MEPI, Mayo Elbow Performance Index; MEPS, Mayo Elbow Performance Score; NA, not available; NR, not reported; OES, Oxford Elbow Score; PLRI, posterolateral rotatory instability; ROM, range of motion; UCL, ulnar collateral ligament; US, ultrasonography; VAS, visual analog scale.

Data are shown as mean or mean (range).

The mechanical symptom is a major presenting symptoms despite pain. Accordingly, we strongly recommend using the modified elbow scoring system for clinical assessments. Despite the heterogeneity of the outcome measurement tools used in the studies presented in this review, surgical resection of symptomatic synovial plicae showed good to excellent results. This review showed that removing plicae will most likely help with symptom resolution. In patients with partial resolution, pain and mechanical symptoms were reported as common residual symptoms. 2,14,17,23,24,29

The reason for partial resolution was rarely discussed, despite the potential implications of this decision. In this review, however, we postulate that having associated chondromalacia and failing to identify associated elbow abnormalities are reasons for partial resolution. This assumption is supported by other studies that argue that surgical resection of the medial plica of the knee joint yields better clinical outcomes without coexisting cartilage lesions. 22 Therefore, attempts to establish direct correlations between favorable results of surgical treatment are questionable mainly because many confounding factors are at play in associated intra-articular abnormalities, which may affect prognoses. 17,20 We also suggest that an assessment of the possible chondral changes on preoperative MRI might be worthwhile before surgical treatment. Another notable concern about surgical resection of plicae is whether they will grow back after incomplete resection (division), as reported for knee joints. 8,16 This systematic...
review was unable to address this concern in the elbow joint. This systematic review revealed an interesting point regarding the satisfaction rate and residual symptoms. Although only approximately 9.3% of patients had residual symptoms, 35.8% were dissatisfied after the surgical procedure. It is unclear how the satisfaction rate was associated with residual symptoms. For example, 1 study described that a patient was satisfied with undergoing surgery. However, the patient also stated that if he could choose again, he would not have undergone the surgical procedure. Furthermore, not all studies provided details of each patient, which prevents a direct association between the satisfaction rate and residual symptoms. Moreover, the literature has reported that the satisfaction rate has been shown to be influenced by many factors, including clinical care, patient outcomes, and hospital/surgical experience. This could explain the reason for dissatisfaction in the absence of complications.11

Limitations

This review has some limitations. First, none of the studies had a control group to enable a comparison of the effects of nonoperative treatment of elbow plicae. Second, data from the included studies were collected retrospectively. Third, the studies’ outcome measurement tools were heterogeneously reported, preventing a direct comparison of outcomes and undermining the need for standardized methods. Last, only 7 studies were classified as high-quality studies based on the MINORS criteria.

CONCLUSION

Plica resection yields favorable outcomes when a thorough diagnostic approach is used to exclude coinciding morbidity. Coexisting chondromalacia and the failure to identify concomitant intra-articular abnormalities may be associated with inferior results. The variability in outcomes assessed in previous studies necessitates the immediate requirement of a consensus on reporting functional outcomes after surgical resection of plicae.

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