

## ORIGINAL ARTICLE

# The Treatment of Simple Elbow Dislocation in Adults

A Systematic Review and Meta-analysis

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## SUMMARY

**Background:** Simple elbow dislocation is a complex soft-tissue injury that can cause permanent symptoms. Its incidence is 5 to 6 cases per 100 000 persons per year. Its proper treatment is debated; options range from immobilization in a cast to surgical intervention.

**Methods:** We systematically reviewed the literature on the treatment of simple elbow dislocation and performed a meta-analysis, primarily on the basis of clinical scores and secondarily with respect to pain, range of motion, and return to work.

**Results:** A randomized controlled trial (RCT) showed that clinical results at short-term follow-up were superior for early functional treatment compared to immobilization in a cast. Brief immobilization, however, reduced pain initially, and the long-term results of early mobilization and immobilization in a cast were the same. Our meta-analysis showed that early mobilization enables patients to return to work earlier (difference of mean values  $-2.91$ , 95% confidence interval [CI]  $-3.18$  to  $-2.64$ ), and that the extent of soft-tissue injury is correlated with the clinical outcome (inverse relationship; difference of mean values  $-12.07$ , 95% CI  $-23.88$  to  $-0.26$ ). Surgical and conservative treatment were compared in a single RCT, which revealed no significant difference in outcomes. A meta-analysis of two retrospective comparative studies showed no advantage of immediate ligament repair over delayed surgery.

**Conclusion:** Early functional treatment is the evidence-based therapeutic standard for simple elbow dislocation. The past few years have seen further developments in surgery for simple elbow dislocation. Further study is needed to determine whether surgery for elbow dislocation with high-grade instability can prevent persistent pain, limitation of motion, and chronic instability.

### ► Cite this as:

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The anatomy of the elbow is complex. Sufficient stability is essential to elbow functionality and is provided by soft tissue structures as well as bony structures. Knowledge of this complex anatomy is important in recognizing injury patterns in elbow dislocation, especially as it is the second most common dislocation after shoulder dislocation, with an incidence of 5 to 6 per 100 000 (1–4). There are a number of mechanisms of dislocation (5, 6); most are posterior dislocations. O’Driscoll et al. (7) performed biomechanical analysis regarding posterolateral elbow dislocation and postulated that it is initiated by a rupture of the lateral ulnar collateral ligament (LUCL). This results in posterolateral rotatory instability, causing the forearm to displace into external rotation and circumferential tearing of the capsuloligamentous structures to occur from lateral to medial (*Figure 1*).

Standard treatment consists of conservative therapy involving short-term immobilization of the joint followed by functional aftercare. However, thanks to scientific advances options for surgical reconstruction of the soft tissues of the elbow have multiplied in recent years (8–18), so discussion of standard treatment for simple elbow dislocation has been rekindled.

Review articles already published on simple elbow dislocation (19, 20) found no difference between surgery and conservative therapy but included in their analysis only one randomized controlled trial comparing the two—dating from 1987 (21). Regarding conservative therapy, they also leave unclear whether early functional therapy is superior to plaster cast immobilization.

This systematic review therefore aims to analyze outcome following conservative therapy or surgery on the basis of clinical and patient-centered parameters, in order to draw conclusions for the treatment of simple elbow dislocation.

## Methods

### Inclusion criteria

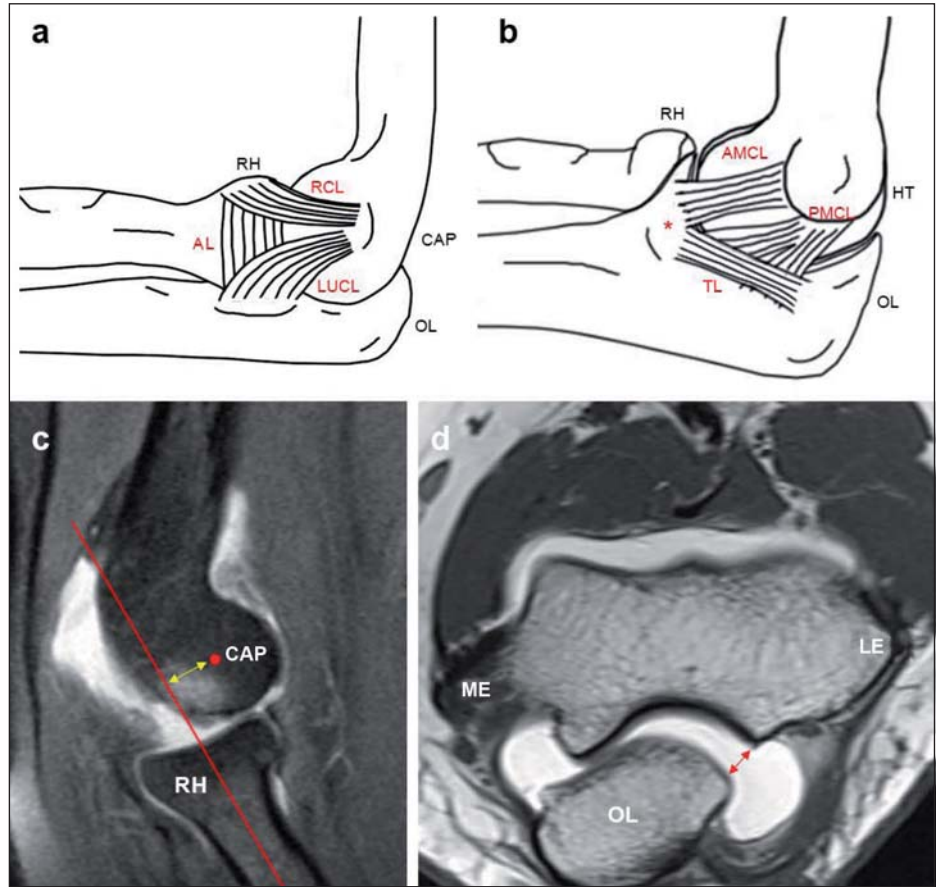
The systematic review was structured according to the PRISMA Checklist (22). A search was performed for randomized controlled trials involving clinical

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**Figure 1: Ligaments of the elbow**

- a) Lateral view. The lateral collateral ligament is divided into the lateral ulnar collateral ligament (LUCL, stabilizer against posterolateral translation) and the radial collateral ligament (RCL, stabilizer against varus stress). Both portions insert on the annular ligament (AL).
- b) Medial view. The medial collateral ligament is divided into an anterior (AMCL) and a posterior (PMCL) bundle. The AMCL is an important stabilizer against valgus stress and inserts on the anteromedial facet of the coronoid process (\*). The PMCL has a fan-shaped insertion on the olecranon (OL). There is also a transverse ligament (TL).
- c) Sagittal MRI section in joint instability. The longitudinal axis of the radial head (RH) (red line) is projected dorsally to the center of rotation (red dot) of the distal humerus. The yellow double-headed arrow shows the extent of posterolateral subluxation of the radial head.
- d) Axial section at the level of the coronoid tip. The ulnohumeral joint is decentered with radially separated joint space (red double-headed arrow).

AL, annular ligament; OL, olecranon; RH, radial head; HT, humeral trochlea; CAP, capitulum; ME, medial epicondyle; LE, lateral epicondyle



investigation of conservative therapy and/or surgery for acute, simple elbow dislocation in adults. Two types of study were included: studies comparing surgery to conservative therapy, and those comparing different conservative therapies or different surgeries. Retrospective comparative analyses were also included. Publications written in German, English, or French were included.

**Exclusion criteria**

Exclusion criteria were concomitant bone injuries comprising complex elbow dislocation and studies in children. Case reports, review articles, and anatomical, biomechanical, and experimental investigations were not included in the evaluation.

**Search strategy**

Electronic databases (MEDLINE and EMBASE) were searched via the DIMDI search engine on December 2, 2014 using the search string “(dislocat\* OR instability OR luxat\* OR subluxat\* OR unstable OR stable OR stability) AND (elbow\* OR radiohumeral OR ulnohumeral OR radioulnar).”

In addition, the references of the included fulltext articles and available review articles (19, 20) were searched for further articles that met the inclusion criteria.

**Study selection**

In order to include and exclude studies according to the criteria stated above, two reviewers (MH and FB) searched the titles and abstracts of all identified publications and, where necessary, the fulltext of each article. Discrepancies were resolved by discussion with a third reviewer (LPM).

**Data extraction**

The data from all included articles was analyzed by two reviewers (MH and KW). Uncertainties were resolved in collaboration with a third reviewer (LPM). Clinical scores (Mayo Elbow Performance Index [23], Broberg and Morrey score [24], QuickDASH [25], and Oxford Elbow Score [26]) were defined as primary outcome parameters. Secondary outcome parameters were range of motion, subjective pain perception according to a visual analogue scale, and time to return to work.

The risk of bias (RoB) in the included studies was analyzed by two reviewers (MH and KW) using the Cochrane Risk of Bias Tool (27) (Table 1).

**Statistical analysis**

Statistical meta-analysis was performed using Review Manager (RevMan) (version 5.3, Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2014). For dichotomous data, the effects of different

**TABLE 1**

**Forms of bias (systematic error)**

Form	Explanation	Example
Performance bias	Insufficient blinding of study patients may lead staff to give better medical care to one patient group, consciously or unconsciously.	A patient who has undergone surgery receives closer medical attention (more physiotherapy, occupational therapy, etc.) than a patient who has received conservative therapy. This may make surgery appear more beneficial.
Selection bias	Faulty blinding may lead to a systematic difference between patient groups on enrolment.	A young, active patient receives early functional therapy because he/she refuses immobilization. This may make early functional therapy appear more beneficial.
Attrition bias	A systematic error in study results caused by loss of follow-up data.	Patients who are dissatisfied with their treatment are more likely to interrupt their treatment and be lost to the study. The outcomes of this patient population are therefore falsely evaluated as positive.
Reporting bias	Bias caused by selective reporting of results.	A doctor prefers surgery and therefore consciously or unconsciously biases the study results because he/she tends to evaluate the clinical outcomes of patients who have undergone surgery more positively than those who have received conservative therapy.
Recall bias	Systematic error caused by study participants recalling earlier events incorrectly.	Retrospectively, a patient has insufficient recollection of his/her level of pain and range of motion before surgery. The information he/she provides, which may be false, leads to a bias in the study results.

therapies were given as a relative risk (RR). For continuous data, mean differences or standardized mean differences were calculated. A 95% confidence interval was selected.

**Results**

**Search of the literature**

Figure 2 provides an overview of the search of the literature.

**Conservative therapy**

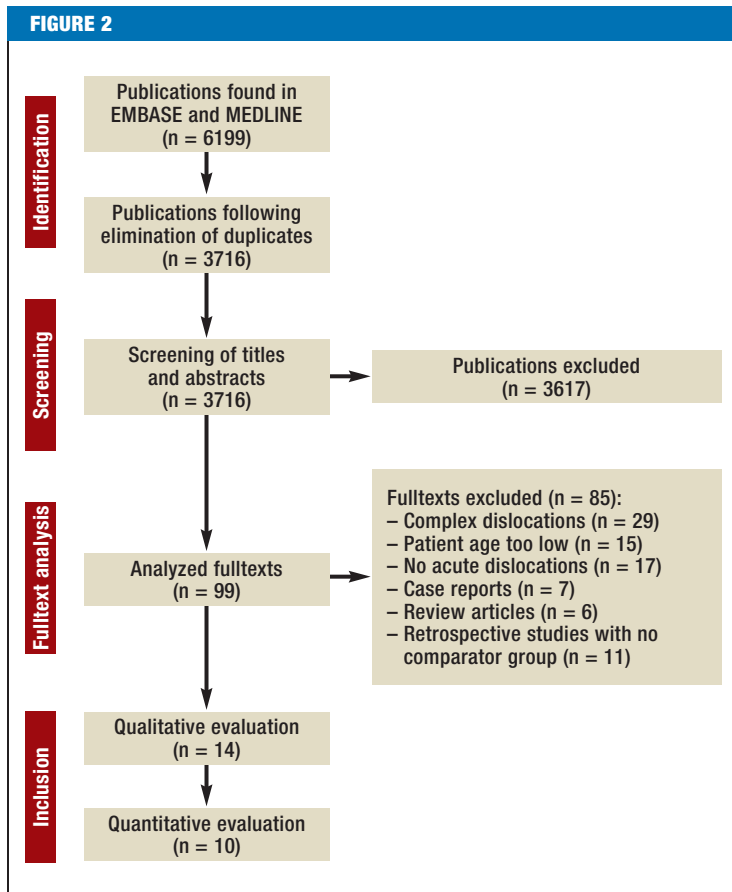
Rafai et al. (28) conducted a randomized controlled trial in 50 patients with simple posterior elbow dislocation. In the first group ( $n = 26$ ) the elbow was immobilized for three weeks following closed reduction, and in the second ( $n = 24$ ) early functional therapy was provided starting on day 3 (Table 2). After 12 months' follow-up, there was a remaining extension deficit in 4% of the patients in group 2, versus 19% in group 1. No other primary or secondary outcome parameters were evaluated. Statistical evaluation is completely absent. Retrospectively, no significant difference between the groups can be established in terms of remaining movement limitations on the basis of this data (RR = 0.22; 95% confidence interval [95% CI]: 0.03 to 1.72) (19, 20). There is a high risk of performance bias and an unclear risk of all other RoB criteria.

In 2010 de Haan et al. registered the FuncSiE trial (29). This was a multicenter randomized controlled trial, and between August 2009 and September 2012 one hundred patients with simple elbow dislocation were enrolled. The results were presented at the SECEC Congress in September 2014 but have not

yet been published. Patients in group 1 received early functional therapy, and those in group 2 were immobilized in plaster casts for three weeks. After 12 months there were no significant differences regarding primary or secondary outcome parameters. Patients in group 2 had significantly worse Quick-DASH scores and range of motion (range  $102^\circ$  versus  $121^\circ$ ) ( $p < 0.05$ ) after six weeks only. There was a significantly lower level of pain in patients in group 2 ( $p < 0.05$ ) at the first follow-up appointment, after one week, only. The risks of attrition bias and reporting bias are assessed as low. The risk of performance bias is rated as high, as there was no blinding of the investigator. Patients expected to experience subsequent difficulties were not included in the study. This may have led to selection bias (unclear risk).

A total of 178 patients underwent follow-up in four retrospective comparative studies after conservative therapy involving immobilization or early functional treatment for simple elbow dislocation (30–33).

Maripuri et al. (30) and Mehlhoff et al. (31) found that longer immobilization of the joint was associated with worse outcomes. Although in the population investigated by Schippinger et al. (32) patients with early mobilization had better absolute values for clinical scores, the difference was not significant. Riel et al. (33) also failed to find a significant difference between patient groups. Immobilization of the elbow, however, did lead to a doubling of recovery time. Table 3 presents a meta-analysis of these studies. This shows a significantly shorter absence from work, slightly better clinical scores, and less pain with early functional therapy.



Flow diagram of literature search and analysis

Eygenmaal et al. (34) performed a retrospective analysis of 50 patients who had suffered elbow dislocation. The mean time of follow-up was 108 months. Persisting medial instability ( $n = 24$ ) was found to be a predictor of poor MEPI scores ( $p = 0.002$ ) and residual pain ( $p = 0.04$ ).

All RoB criteria except selective outcome reporting are rated as high in all retrospective studies.

**Conservative therapy versus surgery**

The only randomized controlled trial comparing surgery to conservative therapy following simple elbow dislocation was published in 1987 by Josefsson et al. (21). In this, 30 patients were enrolled and randomized to two groups (Table 4). Group 1 ( $n = 15$ ) received immobilization of the affected joint for three weeks, while the other 15 patients (group 2) received surgery. Group 2 achieved poorer mobility after 12 months' follow-up, with a mean extension deficit of  $18^\circ$  versus  $10^\circ$  in group 1. The difference was not significant (19, 20).

This trial also included stability testing under anesthetic after a mean of four days. There was substantial instability and a strong tendency to recurrent dislocation in 11 elbows (five from group 1, six from group 2). In follow-up, they showed a mean exten-

sion deficit of  $20^\circ (\pm 19^\circ)$ . The authors state that there was no significant difference between the two groups in this subpopulation, and that there was no significant difference between these 11 patients and the rest of the study population. No statistical significances were given, and they can no longer be evaluated retrospectively due to the limited amount of data presented for the study. This study has a high risk of performance bias and an unclear risk of selection bias. The risks of attrition and reporting bias are rated as low.

**Surgery**

Four retrospective comparative studies with a total of 62 patients were used to analyze the effect of degree of severity of soft tissue injury (10–13) (Table 4). The mean follow-up time of these studies ranges from nine to 32.5 months. Only the study by Kim et al. (12) shows significantly worse MEPI scores for patients with bilateral collateral ligament injury than for patients with unilateral, usually lateral, collateral ligament injury. Meta-analysis of the MEPI scores in these four studies shows no significant difference (Table 3). None of the four individual studies shows a significant difference between groups in terms of range of motion. However, when combined there is slight significance in favor of patients with unilateral ligament injury achieving better range of motion following surgery.

Two trials compared outcomes following surgery according to time of surgery (16, 18). They compared outcomes following acute ligament repair (less than 30 days after injury) to those following delayed ligament repair (more than 30 days after injury). No significant difference was found between patients' Mayo Elbow Performance Index scores or their range of motion in either the individual studies or the meta-analysis of both studies combined (Table 3).

In addition to a high risk of selection, attrition, and performance biases, these retrospective studies also have a very high risk of recall and reporting biases.

**Discussion**

**Conservative therapy as standard treatment**

Despite its name, simple elbow dislocation is a complex injury of the capsuloligamentous structures. The results of the meta-analysis show that severity of soft tissue injury is correlated with prognosis, although the extent to which conclusions can be drawn from the studies on this subject is limited by their retrospective design (10–13, 34).

The study conducted by de Haan et al. (29) and registered in 2010, the results of which were presented at a conference in 2014 but have not yet been published, support conservative therapy as standard treatment. It shows that early functional therapy should be preferred because, at least in the short term, it provides better outcomes in terms of clinical scores, range of motion, and fitness for work and is not associated

TABLE 2

Summary of included studies on conservative therapy for simple elbow dislocation

Author	Year	SD	n	FU	INT	CG	Results: POP	Results: SOP	Bias
Rafai (28)	1999	RCT	50	12	Early functional therapy	Immobilization for 3 weeks	–	Extension deficit: INT : CG = 4% : 19%	High risk: performance bias  Unclear risk: selection, reporting, attrition bias
de Haan (29) / Lordens*2	2014	RCT	100	12	Early functional therapy	Immobilization for 3 weeks	No differences after 12 months (QuickDASH, MEPI, OES)  QuickDASH (6 weeks): better in INT ( $p < 0.05$ )*1	Pain (1 week): lower in CG ( $p = 0.05$ )*1 RoM (6 weeks): INT : CG = 121° : 102°*1 ( $p < 0.05$ ) Return to work: INT : CG = 8 days : 18 days*1 ( $p < 0.05$ )	High risk: performance bias  Unclear risk: selection bias
Maripuri (30)	2007	RCS	47	24–60	Early functional therapy	Immobilization for 2 weeks	MEPI: INT : CG = 96.5 : 83.3 ( $p < 0.05$ )  QuickDASH: INT : CG = 2.7 : 12.8 ( $p < 0.05$ )	Return to work: INT : CG = 3.2 vs. 6.6 weeks*1 ( $p < 0.01$ )	High risk: selection, performance, attrition, recall bias  Unclear risk: reporting bias
Mehlhoff (31)	1988	RCS	52	34	Early functional therapy	Immobilization >24 days	Excellent or good clinical outcome: INT : CG = 100% : 10%	Extension deficit: INT : CG = 5° : 30°*1 ( $p < 0.001$ ) Residual pain: INT : CG = 20% : 90%	High risk: selection, performance, attrition, recall bias  Unclear risk: reporting bias
Schippinger (32)	1999	RCS	45	62	Early functional therapy	Immobilization >3 weeks	Good/excellent BMS: INT : CG = 100% : 70%	Residual pain: INT : CG = 40% : 55%	High risk: selection, performance, attrition, recall bias  Unclear risk: reporting bias
Riel (33)	1993	RCS	39	36–156	Early functional therapy	Immobilization for 3 to 4 weeks	Good/excellent outcome: INT : CG = 90% : 83%	Extension deficit: INT : CG = 57% : 61%  Residual pain: INT : CG = 14% : 11%  Return to work: INT : CG = 8 : 16 weeks	High risk: selection, performance, attrition, recall bias  Unclear risk: reporting bias
Eyghendaal (34)	2000	RCS	50	108	Persisting medial instability	No instability	MEPI: CG significantly better*1 ( $p = 0.002$ )	Residual pain: CG significantly better*1 ( $p = 0.04$ )	High risk: selection, performance, attrition, recall bias  Unclear risk: reporting bias

SD, study design; n, number of cases; FU, mean follow-up time in months; INT, intervention group; CG, control group; POP: primary outcome parameter; SOP, secondary outcome parameter; RCT, randomized controlled trial; RCS, retrospective comparative study; RoM, range of motion; MEPI, Mayo Elbow Performance Index (maximum score 100); OES, Oxford Elbow Score (maximum score 100); BMS, Broberg and Morrey score (maximum score 100)

\*1 significant difference ( $p < 0.05$ )

\*2 data published only as abstract to date: Lordens GIT, Van Lieshout EMM, Schep NWL et al.: Early mobilization vs. plaster immobilization of simple elbow dislocations: results of the FuncSIE multicenter randomized clinical trial [http://ota.org/media/160099/Paper-86-thru-103\\_Upper-Extremity.pdf](http://ota.org/media/160099/Paper-86-thru-103_Upper-Extremity.pdf). Last accessed on 23 February 2015.

with complications such as recurrent dislocation or chronic instability. Short-term immobilization initially provides more effective pain reduction but should be superseded by functional therapy no later than one week after injury to avoid jeopardizing the benefits of early mobilization (29). Retrospective comparative studies (30–33) also show that early functional therapy

leads to a swifter return to work. The conclusions of meta-analysis of these studies, according to which early functional therapy also leads to less pain in the long term and better outcomes in terms of clinical scores, should be called into question in the light of the results of the new randomized controlled trial by de Haan et al. (29).

**TABLE 3**

**Meta-analysis of conservative therapy and surgery**

	OP	Studies	n	Statistical test	Effect size
<b>Conservative therapy: early functional therapy vs. immobilization</b>	Good/excellent scores (%)	4	145	RR (IV, 95% CI)	1.59 (1.30; 1.95)*
	Residual pain	3	103	RR (IV, 95% CI)	0.53 (0.30; 0.95)*
	Return to work	2	79	MD (IV, 95% CI)	-2.91 (-3.18; -2.64)*
<b>Surgical ligament repair: severity of ligament injury (MCL &amp; LCL vs. LCL alone)</b>	BMS or MEPI	4	62	SMD (IV, 95% CI)	-0.22 (-0.75; 0.31)
	RoM	4	62	MD (IV, 95% CI)	-12.07 (-23.88; -0.26)*
<b>Surgical ligament repair &lt;30 vs. &gt;30 days after injury</b>	MEPI	2	48	MD (IV, 95% CI)	0.84 (-4.70; 6.37)
	RoM	2	48	MD (IV, 95% CI)	1.22 (-6.10; 8.55)

OP, outcome parameter; n, number of cases; MCL, medial collateral ligament; LCL, lateral collateral ligament; MEPI, Mayo Elbow Performance Index; BMS, Broberg and Morrey score; RoM, range of motion; RR, relative risk; SMD, standardized mean difference; MD, mean difference; IV, inverse variance; CI, confidence interval; \*statistical significance

**The value of surgery**

De Haan et al. (29) report that 12 months after dislocation only 75% of patients who played sports were able to resume their sporting activities. In retrospective studies the proportion of patients with persistent complaints was sometimes more than 50% (30–35). This problem raises the question of how surgery can help. The data on this subject, however, is too limited to draw a reliable conclusion. Josefsson et al. (21) found in their study—which is probably underpowered—negative effects for surgery that were not statistically significant. Better understanding of anatomy and biomechanics has led to new developments in elbow surgery in recent decades. Research into posterolateral rotatory instability in particular (36) has made a contribution to this and casts doubt on the continuing relevance of the conclusions of Josefsson et al. (21), especially as recent clinical research shows good to excellent outcomes, measured in terms of clinical scores, following surgery for acute elbow instability (8, 10–18).

**Management of complications: ligament repair and ligament reconstruction**

Elbow dislocation can vary in severity. O’Driscoll et al. showed this on the basis of a biomechanical study and formulated an instability classification system for posterolateral rotatory instability. This ranges from a weak tendency to radial head subluxation to high instability of the whole elbow joint, even when immobilized in plaster (37).

If healing is incomplete, instability, usually slight, may remain and can lead to chronic pain, feelings of instability, and also movement limitations (7, 8, 28–30, 36, 38). Collateral ligament reconstruction using autologous or allogeneous tendon grafts is now performed as standard treatment in cases of delayed surgery, because the ligamentous structures are often insufficient and scarred following incomplete healing (8, 14, 15, 23, 36, 39, 40).

The meta-analysis presented here of the studies by O’Brien et al. (18) and Daluiski et al. (16) comes to the

interesting conclusion that ligament repair after several months or even years leads to outcomes as good as those following acute ligament repair, and that collateral ligament reconstruction is not necessarily needed.

**Conclusion, prospects for the future**

Acute elbow instability is varied in nature. After reduction of the elbow joint under analgosedation, targeted clinical examination should be performed in order to ascertain and record the severity of the injury and assess whether an MRI is needed for further diagnosis.

Early functional therapy can be recommended as the evidence-based standard treatment for simple elbow dislocation without higher-grade instability. Short-term immobilization is recommended to reduce pain. The results of this meta-analysis lead to the conclusion that a further randomized controlled trial is needed on treatment for high-grade instability (7), comparing surgery, early functional therapy, and plaster cast immobilization. In addition to clinical scores, such a trial should also use patients’ pain-free range of motion and pain symptoms in particular as outcome parameters. This would enable the as yet unclear value of surgery for simple elbow dislocation to be clarified.

**Conflict of interest statement**

Prof. Müller, PD Dr. Burkhart, and Dr. Wegmann have received consultancy fees and reimbursement of conference fees and travel and accommodation expenses from Medartis, Tornier, Depuy Synthes, and Acumed. They have received fees for preparing scientific events and third-party funds from Medartis.

Dr. Hackl has received reimbursement of conference fees and travel and accommodation expenses from Acumed.

Dr. Beyer and Mr. Leschinger declare that no conflict of interest exists.

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**TABLE 4**

**Summary of included studies on surgery for simple elbow dislocation**

Author	Year	SD	n	FU	INT	CG	Results: POP	Results: SOP	Bias
Josefsson (21)	1987	RCT	28	12	Surgery Ligament repair medially & laterally	Conservative: immobilization for 2 to 3 weeks	-	Extension deficit: INT : CG = 18 (± 15)° : 10 (± 14)° Residual pain: INT : CG = 50 % : 50 %	High risk: performance bias Unclear risk: selection bias Low risk: reporting, attrition bias
Duckworth (10)	2008	RCS	14	27	Ligament rupture medially & laterally	Ligament rupture laterally only	BMS: INT:CG = 87.7:87.3 p >0.05	RoM: INT : CG = 127.1° : 128.6° p >0.05	High risk: selection, performance, attrition, recall bias Unclear risk: reporting bias
Jeon (11)	2008	RCS	13	27	Ligament rupture medially & laterally	Ligament rupture laterally only	MEPI: INT:CG = 95.5:86.7 p >0.05	-	High risk: selection, performance, attrition, recall bias Unclear risk: reporting bias
Kim (12)	2013	RCS	15	9	Ligament rupture medially & laterally	Ligament rupture laterally only	MEPI: INT:CG = 82.9:93.1* p <0.05	RoM: INT : CG = 115.7° : 120.1° p >0.05	High risk: selection, performance, attrition, recall bias Unclear risk: reporting bias
Micic (13)	2009	RCS	20	32.5	Ligament rupture medially & laterally	Ligament rupture laterally only	MEPI: INT:CG = 91.8:95.0 p >0.05	RoM: INT : CG = 106.8° : 121.1° p >0.05	High risk: selection, performance, attrition, recall bias Unclear risk: reporting bias
O'Brien (18)	2014	RCS	14	30	Ligament repair <30 days after injury	Ligament repair >30 days after injury	MEPI: INT:CG = 100:99.3 p >0.05	RoM: INT : CG = 129.4° : 124.9° p >0.05	High risk: selection, performance, attrition, recall, reporting bias Unclear risk: reporting bias
Daluiski (16)	2014	RCS	34	42	Ligament repair <30 days after injury	Ligament repair >30 days after injury	MEPI: INT:CG = 90.0:89.0 p >0.05	RoM: INT : CG = 115.0° : 116.0° p >0.05	High risk: selection, performance, attrition, recall bias Unclear risk: reporting bias

SD, study design; n, number of cases; FU, mean follow-up time in months; INT, intervention group; CG, control group; POP, primary outcome parameter; SOP, secondary outcome parameter; RCT, randomized controlled trial; RCS, retrospective comparative study; RoM, range of motion; MEPI, Mayo Elbow Performance Index (maximum score 100); BMS, Broberg and Morrey score (maximum score 100); \* Significant difference (p <0.05)

**KEY MESSAGES**

- The standard treatment for simple elbow dislocation is conservative therapy. Persistent complaints following simple elbow dislocation are not uncommon, however.
- Simple elbow dislocation is a complex injury to soft tissue structures. Severity of soft tissue injury seems to have an adverse effect on clinical outcome, but data on this is limited.
- Early functional therapy is superior to immobilization in terms of short-term clinical outcome.
- Surgery is an alternative treatment option, particularly in cases of severe instability and stiffness of the joint. There is a lack of evidence on which to base indication criteria for surgery. The as yet limited number of available studies shows essentially no benefit for surgery over conservative therapy.
- According to recent studies, ligament repair is possible even after a delay, with no adverse effect on clinical outcome.

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