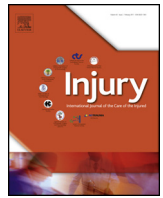




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## Review

# The external rotation immobilisation does not reduce recurrence rates or improve quality of life after primary anterior shoulder dislocation: A systematic review and meta-analysis

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### ABSTRACT

**Purpose:** Conducting a systematic review and meta-analysis of prospective randomised controlled trials directly comparing (1) the rates of recurrence and (2) patient-based quality-of-life assessments after the external rotation (ER) or internal rotation (IR) immobilisation after primary anterior shoulder dislocation.

**Methods:** PubMed, EMBASE, the Cochrane Library and ISI Web of Science were searched up to January 2013, using the Boolean operators as follows: (bankart lesion OR shoulder anterior dislocation) AND ((external rotation AND internal rotation) OR immobilisation). All prospective randomised controlled trials directly comparing recurrence rate and patient-based quality-of-life assessments between the ER and IR immobilisations were retrieved. No limitation of the language or publication year existed in our analysis.

**Results:** Seven of 896 studies involving 663 patients were included, 338 in the ER group and 325 in the IR group. No significant difference was observed in the recurrence rate at all ages (risk ratio (RR) = 0.65; 95% confidence interval, 0.41–1.03;  $p = 0.067$ ), at the age stratum of  $\leq 30$  years (RR = 0.70; 95% confidence interval, 0.38–1.29;  $p = 0.250$ ) and  $> 30$  years (RR = 0.86; 95% confidence interval, 0.38–1.97;  $p = 0.722$ ). Four trials adopted quality-of-life assessments, using the Constant–Murlay functional scoring system, the Rowe scoring system, the Western Ontario Shoulder Instability index (WOSI), the Disabilities of arm, shoulder and hand (DASH) and the American Shoulder and Elbow Surgeons evaluation form (ASES). Only one trial demonstrated borderline statistical significance ( $p = 0.05$ ) and probable superiority of the ER group based on the ASES. No significant difference was observed in other three trials.

**Conclusion:** Based on the results of our analysis, the ER immobilisation could not reduce the rates of recurrence after primary anterior shoulder dislocation or improve the quality of life compared with the IR immobilisation. More rigorous and adequately powered prospective randomised controlled trials with long-term follow-ups are required to elucidate a more objective outcome.

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**Introduction**

The glenohumeral joint is a typical ball-and-socket joint, which significantly improves the range of motion (ROM), but reduces shoulder stability as a compromise [1]. As a result, shoulder dislocations are common injuries in our daily life, especially the anterior dislocation. It was estimated that the incidence rate of shoulder dislocation as 23.9 per 100,000 person-year in the US from emergency cases [2]. Sling immobilisation at internal rotation (IR) position has been the traditional intervention after manipulative reduction for more than 2000 years [3]. However, it is ineffective in decreasing the incidence of recurrent dislocation [4], which is a major complication after primary anterior dislocation and quite frequent among young patients [2,5]. The Bankart lesion, mostly found with primary shoulder dislocation, correlates closely to the recurrence rate. On the basis of a magnetic resonance imaging (MRI) assisted study [6], the Bankart lesion could get better coaptation by the external rotation (ER) immobilisation with the anatomic reduction of less separation and displacement of anteroinferior portion of the labrum than by the IR immobilisation. Then, a preliminary prospective study [7] demonstrated that patients bracing at ER position had a significant decrease of recurrence rates compared with those immobilised at IR position.

However, several following prospective trials demonstrated contradiction on this issue, showing that recurrence rates had no difference in both two groups. One systematic review in 2010 [8] showed that bracing in ER might provide a lower recurrence rate than traditional sling immobilisation in IR without achieving significance ( $p = 0.07$ ) from data synthesis of two prospective trials. In addition, patients without recurrence may not satisfy with the shoulder because of residual symptomatic instability and probable pain, which could greatly impact their daily life. Therefore, patient-based quality-of-life assessments, such as the Western Ontario Shoulder Instability index (WOSI) [9], the American Shoulder and Elbow Surgeons evaluation form (ASES) [10], the Rowe scoring system [11] and the Constant–Murlay functional scoring system [12], should be taken into account in order to evaluate patients’ status comprehensively after the treatment of immobilisation.

The purpose of this study were to conduct a systematic review and meta-analysis of prospective randomised controlled trials directly comparing (1) the rate of recurrence and (2) patient-based quality-of-life assessments after the ER or internal rotation IR immobilisation after primary anterior shoulder dislocation.

**Materials and methods**

*Literature search*

Electronic databases (PubMed, EMBASE, Cochrane Central Register of Controlled Trials, ISI Web of Science and China National Knowledge Infrastructure (CNKI)) were searched without limit by three independent investigators (AL, XX, YC). Results were last updated on January 19, 2013. Boolean operators were used as

follows: (bankart lesion OR shoulder anterior dislocation) AND ((external rotation AND internal rotation) OR Immobilisation) with no restriction of publication year or language. We also hand-searched the reference lists of manuscripts included in order to detect other reports not identified by our original search. This study was conducted strictly following the methods established in the PRISMA 2009 checklist [13] and the *Cochrane Handbook for Systematic Reviews of Interventions 5.0.2*. Two investigators (AL, XX) independently reviewed the titles and abstracts and strictly followed the inclusion criteria: (1) a direct comparison between the external and internal rotation immobilisation with recurrence rate or quality-of-life assessment; (2) trials for primary shoulder dislocation; (3) more than 1 year of follow-up; (4) prospective randomised controlled trial. Exclusion criteria included studies where: (1) retrospective studies, observational studies, case reports, or reviews; (2) only cadaveric studies were included; (3) the outcome data were not available; (4) the follow-up time was less than 1 year. The redundant publications were excluded by title review. The abstracts of all studies that were not excluded by title were reviewed in order to meet the criteria mentioned above. Then publications retrieved in full text were read in detail. All publications included were according with our inclusion criteria.

*Data extraction*

Three reviewers (AL, XX, FB) extracted relevant data and checked the accuracy independently. Specially, study design, patient demographics (sample size, age, sex distribution), duration of immobilisation, mean follow-up time, loss to follow-up rate, recurrence rates and quality-of-life assessments were all abstracted. We used intention-to-treat (ITT) data from the trials whenever available. If not possible, we used data from the analysis of the available data or data from the analysis of treatment received. If the data were not reported in the original article or not displayed in the table, we extrapolated them from the accompanying graphs. We also tried to contact the corresponding authors of the eligible trials to get any further useful data for our analysis.

*Quality assessment*

Two investigators (AL, YC) independently evaluated the methodological quality of each trial on the basis of the 12-item scale [14]. The 12-item scale contained: randomised adequately, allocation concealed, patient blinded, care provider blinded, outcome assessor blinded, acceptable drop-out rate, ITT analysis, avoided selective reporting, similar baseline, similar or avoided cofactor, patient compliance and similar timing. Divergences were assessed by the means of a kappa test and consensus was obtained by the discussion with the third investigator (SY). According to the 12-item standard (Table 1), three high-quality studies [15–17] explicitly introduced the randomisation, the allocation concealment and described ITT analysis; the other four studies [7,18–20] received moderate quality. The weighted kappa for the agreement on the study quality between the investigators was 0.85 (95% confidence interval (CI), 0.77–0.93).

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