Systematic Review

Outcomes of Arthroscopic Anterior Shoulder Instability in the Beach Chair Versus Lateral Decubitus Position: A Systematic Review and Meta-Regression Analysis

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Purpose: This study aimed to systematically review the clinical outcomes and recurrence rates after arthroscopic anterior shoulder stabilization in the beach chair (BC) and lateral decubitus (LD) positions. **Methods:** The authors performed a systematic review of multiple medical databases using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. All English-language literature from 1990 to 2013 reporting clinical outcomes after arthroscopic anterior shoulder stabilization with suture anchors or tacks with a minimum 2-year follow-up period were reviewed by 2 independent reviewers. Data on recurrent instability rate, return to activity/sport, range of motion, and subjective outcome measures were collected. Study methodological quality was evaluated with the Modified Coleman Methodology Score (MCMS) and the Quality Appraisal Tool (QAT). To quantify the structured review of observational data, meta-analytic statistical methods were used. **Results:** Sixty-four studies (38 BC position, 26 LD position) met inclusion criteria. A total of 3,668 shoulders were included, with 2,211 of patients in the BC position (average age, 26.7 $\pm$ 3.8 years; 84.5% male sex) and 1,457 patients in the LD position (average age, 26.0 $\pm$ 3.0 years; 82.7% male sex). The average follow-up was 49.8 $\pm$ 29.5 months in the BC group compared with 38.7 $\pm$ 23.3 months in the LD group. Average overall recurrent instability rates were 14.65 $\pm$ 8.4% in the BC group (range, 0% to 38%) compared with 8.5% $\pm$ 7.1% in the LD group (range, 0% to 30%; $P = .002$). The average postoperative loss in external rotation motion (in abduction) was reported in 19 studies in the BC group and in13 studies in the LD group, with an average loss of 2.4° $\pm$ 1.0° and 3.6° $\pm$ 2.6° in each group, respectively ($P > .05$). **Conclusions:** Excellent clinical outcomes with low recurrence rates can be obtained after arthroscopic anterior shoulder stabilization in either the BC or the LD position; however, lower recurrence rates are noted in the LD position. Additional long-term randomized clinical trials comparing these positions are needed to better understand the potential advantages and disadvantages of each position. **Level of Evidence:** Level IV, systematic review of studies with Level I through Level IV evidence.

Anterior shoulder instability remains a growing problem in the young athletic patient population. Despite substantial improvements in both surgical techniques and instrumentation options throughout the past decade, recurrent instability remains problematic, with reported rates anywhere from 10% to 30% after repair.[1-5]

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Although the gold standard for anterior shoulder stabilization has historically been open repair, recent literature has shown no discernable differences between open and arthroscopic techniques, even in collision and contact athletes.[1,6] This can likely be attributed to improved understanding of the underlying pathoanatomy associated with anterior glenohumeral instability, improved arthroscopic instrumentation, improved arthroscopic implants, and a better understanding of the surgical pitfalls associated with shoulder arthroscopy.

The goals of shoulder stabilization surgery are to create an anatomic and secure repair with appropriate capsular tensioning while avoiding complications,[7] including iatrogenic chondral damage and neurovascular injury. In most cases of anterior instability, an anteroinferior labral tear (Bankart lesion) is present, necessitating repair to the glenoid rim with any number of a variety of fixation devices.[8-20] The evolution of repair techniques for arthroscopic anterior shoulder

stabilization has essentially seen 3 "phases" over the past several decades, including transglenoid suture repair (Caspari technique),[21-23] repair with bioabsorbable tacks, and repair with suture anchors. For most patients, arthroscopic stabilization with suture anchors has become the accepted standard of care,[3,4,6,24-28] although as described, recurrence rates are still unacceptably high. Such failure rates are clearly challenging, especially given the relatively young average age in most of this patient population. Thus, investigators are continuing to search for ways to improve outcomes and lower recurrence rates. Interestingly, despite the exponential increase in publications analyzing anterior shoulder stabilization in the past decade, one factor that seems to have slipped under the radar is patient positioning.

Arthroscopic anterior shoulder stabilization can be performed in either the beach chair (BC)[29,30] or the lateral decubitus (LD) position. Surgeon preference, experience level, and the specific intended procedure often dictate which position is used. With appropriate setup and positioning, both techniques are reliable with low complication rates. The BC position offers the advantage of easy conversion to open techniques, whereas the LD position may allow for lower suture anchor position on the glenoid. Because the typical zone of injury in the setting of anterior instability is in the anterior-inferior glenoid quadrant, the zone of injury is usually between the 3 and 6 o'clock positions (for a right shoulder). For adequate repair, it is critical that the surgeon achieve inferior anchor placement to address the inferior component of traumatic instability.[17] Modified portal placement and new curved drill guide systems have been proposed as ways to improve inferior anchor placement[31,32]; however, the potential effect of patient positioning and its relationship to clinical outcomes, including recurrence rates, has not yet been evaluated.

The purpose of this study was to systematically review the clinical outcomes after arthroscopic anterior shoulder stabilization in either the BC or LD position. We hypothesized that clinical outcomes and recurrent instability rates would be similar regardless of the choice of patient positioning.

Methods

We conducted a systematic review of publicly available evidence using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines with a PRISMA checklist (registration number CRD42013005152).[33,34] Two independent reviewers completed the search, which was performed on September 3, 2013. The following databases were used: PubMed, CINAHL (Cumulative Index to Nursing and Allied Health Literature), EMBASE, and Cochrane Central Register of Controlled Trials. An initial search using the terms arthroscopy, arthroscopic, shoulder, instability, and beach chair or lateral decubitus yielded very few results (4 results and 8 results, respectively), so the search strategy was broadened to capture as many potential articles as possible for inclusion. Therefore, the following terms were searched: arthroscopy, arthroscopic, shoulder, instability, and Bankart. The PubMed search strategy included the following:

Search 1: "arthroscopy"[MeSH Terms] OR "arthroscopic"[All Fields] AND "shoulder"[MeSH Terms]

Search 2: "arthroscopy"[MeSH Terms] OR "arthroscopic"[All Fields] AND "shoulder"[MeSH Terms] AND "instability"[MeSH Terms]

Search 3: "arthroscopy"[MeSH Terms] OR "arthroscopic"[All Fields] AND "shoulder"[MeSH Terms] AND "instability"[MeSH Terms] AND "Bankart"[MeSH Terms]

Inclusion criteria were English-language studies from 1990 to 2013 incorporating the described search items. Studies analyzing open surgery, revision surgery, all-suture repair (transglenoid), thermal capsulorrhaphy, and studies not specifying surgical technique were excluded. Additional exclusion criteria included biomechanical studies, novel technique studies, perception-based studies, scientific meeting abstracts/proceedings, and systematic reviews/meta-analyses. Studies with levels of evidence I, II, III, and IV (designated according to the Oxford Centre for Evidence-Based Medicine used by the American version of the *Journal of Bone and Joint Surgery*[34] and *Arthroscopy*) were included. Articles designated as E-published only and E-published ahead of print as well as print journal articles were included. Studies that included both open and arthroscopic cases but separated their results clearly by group were allowed, with only the data from the arthroscopic cases included in this analysis. In the event of disagreement on final study inclusion for analysis, the senior author made the final decision. All references within included studies were cross-referenced for potential inclusion if omitted from the initial search. Figure 1 illustrates the search methods used to generate the final studies for inclusion and analysis.

For those studies deemed appropriate for inclusion, study data including recurrence rate, repeated procedures, return to activity/sport, physical examination including range of motion parameters, and subjective outcomes instruments were collected and pooled. Study methodological quality (including potential sources of bias) was evaluated with the Modified Coleman Methodology Score (MCMS)[35] and the Quality Appraisal Tool (QAT)[36] score, both of which have been used in multiple previous orthopaedic, sports medicine, and shoulder publications.[1,37-40] The original Coleman Methodology score used 10 criteria to assess the methodology of a given study, with a possible total score ranging between 0 and 100. A score of 100