

Systematic Review

Arthroscopic Repair of Isolated Subscapularis Tears: A Systematic Review of Technique-Specific Outcomes

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Purpose: To systematically review the literature to identify all studies reporting outcomes of arthroscopically repaired isolated subscapularis tears, to (1) report outcomes across all repair techniques, (2) compare outcomes by arthroscopic technique, and (3) highlight the frequency and management of associated long head of biceps pathology, and the influence of these concomitant procedures on outcomes following arthroscopic subscapularis repair. **Methods:** A systematic literature review was conducted using the MEDLINE, Embase, and Scopus databases with the following term: (“isolated repair” AND “arthroscopic subscapularis tear”). Only studies evaluating the techniques and outcomes of isolated subscapularis repair were included. Data were extracted, including patient characteristics, surgical technique, and outcomes. Descriptive analysis was provided for the available literature. **Results:** Eight studies were included in this review. Uniformly, improvements in patient-reported outcome scores were substantial after arthroscopic subscapularis repair. Constant Total scores improved in each individual study from preoperative to postoperative (range, Δ 18.8- Δ 49.8 points), as did Strength (range, Δ 1.3- Δ 13.7 points), Pain (range, Δ 7.6- Δ 8.9 points), Range of Motion (range, Δ 7.3- Δ 13.3 points), and Activities of Daily Living (range, Δ 8.7- Δ 10.2 points) subscores. Significant improvements were seen in most individual studies for belly-press (Δ 21.6 N or Δ 1.9 out of 5) and lift-off strength (Δ 24.3 N or Δ 1.7- Δ 1.9 out of 5), range of motion in forward flexion (29.1° - 37.0°), external rotation (10.3° - 16.0°), and internal rotation. Complications were relatively infrequent overall, with 5 studies reporting no complications, and the remaining 3 studies with rerupture rates between 4.8% and 11.8%. Studies that used only double-row repair reported fewer complications (0% vs 5%-10%) and better outcome scores than single-row repair, similar to those studies that uniformly performed biceps tenodesis compared with no biceps intervention. **Conclusions:** This descriptive study highlights that arthroscopic subscapularis repair appears to be a reasonable option for the treatment of isolated tears of the subscapularis to obtain successful functional and patient-reported clinical outcomes. Its findings also pose the question of whether future prospective, comparative studies will find double-row surgical fixation and concomitant biceps tenodesis surgery to be superior to single-row fixation and leaving the biceps alone. **Level of Evidence:** Level IV, systematic review of Level IV studies.

The gold standard subscapularis repair technique uses an open approach, as historically the arthroscopic technique presented a number of technical challenges,

particularly for the inexperienced arthroscopist. Recently, there has been an increase in the use of all arthroscopic techniques, which is likely a function of both improved

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equipment and training in arthroscopy. Since the first publication evaluating arthroscopic repair of isolated subscapularis tears in 2002,¹ there has been increased interest in different arthroscopic subscapularis repair techniques, namely, single- and double-row constructs.

Currently, there is a limited understanding of the influence that repair technique can have on the outcome. Prior studies evaluating arthroscopic repairs of the supraspinatus and/or infraspinatus tendon found success compared with their open intervention counterparts,²⁻⁵ giving credence to the idea that arthroscopic repair of the subscapularis could similarly be performed in lieu of open repair with adequate outcomes. A 2012 article by Mall et al.⁶ analyzed outcomes of arthroscopic and open repairs of isolated subscapularis repairs. The authors analyzed 3 studies of arthroscopic repair and 6 studies on open repair, with both techniques generating excellent results. Since that time, numerous studies have been published evaluating arthroscopic subscapularis repair.

In the present study, our purpose is to systematically review the literature to identify all studies reporting outcomes of arthroscopically repaired isolated subscapularis tears, to (1) report outcomes across all repair techniques, (2) compare outcomes by arthroscopic technique, and (3) highlight the frequency and management of associated long head of biceps pathology, and the influence of these concomitant procedures on outcomes after arthroscopic subscapularis repair. The hypothesis of the study is that this descriptive analysis will provide enough evidence to suggest arthroscopic repair is a reasonable option to treat subscapularis tears, and will suggest a superiority of double-row fixation technique and concomitant biceps tenodesis that should be further evaluated with prospective comparative study.

Methods

Study Design and Data Collection

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (www.prisma-statement.org) were used in the design of our systematic review of the available literature. The MEDLINE, Embase, and Scopus databases were reviewed for all English-language studies published between inception of the databases and November 2015. The following search algorithm was used: (“isolated repair” AND “arthroscopic subscapularis repair”).

We decided to choose isolated subscapularis tears in an effort to minimize confounding factors associated with concomitant rotator cuff tendon repair so as to improve on our ability to compare different arthroscopic techniques with respect to subscapularis tears. The analysis was thus limited to isolated subscapularis tears without excluding repair of any other rotator cuff pathology.

Inclusion criteria included the following: (1) Level I to IV studies; (2) studies reporting the operative

techniques, radiographic outcomes, and/or clinical outcomes after isolated arthroscopic subscapularis repair. Exclusion criteria included the following: (1) studies evaluating intervention with concomitant rotator cuff pathology (other than the subscapularis) addressed with repair at the time of surgical intervention; (2) studies evaluating any open approach for repair of the subscapularis; (3) studies that were not in the English language; (4) unpublished studies; (5) studies with Level V evidence; (6) survey studies; (7) technique articles without any clinical outcomes or results of patient series; (8) diagnostic studies; (9) review articles; (10) cadaver/biomechanical studies; (11) only partial subscapularis tear (as opposed to complete tears requiring intervention); (12) studies that evaluated nonreparative means for subscapularis tear (i.e., debridement). All abstracts were reviewed by 2 of the included authors (M.J.C. and T.A.A.) and evaluated with the aforementioned criteria in mind. The same authors then reviewed the full text of eligible studies to determine final inclusion. Reference lists and citations were cross-referenced for included studies to ensure no article was missed from our search. Data were extracted by the same 2 authors from all of the included studies using a standardized data form created by the authors at the onset of the study. Inconsistencies between authors were resolved by joint review of the content in question. After data extraction, articles were grouped according to surgical technique (single- vs double-row repairs), as well as by concomitant treatment of the biceps tendon.

Data Synthesis and Analysis

As the available literature for this review included only Level IV studies, it was determined that pooling the data and performing a formal meta-analysis was not indicated. A descriptive summary of the studies in terms of the demographics, tear characteristics, outcome data, failure rates, adverse events, and individual study bias is instead provided for this updated literature on the topic. Additionally, we compare the data to a historical open repair group provided by Mall et al.⁶ in their systematic review of the literature.

Results

Study Characteristics and Patient Demographics

Our initial literature search yielded 159 articles; following elimination of unrelated articles after evaluation of titles, 60 were further evaluated. After applying our exclusion and inclusion criteria outlined above, 33 articles underwent full-text evaluation, from which 8 total studies⁷⁻¹⁴ were deemed appropriate for inclusion in this analysis (Fig 1).

The 8 included articles comprised a total of 115 patients (range, 6-22). Surgical repairs of patients included in

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