Graft Elongation Occurs Beyond Intraoperative Dimensions After Superior Capsular Reconstruction: An In Vivo Analysis

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All Authors:
Clarisse Levasseur MS UNITED STATES
Gillian Kane BS UNITED STATES
Jonathan D. Hughes MD UNITED STATES
William Anderst PhD UNITED STATES
Albert Lin MD UNITED STATES

Summary:
The graft used in SCR is stretched well beyond its intra-operative length and the length exceeds the graft ultimate strain.

Data:
INTRODUCTION: Superior capsular reconstruction (SCR) has led to favorable clinical outcomes [1,2], but the in vivo behavior of the SCR graft remains unclear. The aims of this study were to determine regional graft elongation after SCR, its relationship to graft healing, and the effects on kinematics. It was hypothesized that anterior and posterior regions of the SCR graft would elongate uniformly, greater graft elongation would be associated with graft failure, and the graft would affect shoulder kinematics by decreasing the distance between graft anchor points after surgery. METHODS: Ten patients with irreparable rotator cuff were enrolled in this IRB approved study. Synchronized biplane radiographs of the shoulder were collected before (PRE) and 1 year after dermal SCR (POST) at 50 frames/s while patients performed 3 trials of both scapular plane abduction and internal/external rotation at 90° of humerorhathoric abduction. Kinematics were determined with sub-millimeter accuracy by matching subject-specific digitally reconstructed radiographs of the CT-based models of the humerus and scapula to radiographs using a validated volumetric tracking technique [3]. Intra-op graft lengths were recorded from surgical notes. MRIs were acquired POST to identify anchor locations on bines and to evaluate whether the graft was healed at the four anchor locations. The graft length between anchors was calculated based upon bone motions recorded using biplanar radiography. Differences between the abduction angle at which the graft reached the intra-op length in healed and not healed grafts were evaluated using a Mann-Whitney U test, with significance set at p<0.05. RESULTS: All SCR grafts elongated beyond their intra-op length. During abduction, the anterior and posterior regions elongated up to 340% and 118% compared to intra-op, while during rotation the anterior and posterior regions elongated up to 222% and 171%. On average, graft elongation occurred when the GH joint passed below 66° of abduction. During rotation, the posterior regions elongated during internal rotation while the anterior region did not elongate (p<0.01). Grafts that were healed at both anterior anchors reached the intra-op length at lower abduction angles than grafts that were not healed at one of the anchors. The posterior anchor points were 2.1±1.5mm and 2.1±3.6mm farther apart POST compared to PRE during abduction (p<0.01) and rotation (p=0.05), respectively, but no difference was found in the distance between anterior anchor points for either motion (all p>0.38). DISCUSSION: The main finding of this study was that the graft used in SCR is stretched well beyond its intra-operative length and the length exceeds the graft ultimate strain of 24% [4]. The graft regions did not elongate uniformly during rotation, contradicting our first hypothesis. Grafts that were healed in the anterior region became elongated at lower abduction angles than grafts that were not healed, supporting our second hypothesis. The graft lengths were larger in the posterior region during abduction POST than they would have been in the simulated PRE graft, contradicting our third hypothesis.

Category: Shoulder - Rotator Cuff

Subacromial Decompression is Associated with a Number Needed to Treat of 4 for Reduced Revision Rotator Cuff Repair: A Large Matched Cohort Insurance Database Analysis

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All Authors:
Elise Berlinberg BS UNITED STATES
Kendall Derry BS UNITED STATES
Harsh Patel BS UNITED STATES
Enrico Forlenza MD UNITED STATES
Vikram R. Mirle BS UNITED STATES
Vahram Gamsarian BE UNITED STATES
Randy Mancarenhas MD, FRSCS CANADA
Brian Forsythe MD UNITED STATES

Summary:
In a large cohort of over 60,000 patients with partial or complete rotator cuff tears, performing concurrent SAD conferred a 26% relative risk reduction (NNT=4 patients) for revision rotator cuff repair when compared to ARCR alone.

Data:
Purpose: Subacromial decompression (SAD) during arthroscopic rotator cuff repair (ARCR) has traditionally been performed to relieve impingement of the rotator cuff tendons as they pass through the subacromial space. The purpose of this study is to quantify the reduced risk of revision rotator cuff surgery conferred by performing SAD with ARCR. Methods: The PearlDiver administrative claims database was queried for patients who underwent ARCR between 2015-2020 with a minimum follow up of 2 years. The study population was stratified by whether concurrent SAD was performed at the time of the index ARCR. Groups were matched on age, gender, Charlson Comorbidity Index (CCI), complete versus partial tear, and comorbidities previously correlated with RCR healing. The primary outcome was requiring a revision rotator cuff repair. Results: The final analysis included 30,407 patients per group, with a mean age of 60 years (SD=7) and 45.3% women. Baseline demographics were similar between groups after matching. 551 (1.8%) patients without SAD vs. 437 patients with SAD (1.4%) underwent a revision rotator cuff repair, corresponding to a number needed to treat (NNT) of 3.8 (unadj-OR=0.79, 95% CI 0.70-0.90, P<0.001). In a multivariable model, factors associated with revision rotator cuff repair included subacromial decompression (adj-OR=0.79, 95%CI 0.70-0.90, P<0.001), male gender (adj-OR 0.97, 95% CI 0.97-0.98, P=0.017), older age (adj-OR=0.97, 95% CI 0.97-0.98, P<0.001), complete tear (adj-OR=3.62, 95% CI 2.87-4.57, P<0.001), tobacco use (adj-OR=1.33, 95% CI 1.12-1.52, P<0.001), and CCI (adj-OR 1.05, 95% CI 1.01-1.09, P=0.027). Conclusions: In a large cohort of over 60,000 patients with partial or complete rotator cuff tears, performing concurrent SAD conferred a 26% relative risk reduction (NNT=4 patients) for revision rotator cuff repair when compared to ARCR alone. These findings suggest that SAD may reduce the risk of revision rotator cuff surgery.

Category: Shoulder - Rotator Cuff

Lower Trapezius Tendon Transfer For Massive Irreparable Rotator Cuff Tears Improves Outcomes In Patients With High Grade Fatty Infiltration Of Teres Minor

Abstract ID# 21639
All Authors:
Jarret M. Woodmass MD, FRCSC CANADA
Albert Lin MD UNITED STATES
Jonathan D. Hughes MD UNITED STATES
Gillian Kane BS UNITED STATES
Kendall Derry BS UNITED STATES
Harsh Patel BS UNITED STATES
Enrico Forlenza MD UNITED STATES
Vikram R. Mirle BS UNITED STATES
Vahram Gamsarian BE UNITED STATES
Randy Mancarenhas MD, FRSCS CANADA

Summary:
Of Teres Minor

Category: Shoulder - Rotator Cuff