Consequences of Concomitant Subscapularis Repair with Reverse Total Shoulder Arthroplasty

INTRODUCTION: Proper function of the subscapularis is essential for successful total shoulder arthroplasty (TSA). The subscapularis tendon is typically incised during the surgical approach and repaired after the prosthesis is implanted. Surgeons may extrapolate their knowledge of the importance of the subscapularis repair to the case of reverse total shoulder arthroplasty. However, some surgeons report that subscapularis function is not important for the reverse TSA and indeed they do not perform a repair.

RESULTS: The deltoid force required for abduction with concomitant subscapularis repair was significantly higher between 15° and 45° for both 44N and 88N on the subscapularis (p < 0.01). The difference (111N or 132% increase) was greatest at 15°. The forces required of the posterior rotator cuff were significantly higher for the subscapularis when performing reverse TSA. The hypothesis of this study was that concomitant repair of the subscapularis would increase the deltoid force required for abduction and increase the posterior cuff force required to maintain neutral rotation for a reverse TSA.

DISCUSSION: The results of the study support the hypotheses. Deltoid and posterior rotator cuff force requirements are greatly elevated by the intact subscapularis in the setting of a reverse TSA. The magnitude of the force requirements raises the question whether the posterior cuff and deltoid can develop sufficient force levels. The posterior cuff must generate external rotation torque to allow the hand to reach a functional position. With the elbow flexed at 90° and the subscapularis active, the oft-times compromised infraspinatus and teres minor may not be able to provide this torque. Furthermore, the greatly elevated joint reaction force may contribute to wear of the prosthesis. This provides a biomechanical rationale for not repairing the subscapularis with reverse TSA designs that medialize the center-of-rotation and distalize the tuberosities.

SIGNIFICANCE: This study quantifies the consequences of subscapularis repair with reverse TSA. This provides justification for avoiding the repair in this setting and should give surgeons confidence in this decision.