Optimizing Internal Rotation after Reverse Shoulder Replacement: A Survey of Shoulder Arthroplasty Specialists

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INTRODUCTION:

Reverse total shoulder arthroplasty (RSA) is a valuable intervention for patients suffering from conditions including glenohumeral osteoarthritis and rotator cuff tear arthropathy, but post-operative limitations in shoulder mobility, especially internal rotation (IR), may be a concern for patients and physicians. Internal rotation of the shoulder is important to several activities of daily living (ADLs), including toileting and bathing. However, it is unclear to what degree IR generally improves or is even retained following RSA. There is a paucity of literature examining the impact of internal rotation limitations on patient satisfaction post-operatively, and little consensus among the orthopedic surgical community regarding factors that affect internal rotation for patients undergoing this procedure. The aim of this study was to gain insight into 1) the importance of IR to RSA patients and 2) patient-based and surgical variables that influence IR by surveying shoulder replacement specialists of various backgrounds.

METHODS:

An anonymous online survey was developed to collect responses for this study. The questionnaire was intended for high-volume shoulder arthroplasty specialists and was sent to members of the Codman Shoulder Society (CSS), American Shoulder and Elbow Surgeons (ASES), and the European Society for Surgery of the Shoulder and Elbow (SECEC). Respondents were asked a series of questions relating to internal rotation after reverse shoulder arthroplasty, including what share of their RSA patients achieved IR above L1, whether post-operative IR affected patient satisfaction, and which factors most significantly affect post-operative IR.

RESULTS:

280 responses were received across all three organizations of shoulder surgeons (CSS: 76, ASES: 124, SECEC: 80). Highly represented countries of practice included the United States, Spain, Germany, and Switzerland. Over 43% of participants had 1-6 or more years of experience in shoulder surgery. A large majority of ASES respondents completed 30 or more RSAs per year (87% of ASES answered in the 30+ category compared to 70% across all respondents). Participants from all 3 surgery organizations reported that 43-44% of their patients were able to internally rotate to L1 or more following reverse shoulder arthroplasty (Fig. 1). Most surgeons (78%) agreed that IR is an important component of patient satisfaction with their post-operative shoulder function, with consistent distribution across all organizations. When asked whether pre-operative planning with 3-dimensional virtual surgery positively affects post-operative IR, surgeons slightly leaned toward “no” (41% yes, 59% no), though members of ASES were more unevenly split than the average (36% yes, 64% no). Regarding factors that most heavily influence internal rotation following RSA, shoulder specialists from all societies agreed that subscapularis integrity and lateralization of the humerus were most impactful. Surgeons from the ASES and SECEC had differing opinions on the importance of inferior positioning of the glenoid (30% of ASES respondents felt it was a major factor vs. 43% of SECEC) and shoulder extension (ASES: 41%; SECEC: 26%) (Fig. 2). 35% of participants also wrote in responses, including humeral retroversion, coracoid impingement, and BMI/body habitus.

DISCUSSION AND CONCLUSION:

The impact of reverse shoulder arthroplasty on internal rotation has long been overlooked and poorly characterized in literature. The aggregate results from this survey show that, despite internal rotation being an important feature of shoulder function to RSA patients, there is a lack of agreement regarding conserving and improving this motion, even among expert shoulder surgeons. Surgeons across the three societies differed mostly in locations of practice, having largely even distributions of experience and arthroplasty volume (with most being high-volume arthroplasty specialists). Despite this, there were some discrepancies among organizations about the most important factors affecting internal rotation after RSA (Fig. 2), and respondents stated less than 50% of patients were able to internally rotate past the lumbar spine (Fig. 1). This study suggests that RSA is not currently a reliable operation for restoring internal rotation and the most important determinants of internal rotation following RSA remain elusive.

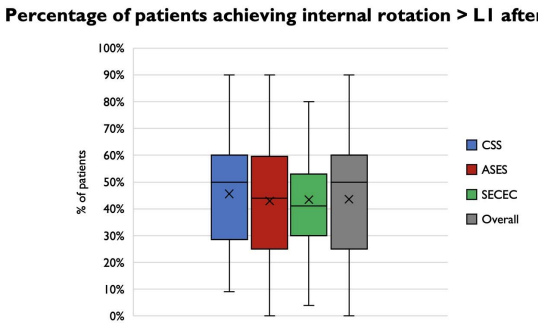

Figure 1. *Percentage of respondents' patients who achieve internal rotation past the lumbar spine by organization.*

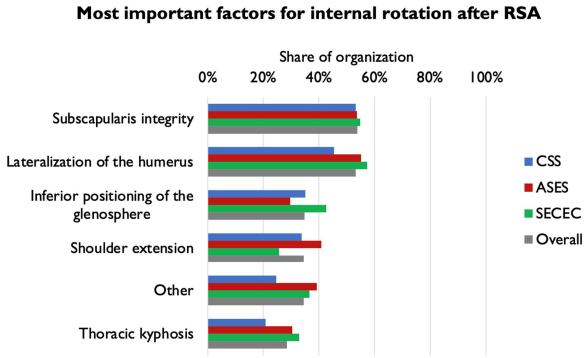

Figure 2. *Most important factors in conserving/restoring internal rotation after RSA. Percentages may exceed 100% because participants were permitted to select multiple options.*