Hand Dominance Does Not Influence Patient-Reported Outcomes Following Anatomic or Reverse Total Shoulder Arthroplasty: A Retrospective Cohort Study

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INTRODUCTION: Anatomic and reverse total shoulder arthroplasties (aTSA and rTSA) are increasingly common procedures with generally high satisfaction rates. While hand dominance influences the performance of activities of daily living, its role in patient-reported outcomes and satisfaction following aTSA or rTSA remains unclear. This study aims to evaluate the influence of hand dominance on ipsilateral aTSA and rTSA patient-reported outcome measures.

METHODS: A single-institution retrospective cohort study was performed by assessing clinical outcomes following aTSA or rTSA procedures performed from February 1st, 2016, to December 31st, 2020. Inclusion criteria consisted of patients in our institutional clinical registry who received a total shoulder arthroplasty and had completed baseline and 2-year postoperative patient-reported outcome metrics. Patients were excluded if they defined themselves as ambidextrous or did not have documented 2-year follow-up. Patients were stratified based on dominant versus non-dominant limb shoulder arthroplasty procedures. Independent t-tests and linear regression models adjusting for patient-reported confounding variables were used to evaluate the association between hand dominance and postoperative clinical outcomes following aTSA and rTSA.

RESULTS: A total of 488 patients undergoing a primary shoulder arthroplasty procedure (362 aTSA [200 dominant hand; 162 non-dominant hand]; 126 rTSA [71 dominant hand; 55 non-dominant hand]) met inclusion criteria. After stratifying by procedure type, no significant differences in postoperative American Shoulder and Elbow Surgeon (ASES), Single Assessment Numeric Evaluation (SANE), PROMIS Pain Interference (PROMIS-PI), PROMIS Upper Extremity (PROMIS-UE), or Shoulder Arthroplasty Smart (SAS) scores were observed between dominant and non-dominant limb arthroplasty cohorts ($p > 0.05$) (Table 1 & 2).

DISCUSSION: The principal finding of the present study was that two-year postoperative clinical outcome measures following both aTSA and rTSA did not differ significantly based upon whether surgery was performed on patients' dominant or nondominant extremity. Cvetanovich et al., in a retrospective case series of 156 aTSA patients diagnosed with primary osteoarthritis (OA) and intact rotator cuffs, found no difference in simple shoulder test (SST), ASES, and visual analog scale (VAS) pain scores between dominant and non-dominant cohorts. Importantly, however, this study was underpowered which may have resulted in an inability to determine a clinically important difference. In a retrospective study of 44 aTSA patients with primary OA and intact rotator cuffs, Berthold et al., also found no difference in ASES, SST, and VAS pain scores between dominant and nondominant cohorts. Our study builds on this existing literature by including patients with minimum two year follow up scores, utilizing a substantially larger cohort, and evaluating both anatomic and reverse total shoulder arthroplasty procedures. To our knowledge, this is the first study to examine PROMs as a function of hand dominance following rTSA. Despite its popularity, some surgeons have expressed concern in relying on rTSA in instances where aTSA is not expressly contraindicated, as inherit biomechanical differences in rTSA constructs may result in rotational deficiencies that can limit patient activities of daily living. Consequently, surgeons may be reluctant to perform rTSA in dominant limbs in patients who are also candidates for aTSA. The results of our study suggest that hand dominance should not dissuade a patient from receiving an rTSA if indicated for it. These findings may be used as an adjunct to counsel patients regarding postoperative outcomes following shoulder arthroplasty regardless of hand dominance.

SIGNIFICANCE/CLINICAL RELEVANCE: Hand dominance did not affect 2-year PROMs after either aTSA or rTSA (ASES, SANE, PROMIS-UE/PI, SAS), indicating comparable functional recovery whether surgery is on the dominant or nondominant arm. Clinically, patients can be counseled that dominance should not lower expectations or dictate implant choice—supporting indication-driven selection (including rTSA on the dominant side) and shared decision-making.