

## One year patient-reported outcomes following primary arthroscopic rotator cuff repair vary little by surgeon

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**INTRODUCTION:** Rotator cuff repairs (RCR) have varying success depending on the outcomes being measured (structural versus patient-reported) and the reasons for such variations are poorly understood. This study's purpose was to investigate the extent to which "surgeon as a variable" influences 1-yr patient reported outcome measures (PROMs) in patients undergoing RCR, after controlling for general patient factors and disease-specific factors. We hypothesized that surgeon would be associated with 1-yr PROMs, specifically the baseline to 1-yr improvement in Penn Shoulder Score (PSS).

**METHODS:** Patients undergoing outpatient primary RCR at a single health system in 2018 and followed up for 1 year were included in the study. We modeled the effects of surgeon (and alternatively surgical case volume) on 1-yr PSS improvement in the patients using a linear mixed model with random surgeon effects, covariate adjusting for possible confounding from eight preoperative patient factors and six disease-specific factors. Akaike's Information Criterion (AIC) comparisons were performed to investigate the relative importance of each variable in explaining variation in 1-year PSS improvement. Patient Acceptable Symptom State (PASS) at 1 year, return to work by 1 year, and additional surgery during the 1 year following RCR were also assessed. Results are presented as median (interquartile range) for numeric variables, and counts (%) for categorical variables.

### RESULTS:

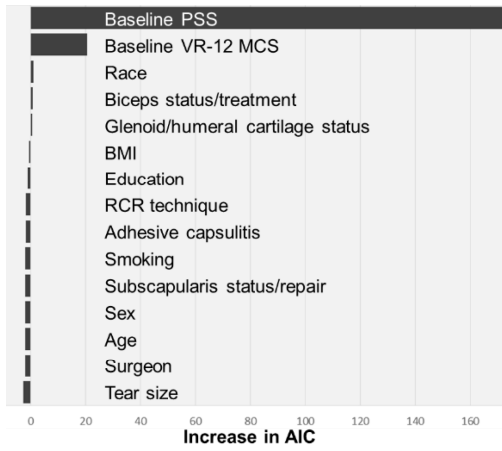
518 cases performed by 28 surgeons at 13 hospitals and surgery centers in the Cleveland Clinic Health System met inclusion criteria. Patients had a median age of 61 (interquartile range, 55-67) years, BMI of 29.4 (26.1-33.8), 14 (12-16) years of education, VR-12 MCS of 53.9 (45.8-60.5), and baseline PSS of 41.9 (31.9-53.9). Patients were predominantly white (85.9%), males (59.7%), undergoing double-row repair (62.4%) of a medium-sized (45.8%) tear. 44.2% were current or former smokers. Most cases had a subscapularis tendon that was normal or not repaired (86.7%); a biceps that was normal, not treated or treated only by debridement (60.6%); little or no arthritis on the glenoid or humeral head (92.3%); and no adhesive capsulitis requiring treatment (96.9%).

Patients had 1-yr PSS improvement of 42 (29.1-55.3) and 1-yr PSS of 90.2 (77-97) points. 93% of patients demonstrated improvement in PSS of at least the 11.4 MCID points<sup>4</sup> and 83% had reached an PASS-acceptable state at 1 year. In addition, 86% of employed patients returned to work and only 1% (n=5) required additional surgery during the 1 year following RCR.

Surgeon and surgical case volume were not found to be significantly associated with 1-yr PSS improvement. Baseline PSS and mental health status (VR-12 MCS) were the dominant and only statistically significant predictors of 1-yr PSS improvement (**Figure 1**), with lower baseline PSS and higher VR-12 MCS predicting larger 1-yr PSS improvement. Other predictors held constant, 1-yr PSS improvement increased approximately three points per four points lower baseline PSS, and one point per three point higher baseline VR-12 MCS, both statistically significant with  $p < 0.001$

### DISCUSSION AND CONCLUSION:

The relationships of "surgeon as a variable" to outcomes following RCR are not fully understood<sup>1-3</sup>. This study did not find evidence that the individual surgeon or surgeon case-volume influences 1 year PROMs following primary RCR in a large academic tertiary referral employed hospital system where the majority of patients generally reported excellent 1 year outcomes following primary RCR.



**Figure 1.** Relative importance of general patient, disease-specific, and surgical factors on one-year postoperative PSS based on increase in AIC.