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TITLE: Standard versus the Alternative Center Line Techniques for Baseplate Fixation in Reverse Shoulder Arthroplasty: A Comparison of Anterior Shoulder Pain

BACKGROUND: Reverse total shoulder arthroplasty (RSA) has increasingly become a reliable intervention to improve function and pain for a variety of indications. Glenoid fixation is critical to the success of RSA and traditionally the anatomic center line is used allowing for central baseplate fixation. However, in cases of severe bone loss, baseplate fixation along the alternative center line has been described[1]. The baseplate axis is anteverted and inferiorly tilted allowing for fixation into a column of bone where the base of the scapular spine and coracoid meet, thereby prioritizing glenoid fixation. Previous studies have demonstrated no differences in pain, function, or complications when comparing the former technique to standard center line fixation[2]. However, there is concern that excessive anteversion may lead to pain related to anterior soft tissue or bony impingement. Therefore, the objective of this study was to investigate the outcomes of RSA in cases when the alternative center line was used for baseplate fixation and to specifically assess the incidence of anterior shoulder pain.

METHODS: This was a single-institution retrospective series of all primary or revision RSA patients who underwent glenoid baseplate fixation using an alternative center line with minimum two year follow up. A matched-cohort analysis was performed to compare the standard and alternative center-line groups (ratio 3:1) based on indication for surgery, age, and sex. Our primary outcome was anterior shoulder pain using the anterior shoulder pain and dysfunction survey (ASPDS). Secondary outcomes included the American Shoulder and Elbow Surgeons score (ASES), visual analogue pain scale (VAS), Single Assessment Numerical Evaluation (SANE), radiographic outcomes, and complications.

RESULTS: A total of 50 patients participated in our matched analysis (16 alternative center line group and 34 in the standard center line group). The mean age of our cohort was 65.4 ±9.3 years of which 28% were males. The average length of follow up was 62.6 ±37 months. Sixty-three and 70% of alternative and matched cases were revisions respectively. At final follow up, anterior shoulder pain was not significantly different between groups (28.1±9.2 vs. 28.2±7.0, p=0.96). Furthermore, ASES, VAS, and SANE scores did not differ significantly between groups postoperatively at final follow up. Three patients in the alternative center line group (18%) developed radiographic evidence of humeral loosening. Four patients developed notching (25%), and one patient had an instability episode (6%). There were no cases of baseplate failure in the alternative center line group. Postoperative RSA angle was significantly larger in patients treated with an alternative center line (36.6°±11 vs. 13.9°±6, p=0.03). In the control group, there was one patient with an acromial stress fracture, one with baseplate failure, and one with low notching.

Conclusion: In cases of severe bone loss, baseplate fixation along the alternative center line is a reasonable option with low complication rates. Though there is increased baseplate anteversion with this technique, our preliminary data did not demonstrate an increase in anterior shoulder pain with similar postoperative outcomes compared to the standard centerline technique following RSA.

Level of Evidence: III, Retrospective Cohort Study

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References:

1. Frankle MA, Teramoto A, Luo Z, et al. Glenoid morphology in reverse shoulder arthroplasty : Classification and surgical implications. *J Shoulder Elb Surg* 2009; 18: 874–885.

2. Colley R, Polisetty TS, Levy JC. Mid-term outcomes of reverse shoulder arthroplasty using the alternative center line for glenoid baseplate fixation: a case-controlled study. *J Shoulder Elb Surg* 2021; 30: 298–305.