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Mid-term Radiological Comparison after Reverse Total Shoulder Arthroplasty: Mini (Short) Versus Standard Stem

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Introduction and Background

Introduction: The purpose of this study was to compare the mid-term postoperative radiologic and clinical outcomes of micro- versus standard-length humeral stems in reverse total shoulder arthroplasty (RTSA). Although micro (short) stems are intended to preserve bone and facilitate revision, their fixation pattern and radiographic consequences within a single, consistent implant design remain uncertain.

Material and Method

Methods: We evaluated patients who underwent RTSA (Comprehensive Reverse Shoulder System, Zimmer Biomet, USA) using a standard or micro humeral stem with identical geometry. Immediate postoperative radiographs were reviewed to assess stem alignment and canal filling ratios at the metaphyseal and diaphyseal levels, including the presence of diaphyseal contact at the stem tip. Serial radiographs were examined for early indicators of proximal stress shielding (particularly around the greater tuberosity), radiolucent lines, loosening. Clinical outcomes included standardized shoulder function scores and range of motion (ROM). Between-group comparisons (standard n=35; micro n=47) were performed with significance set at $p<0.05$.

Results

Results: Eighty-two RTSA cases were analyzed (micro 47, standard 35). In the micro-stem group, most cases demonstrated diaphyseal contact at the stem tip, indicating a tendency toward diaphyseal fixation; filling ratios reflected relatively greater diaphyseal engagement compared with standard stems. There were no statistically significant differences between groups in radiographic findings, including greater tuberosity resorption, radiolucent lines, or evidence of gross loosening. Clinically, shoulder function scores and ROM were comparable, with no statistically significant differences between the micro and standard groups at mid-term follow-up.

Conclusions

Conclusion: In the Comprehensive Reverse Shoulder System, the micro stem design shows a tendency toward diaphyseal fixation and, from a stress-shielding standpoint, does not exhibit distinguishable advantages compared with the standard stem. However, by preserving proximal bone stock, the micro stem may offer practical benefits if revision surgery is required, potentially facilitating extraction and reconstruction, despite no clear mid-term clinical or radiographic superiority.

