

Long-Term Outcomes of Secondary Implant Removal and Arthrolysis in Patients with a Painful Stiff Shoulder After Open Reduction and Locking Plate Fixation for a Proximal Humeral Fracture

*Navnit S. Makaram, MBChB, MRCS; Christopher M. Robinson, MD
Royal Infirmary of Edinburgh, Edinburgh, United Kingdom*

Purpose: Open reduction and plate fixation (ORPF) for displaced proximal humerus fractures can achieve reliably good long-term outcomes. However, a minority of patients persist with pain and stiffness. These patients can benefit from open arthrolysis, subacromial decompression, and hardware removal (ADROM). The long-term outcomes of ADROM remain unknown. Our primary aim was to assess long-term outcomes of patients undergoing ADROM for stiffness following proximal humerus ORPF.

Methods: Between 1998 and 2018, 424 consecutive patients were treated with primary ORPF for proximal humerus fracture. ADROM was offered to symptomatic patients with a healed fracture at 6 months postoperatively, and performed through a deltopectoral approach. Patients were followed up prospectively with demographic data, fracture characteristics, and complications recorded. Active range of movement (aROM), Oxford Shoulder Score (OSS), and EuroQol 5 Dimensions 3-Level (EQ-5D-3L) were recorded preoperatively and postoperatively.

Results: 138 patients underwent ADROM; 111 patients were available for long-term follow-up at a mean of 10.9 years (range, 1-20). Mean age was 50.8 years (18-75); 79 (57.2%) were female. Mean time from primary ORPF to ADROM was 11.9 months (6-19). Five patients developed superficial wound infection; 10 patients developed late symptomatic humeral head osteonecrosis. Four patients underwent revision arthrolysis. Median OSS improved from 17 (interquartile range, 12.0-22.0) preoperatively to 40.0 (31.5-48.0) postoperatively ($P<0.001$) and 39.0 (31.5-46.5) at long-term follow-up ($P<0.001$). Median EQ-5D improved from 0.079 (-0.057 to 0.215) to 0.691 (0.441-0.941) postoperatively ($P<0.001$) and 0.701 (0.570-0.832) at long-term follow-up ($P<0.001$). aROM improved in all planes ($P<0.001$). On multivariate regression analysis, a manual occupation and being more socioeconomically deprived were independent predictors of lower OSS. A worsening Charlson comorbidity index was an independent predictor of lower EQ-5D.

Conclusion: ADROM in patients with persistent symptomatic stiffness following proximal humerus ORPF can achieve excellent short- and long-term outcomes. More socioeconomically deprived patients, those in a manual occupation, and those with worsening comorbidities are at greater risk of poorer outcomes following ADROM.