

## **Reverse Shoulder Arthroplasty Superior at 2 Years Compared With Plate Fixation for Displaced Proximal Humeral Fractures in the Elderly: A Multicenter Randomized Controlled Trial**

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**Purpose:** Treatment of displaced proximal humeral fractures (PHFs) is still controversial, and operative treatment is increasing despite sparse evidence on which operative treatment to prefer. In this clinical study comparing reverse shoulder arthroplasty and plate fixation, the hypothesis was that reverse arthroplasty yields better clinical results at 2 years.

**Methods:** This was a multicenter single-blinded randomized controlled trial comparing reverse shoulder arthroplasty and plate fixation for treating displaced PHFs type B2 and C2 (OTA/AO 2007 revision) in elderly patients. A total of 124 patients aged 65-85 years were included between January 2013 and May 2017, and were allocated to either reverse arthroplasty (64 patients) or plate fixation (60 patients). Constant score at 2 years was the primary outcome measure, and Oxford Shoulder Score (OSS) and radiologic measurements were secondary outcomes. Results were reported as mean difference with 95% confidence intervals (CIs). Intention-to-treat principle was held for cross-over patients.

**Results:** The mean age was 75 years in both treatment groups, and 90% of included patients were female. The reverse arthroplasty patients had a mean Constant score of 68.0 points (95% CI: 63.7, 72.4) at 2 years, compared with 54.6 points (95% CI: 48.5, 60.7) in the plate fixation group, a significant mean difference of 13.4 points (95% CI: 6.2, 20.6;  $P < 0.001$ ) in favor of reverse arthroplasty. Stratified for OTA/AO fracture classification, patients with type C2 PHFs scored 69.3 points (95% CI: 63.9, 74.7) in the reverse arthroplasty group and 50.6 points (95% CI: 41.9, 59.2) in the plate fixation group, a significant mean difference of 18.7 points (95% CI: 9.3, 28.2;  $P < 0.001$ ) in favor of reverse arthroplasty. For patients with type B2 PHFs, reverse arthroplasty scored 66.2 points (95% CI: 58.6, 73.8) and plate fixation 58.5 points (95% CI: 49.6, 67.4), a nonsignificant mean difference of 7.6 points (95% CI: 3.8, 19.1;  $P = 0.19$ ).

**Conclusion:** At 2-year follow-up, the data suggest an advantage of reverse arthroplasty over plate fixation for displaced OTA/AO type B2 and C2 proximal humeral fractures in elderly patients.