

Physical Therapy Does Not Improve Outcomes after Reverse Total Shoulder Arthroplasty: A Multicenter, Assessor-Blinded Randomized Clinical Trial

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INTRODUCTION: Reverse total shoulder arthroplasty (RTSA) alters the biomechanics of the shoulder and thus rehabilitation may be important postoperatively. The objective of this study was to compare range of motion (ROM) and patient-reported outcomes (PROs) between a structured home exercise program (HEP) and supervised physiotherapy (PT) after primary RTSA by performing a multicenter, assessor-blinded, randomized clinical trial.

METHODS: In this randomized clinical trial, patients undergoing primary RTSA at two centers were recruited. In the HEP group, patients were given a handout and a rope pulley but no further specific instructions and in the PT group a standardized protocol was prescribed. Surgical technique was standardized with respect to the implant, humeral version, and the subscapularis was not repaired. At baseline, six weeks postoperatively, three months postoperatively, and one year postoperatively, we obtained American Shoulder and Elbow Surgeons (ASES) scores, Western Ontario Osteoarthritis Scores (WOOS), visual analogue scale for pain (VAS) scores, and measured ROM. Specifically patients were asked to maximally forward elevate, abduct, externally rotate in adduction, and internally rotate in adduction while being videotaped. ROM was then measured on these videos by blinded observers after demonstration of inter-observer reliability. At all study visits, patients were asked how many days per week they were in PT and how many days a week they completed HEP to determine compliance and cross-over. An *a priori* power analysis suggested 29 patients per group, 56 patients total.

RESULTS:

All ROM measurements were reliable, with intra-class correlation coefficients of >0.923 and kappa values of >0.6 . Eighty-nine patients were randomized, 43 to PT, and 46 to HEP. We obtained one year PRO follow up on 83 patients (93%) and ROM follow up on 73 patients (82%). Nine patients (20%) crossed over from HEP to PT. Complications occurred in 13% of HEP and 17% of PT patients ($p=0.629$) and feelings of instability were present in 9% of HEP patients and 7% of PT patients ($p=1.000$). There were no significant differences between groups in the intent-to-treat analyses of either the final PROs or ROM variables at any postoperative timepoint. At one year, VAS was 0.8 ± 1.3 in the HEP vs. 1.4 ± 1.9 in the PT group ($p=0.13$), ASES 80 ± 19 vs. 78 ± 26 ($p=0.661$), WOOS 84 ± 14 vs. 75 ± 27 ($p=0.094$), satisfaction was 90% in both groups ($p=1.000$), abduction $137 \pm 32^\circ$ vs. $136 \pm 28^\circ$ ($p=0.952$), active forward elevation $131 \pm 31^\circ$ vs. $133 \pm 22^\circ$ ($p=0.692$), active adducted external rotation $32 \pm 19^\circ$ vs. $34 \pm 19^\circ$ ($p=0.657$), and active adducted internal rotation averaged at the waist in both groups ($p=0.562$). In the as-treated analysis, the HEP group had significantly better VAS-pain ($p=0.012$), WOOS ($p=0.006$), and abduction ($p=0.042$), but did not differ in any other outcome.

DISCUSSION AND CONCLUSION:

In this multicenter, assessor-blinded randomized clinical trial, a HEP provided an equivalently good outcome to PT after RTSA. Thus it is not necessary to recommend PT as a protocol for all patients after RTSA, with PT recommended as needed. However, those patients who fail HEP and in whom PT may be felt to be necessary are at risk for worse outcomes.

Figure 1. This column chart demonstrates mean American Shoulder and Elbow Scores for both groups at each time point in the intent-to-treat analysis. Error bars denote one standard deviation. There were no statistically significant differences at any timepoint.