

## Costs and Outcomes of Physical Therapy Following Shoulder Arthroplasty

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### INTRODUCTION:

Recent evidence has questioned the need for formal physical therapy (PT) following shoulder arthroplasty. The increasing demand of shoulder arthroplasty and emphasis on cost-effective care in our current healthcare environment requires physicians and hospitals to continuously identify areas for potential cost-savings while optimizing patient outcomes. This study compares the differences in costs and functional outcomes between patients who participated in formal PT and those who did not following primary anatomic total (aTSA) and reverse shoulder arthroplasty (RSA).

### METHODS:

Claims data from a single private insurer as well as the Centers for Medicare and Medicaid Services (CMS) Bundled Payment for Care Improvement (BPCI) was queried identifying patients who underwent primary aTSA or RSA between 2018 and 2019 by fellowship-trained surgeons in our tertiary referral practice. Demographics, comorbidities, 90-day episode-of-care (EOC), post-acute care (PAC), and inpatient costs, as well as number and cost of PT visits within the 90-day episode of care were recorded. Functional outcomes (American Shoulder & Elbow Surgeons (ASES) Score and Single Alpha Numeric Evaluation (SANE) Score), readmissions, complications, and episode-of-care costs were compared between patients who used formal PT services (home PT, outpatient PT, or both) [PT group] and those who did not [NPT group]. Patients who did not utilize formal PT services received a physician-guided, self-directed home exercise program. Only patients who completed functional outcomes scores at 2-year follow-up were included. Groups were compared using Student *t* tests or Mann-Whitney U tests, based on data normality. Categorical variables were compared with Chi-square or Fischer exact test.

### RESULTS:

139 patients were included in the analysis, 54 aTSA and 85 RSA. There were 107 patients in the PT group and 32 patients in the NPT group. Baseline ASES and SANE scores were comparable between PT and NPT groups (ASES: 37.5 vs 39.8,  $p=.58$ ; SANE: 35.1 vs 37.6,  $p=.53$ ). Overall, there was no difference in ASES or SANE scores between PT and NPT groups at 6-months (ASES: 79.8 vs 78.1,  $p=.76$ ; SANE: 74.7 vs 70.6,  $p=.66$ ), 1-year (ASES: 85.1 vs 81.6,  $p=.32$ ; SANE: 85.1 vs 78.7,  $p=.32$ ), or 2-years (ASES: 84.6 vs 85.3,  $p=.76$ ; SANE: 82.0 vs 86.2,  $p=.70$ ). Readmission rates (2.8% vs. 6.2%,  $p=.33$ ) and complication rates (14% vs. 28%,  $p=.10$ ) were comparable between PT and NPT groups. Among aTSA patients, the PT group achieved higher ASES scores (90.3 vs 77.8,  $p=.02$ ) at 1-year. There was no difference in ASES or SANE scores preoperatively, at 6-months, or at 2-years follow-up. Among RSA patients, there was no difference in ASES or SANE scores at any time point.

Patients in the PT group participated in an average of 14 therapy visits [range: 1-54]. Average cost per PT visit was \$107 [range: \$35-\$228]. Excluding patients discharged to Skilled Nursing Facilities (SNF), PAC costs were lower in the NPT group (\$1,425 vs \$2,845,  $p<.01$ ) and EOC costs (\$22,301 vs \$22,702,  $p<.01$ ), but there were no differences in inpatient costs (\$20,875 vs. \$19,856,  $p=.66$ ) compared to the PT group. In the PT group, PT averaged 6% of EOC costs and 51% of PAC costs.

### DISCUSSION AND CONCLUSION:

Participation in formal physical therapy accounts for 6% of total episode-of-care costs and approximately 50% of post-acute care costs following shoulder arthroplasty. Overall, there are no statistically significant differences in complications, readmission rates, or functional outcome measures at any time point between patients who participate in formal physical therapy and those who do not following shoulder arthroplasty. Physical therapy can accelerate functional outcomes in patients undergoing anatomic total shoulder arthroplasty at 1-year postoperatively, but this difference is not maintained at 2-years. While formal physical therapy may have a role in certain patients, those who are able to perform self-directed therapy can achieve equally good outcomes while lowering post-acute care costs.