Patient Outcomes Following Denied Rehabilitation After Total Wrist Arthroplasty: A Retrospective Review

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INTRODUCTION:
Postoperative rehabilitation is essential for optimizing TWA outcomes. Therapy must be individualized to the implant, tissue quality, and intraoperative ROM, with frequent, short movements to minimize joint and soft tissue stress. Close collaboration between surgeons and occupational therapists is crucial. Unfortunately, access to postoperative rehabilitation is often restricted by insurance coverage, and data on its impact remains limited. This study evaluates the effect of structured, occupational therapist–led rehabilitation on TWA outcomes by comparing ROM and QuickDASH scores between patients who received therapy and those who did not, while also analyzing complication rates and associated costs. We hypothesize that rehabilitation improves ROM, enhances function, reduces complications, and lowers overall costs.

METHODS: This retrospective cohort study, conducted with Institutional Review Board approval, included patients who underwent KinematX total wrist arthroplasty (TWA, CPT 25446) at a single tertiary institution between January 1, 2020, and February 19, 2025. Of 48 identified patients, 37 met inclusion criteria (≥18 years old, adequate follow-up), with exclusions for inadequate follow-up or procedures other than TWA. Sex was collected for this study which included 23 males and 14 females. Patients were divided into two groups: those who attended in-house occupational therapy (OT) and those who either used outside therapy, were denied coverage, or declined therapy. The primary outcomes were wrist range of motion (ROM: extension, flexion, pronation, supination, radial/ulnar deviation, and grip strength) and QuickDASH scores, measured preoperatively and at final follow-up. Secondary outcomes included complication rates, need for revision, and cost analysis based on Medicare reimbursement rates. Statistical analyses were performed using t-tests for continuous variables and chi-square or Fisher's exact tests for categorical variables. Power analysis determined that a minimum of 13 patients per group was needed for adequate statistical power.

RESULTS SECTION: There were no significant demographic differences between groups. Overall, 54% of patients received postoperative occupational therapy, while 46% did not, with over half of the non-therapy group denied coverage by insurance. Compared to the non-therapy group, the therapy group demonstrated significantly greater improvements in wrist extension (20° vs. 8°, p=0.025), as well as pronation and supination, whereas the non-therapy group showed declines in both measures (p=0.014 and p=0.005, respectively). No significant differences were found for flexion, radial/ulnar deviation, grip strength, or QuickDASH scores, though the therapy group trended toward greater functional improvement. Complications occurred in 15% of the therapy group compared to 47% of the non-therapy group, approaching statistical significance (p=0.069). All patients incurred a minimum procedural cost of $3,155; however, costs were significantly higher in the non-therapy group due to additional surgeries for complications (p=0.004).

DISCUSSION: Our study demonstrates that postoperative occupational therapy following TWA leads to significant improvements in wrist extension, pronation, and supination, as well as fewer complications and lower overall treatment costs compared to patients who did not receive therapy. Notably, most non-therapy cases were due to insurance denials, suggesting that systemic barriers directly contribute to poorer outcomes and higher costs. These findings mirror prior evidence from arthroplasty of the knee, shoulder, and small joints of the hand, where structured rehabilitation consistently improved function and reduced postoperative complications. While therapy clearly supports better outcomes, insurance restrictions remain a major obstacle to delivering optimal care, highlighting an important area for policy change. This study has several limitations. Its retrospective design and lack of randomization limit generalizability and allow for potential sampling bias. Functional outcome data (QuickDASH) were not available for all patients, possibly skewing results. Some patients may have received therapy at outside facilities without documentation, leading to misclassification in group assignment. Outcomes may also be implant-specific, as all procedures were performed with the KinematX prosthesis. Finally, as a single-institution study with limited sample size, these findings should be validated with larger, prospective, multicenter trials to better define the role and optimal regimen of rehabilitation after TWA.

SIGNIFICANCE/CLINICAL RELEVANCE: (1-2 sentences): Postoperative rehabilitation after total wrist arthroplasty is critical for optimizing range of motion, reducing complications, and minimizing the need for costly revision surgeries. Insurance denials that limit access to specialized therapy may compromise recovery, underscoring the need for policy changes to ensure equitable rehabilitation access and improved patient outcomes.

IMAGES AND TABLES:

	Overall (n=37)	Therapy (n=20)	Non-Therapy (n=17)	p-Value
Extension				
Baseline	33 ± 14	33 ± 15	31 ± 13	0.349
Final	46 ± 17	51 ± 10	39 ± 15	**0.022***
Delta	14 ± 18	20 ± 18	8 ± 15	**0.025***
Flexion				
Baseline	26 ± 15	25 ± 11	26 ± 18	0.416
Final	41 ± 18	40 ± 19	42 ± 19	0.386
Delta	17 ± 18	16 ± 19	16 ± 18	0.432
Pronation				
Baseline	70 ± 22	62 ± 26	81 ± 6	**0.005***
Final	79 ± 12	80 ± 13	79 ± 10	0.416
Delta	9 ± 26	17 ± 30	-3.2 ± 12	**0.014***
Supination				
Baseline	70 ± 26	64 ± 32	79 ± 10	**0.042***
Final	77 ± 14	76 ± 13	78 ± 16	0.338
Delta	12 ± 26	22 ± 29	-2 ± 13	**0.005***
Radial Deviation				
Baseline	7 ± 5	5 ± 4	8 ± 6	0.053
Final	14 ± 7	13 ± 6	15 ± 8	0.347
Delta	7 ± 7	8 ± 6	5 ± 9	0.241