

Other Surgical Factors Associated with Thumb Carpometacarpal Joint Arthroplasty: It's Not Just about Technique

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INTRODUCTION: Thumb carpometacarpal (tCMC) osteoarthritis is a common musculoskeletal ailment that presents with progressive joint pain and decreased thumb strength and range of motion. Treatment is often nonsurgical initially, yet surgery may be indicated based on progression of disease, pain, or decreased function. Several surgical techniques exist for tCMC arthritis, but a superior surgical technique has not yet been identified. The purpose of this study is to determine other surgical factors that would distinguish a superior surgical technique for tCMC arthroplasty.

METHODS:

Patients who underwent tCMC arthroplasty by one of five fellowship trained hand surgeons between January 2015 and January 2021 were queried. Surgical technique was assessed by reviewing operative notes. Patient demographics, surgical details, clinical outcomes, and patient-reported outcome (PRO) data was collected. PROs utilized as part of this study included a pain management questionnaire, PROMIS Bank v2.0 – Upper Extremity, PROMIS Bank v1.1 – Pain Interference, and the QuickDASH outcome measurement. Revision procedures and patients that had additional operations at the time of the tCMC arthroplasty were excluded.

RESULTS:

Overall, 148 records (132 patients) met inclusion criteria: 48 (32.4%) underwent suture suspensionplasty, 32 (21.6%) underwent ligament reconstruction and tendon interposition (16 with pinning, 16 without pinning), 22 (14.9%) underwent suture anchors and suture tape suspension, 35 (23.6%) underwent palmaris longus tendon weave, and 11 (7.4%) patients underwent other techniques or combinations. Patient age at surgery, BMI, and comorbidities were similar between groups. After adjusting for age, BMI, and Charlson Comorbidity Index (CCI), tourniquet time was significantly reduced in patients that underwent ligament reconstruction and tendon interposition with pinning (mean 44.9 ± 13.5 min, p < 0.001). Suture anchor and suture tape suspension was significantly more expensive than the other techniques (mean \$19,062 ± 3,872, p < 0.001). There was no difference in complications between groups. A subanalysis of PROs including the Promis v1.1, Promis v2.0, and QuickDASH revealed no significant difference between groups.

DISCUSSION AND CONCLUSION: Patients who undergo tCMC arthroplasty for treatment of tCMC OA can expect good clinical outcomes from a variety of surgical techniques. Aspects of tCMC arthroplasty, such as tourniquet time and cost, should be considered when planning surgery. Surgical techniques for tCMC arthroplasty do not differ in patient-reported outcomes or clinical outcomes. Larger, randomized studies should be pursued to further delineate if differences exist between surgical techniques.

Table 1. Surgical information and clinical outcomes. LRTI = Ligament reconstruction and tendon interposition, SA and ST = Suture anchor and suture tape, PL = Palmaris longus

| | Suture suspensionplasty (n = 48) | LRTI with pinning (n = 16) | LRTI without pinning (n = 16) | SA and ST suspension (n = 22) | PL tendon weave (n = 35) | Other (n = 11) | P-value |
|----------------------------------|----------------------------------|----------------------------|-------------------------------|-------------------------------|--------------------------|----------------|----------|
| Tourniquet time, mean ± SD | 55.9 ± 11.3 | 44.9 ± 13.5 | 69.6 ± 11.2 | 57.8 ± 13.8 | 57.0 ± 12.0 | 60.3 ± 23.1 | < 0.0001 |
| Tourniquet before closure, n (%) | 29 (60.4) | 16 (100.0) | 6 (37.5) | 3 (13.6) | 4 (11.4) | 8 (72.7) | < 0.0001 |
| Postop Complication, n (%) | 0 (0.0) | 2 (12.5) | 1 (6.3) | 1 (4.5) | 0 (0.0) | 2 (18.2) | -- |
| Reoperation, n (%) | 0 (0.0) | 1 (6.3) | 1 (6.3) | 1 (4.5) | 3 (8.6) | 0 (0.0) | -- |
| Final ROM (full), n (%) | 43 (89.6) | 12 (75.0) | 11 (68.8) | 19 (86.4) | 26 (74.3) | 8 (72.7) | 0.25 |
| Cost, (\$) | 12733 ± 1528 | 12539 ± 2028 | 12707 ± 17934 | 19062 ± 3872 | 12776 ± 1809 | 14405 ± 2726 | < 0.0001 |

Table 2. Patient-reported outcomes. LRTI = Ligament reconstruction and tendon interposition, SA and ST = Suture anchor and suture tape, PL = Palmaris longus

| | Suture suspensionplasty (n = 48) | LRTI with pinning (n = 16) | LRTI without pinning (n = 16) | SA and ST suspension (n = 22) | PL tendon weave (n = 35) | Other (n = 11) | P-value |
|----------------------------------|----------------------------------|----------------------------|-------------------------------|-------------------------------|--------------------------|----------------|---------|
| PROMIS v1.1, mean | 50.7 | 46.8 | 53.2 | 46.5 | 48.4 | 46.0 | 0.70 |
| PROMIS v1.1 Standard Error, mean | 2.7 | 3.8 | 2.8 | 3.7 | 3.2 | 3.7 | -- |
| PROMIS v2.0, mean | 48.6 | 48.7 | 42.8 | 41.2 | 48.5 | 48.0 | 0.70 |
| PROMIS v2.0 Standard Error, mean | 3.5 | 4.0 | 2.9 | 3.0 | 3.6 | 3.4 | -- |
| QuickDASH, mean | 16.3 | 12.4 | 24.4 | 26.1 | 11.4 | 6.2 | 0.19 |