

Comparative Evaluation of Surgical Procedures with Clinical Equipoise: the Unique Perspective of Our Hand Therapy Colleagues

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Abstract *Background:* There are several accepted surgical treatment options available for carpal tunnel syndrome, thumb carpometacarpal joint (CMC), osteoarthritis (OA), and wrist degenerative joint disease. *Questions/Purposes:* We sought to obtain the views and preferences from a cohort of certified hand therapists (CHT) and hypothesized that this source may identify differences in procedures that are otherwise widely believed to have clinical equipoise. *Methods:* Five hundred twelve CHTs were surveyed regarding their experience, volume, and referral base along with their subjective assessments and preferences regarding open versus endoscopic carpal tunnel release (CTR), various surgical procedures for CMC OA, and proximal row carpectomy (PRC) versus 4-corner fusion (4-CF). *Results:* The average CHT surveyed had 15.2 years experience and had a referral base of 7.7 different hand surgeons. Twenty-seven percent of respondents perceived superior pain control and incisional tenderness following open CTR compared to that of endoscopic CTR. However, 68% of CHTs would elect to undergo an open CTR themselves. There was no clear consensus for the optimal reconstructive technique for thumb CMC

OA. As compared to that of 4-CF, PRC was thought to result in superior pain control (34 versus 22%), motion (43 versus 18%), and earlier discharge from therapy (32 versus 19%); however, 53% of respondents would prefer a 4-CF for themselves. *Conclusions:* Hand therapists are intimately involved in the care of surgical patients and provide an educated and unique source for evaluating postoperative outcomes.

Keywords hand therapy · CHT · carpal tunnel syndrome · arthritis

Introduction

Some of a hand surgeon's most frequently encountered problems, carpal tunnel syndrome (CTS), thumb carpometacarpal (CMC) joint, osteoarthritis (OA), and wrist degenerative joint disease (DJD)—have multiple treatment options with clinical equipoise. Using an evidence-based approach to choosing a procedure is optimal, but oftentimes, the literature is inconclusive with individual techniques being variably advocated [5, 7, 15]. As a result, a multitude of other factors such as surgeon experience and familiarity, training background, procedural ease and fluidity, anecdotal evidence, patient anatomy and preferences, cost, and industry relationships may play increasingly important roles in how an individual surgeon chooses their treatment of choice.

CTS may be surgically treated by division of the flexor retinaculum via either an open or endoscopic technique with neither being clearly documented as superior [5]. CMC OA has a myriad of surgical solutions, with a recent Cochrane Database analysis of seven common surgical options unable to demonstrate that any specific surgical technique conferred a clear benefit over another [15]. In wrist DJD developing as a result of scaphoid non-union advanced collapse (SNAC) or scapholunate advanced collapse (SLAC), certain stages may ultimately be managed with either proximal row carpectomy

Investigation performed at Stanford University Medical Center, Redwood City, CA.

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(PRC) or midcarpal/4-corner fusion (4-CF), with similar outcomes being reported via systematic review [7].

The purpose of this study was to illuminate the views of Certified Hand Therapists (CHT) regarding their evaluation of postoperative course and outcomes following various common and controversial procedures in hand surgery. CHTs represent a well-educated and experienced cohort who spends a considerable amount of time (often daily) with patients postoperatively. They are intimately involved in the rehabilitative course and may be uniquely aware of the pros and cons, and subtle outcome differences following these procedures. Their preferences for patients and for themselves in a theoretical situation could potentially provide intriguing and clinically useful outcomes data to hand surgeons. Specifically, the purpose of this study was to use a survey of CHTs to elucidate experiences and preferences regarding the following: (1) open versus endoscopic treatment of CTS, (2) surgical treatment of thumb CMC OA, and (3) PRC versus 4-CF salvage procedures for wrist DJD.

Materials and Methods

This study was deemed exempt from institutional review board approval by our institution. A 20-question survey (Appendix 1) was administered to all members of the American Society of Hand Therapists via an emailed link to an online survey made with a web-based survey and questionnaire tool (www.surveymonkey.com). The link was sent on two occasions with a 30-day interval in between, with the software permitting only one response per email address.

The survey aimed to assess CHT experience, volume, referral base, and opinions following surgical treatment of CTS, CMC OA, and wrist DJD. For CTS, respondents were asked to compare pain and incisional tenderness between open and endoscopic release techniques. For CMC OA, respondents were asked the proportion of various procedures performed in patients they treat and asked their opinions regarding which technique resulted in superior pain control, range of motion, thumb position, and time to discharge. Regarding CMC OA techniques, a comprehensive list of multiple-choice options was not feasible, so the most commonly performed techniques [1] were offered along with an “other” option. For wrist DJD, the CHTs were asked to compare PRC and 4-CF in terms of pain control, range of motion, and time to discharge. A number of additional questions were entertained, but an effort was made to succinctly address the underlying questions with minimal survey length in order to maximize responses. A comment section was also included, but not formally used in the analysis.

In addition to the subjective outcome assessments, CHTs were asked to select which procedure they would elect to have performed on themselves if clinically necessary for each of the three treatment dilemmas. Estimated completion time was 3 min, and no follow-up inquiries were sent. A response was required for all questions for inclusion. Participants were not granted access to the results, which were

stored online and only accessible to the primary author via password protection.

Respondents’ answers were tabulated using Microsoft Excel. Means were calculated for all demographic data, and percentages were used to create parts-of-whole tables for each remaining question. In line with previously published survey studies, statistical analysis was not performed as this project was not intended to be scientific in design [1, 8, 12].

Results

The survey was sent to 2371 CHTs, and responses were received from 512 (22% response rate). The average CHT surveyed had 15.2 years experience (range 1–36 years, median 15), treated 38.5 patients per week (range 5–79, median 36), and had a referral base of 7.7 different hand surgeons (range 1–20, median 8).

Carpal Tunnel Syndrome

The respondents reported treating an average of 6.1 postoperative CTR patients per month, of which 67% are open versus 33% endoscopic releases. The majority of CHT respondents (48%) believed endoscopic CTR had superior pain control and less incisional tenderness, whereas 27% thought open CTR was superior, and 25% thought there was no notable difference (Fig. 1). Despite their concerns for increased postoperative pain, 68% of CHTs would prefer their own CTR to be performed via an open technique whereas 32% would prefer an endoscopic release.

Thumb CMC Osteoarthritis

For thumb CMC OA, CHTs reported treating on average 5.7 postoperative patients per month. The most common procedure performed was ligament reconstruction and tendon interposition (LRTI) (45%), followed by simple trapeziectomy (23%), TightRope (Arthrex, Naples, FL) suspensionplasty (12%), trapeziectomy and pinning (12%), and “other” (8%). The preferred technique that CHTs would choose for themselves as a patient was LRTI (62%),

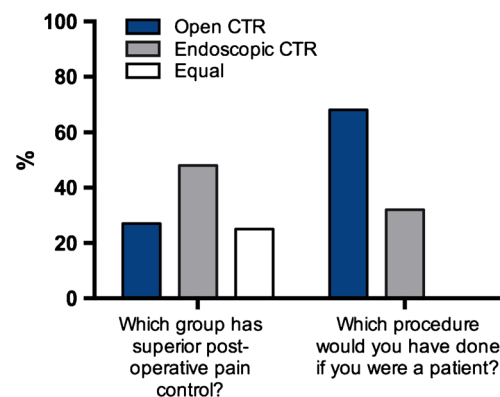


Fig. 1. Carpal tunnel release (CTR) survey results. Certified hand therapists were asked to compare pain control and incisional tenderness following open versus endoscopic CTR. They were also asked what procedure they would undergo in a hypothetical situation.

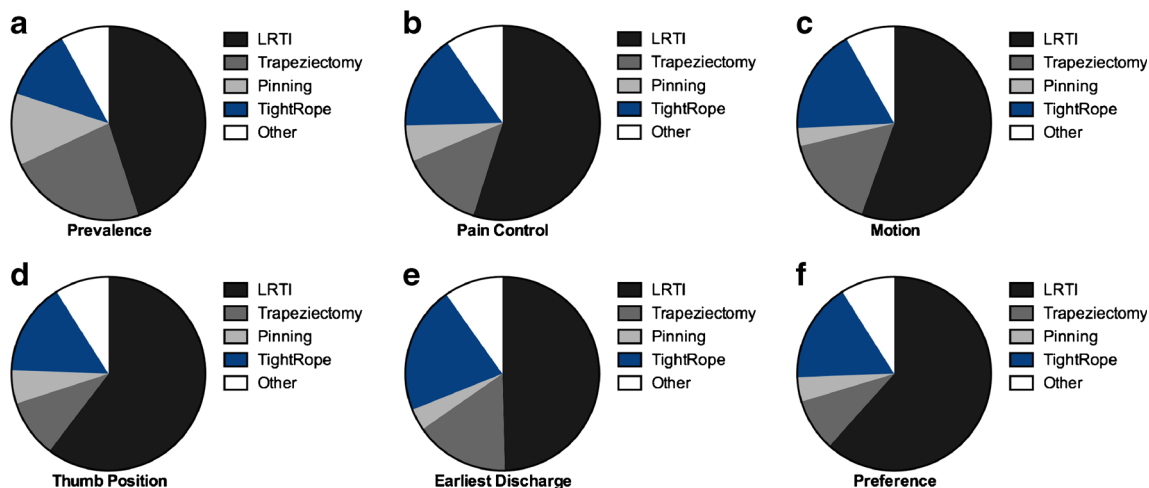


Fig. 2. Thumb carpometacarpal joint osteoarthritis surgery survey results. Certified hand therapists’ responses regarding a frequency of various surgical procedures in postoperative patients treated, and opinions regarding which cohort has superior b pain control, c motion, d thumb position, and e earliest discharge from their care. f Respondents were also asked which procedure they would prefer for themselves in a hypothetical situation. *LRTI* ligament reconstruction and tendon interposition.

TightRope (17%), “other” (9%), simple trapeziectomy (8%), and trapeziectomy and pinning (4%). Survey results regarding various postoperative subjective measures are shown in Fig. 2.

Wrist Degenerative Joint Disease

The CHTs surveyed treated on average 1.9 patients per month following wrist salvage procedures, of which 54% were PRC and 46% were 4-CF. The CHT responses regarding pain control, motion, and time to discharge are shown in Fig. 3. PRC was reported to lead to improved postoperative pain and motion and earlier discharge. Nevertheless, 53% of CHTs would prefer a 4-CF if they were a patient and 47% would opt for a 4-CF.

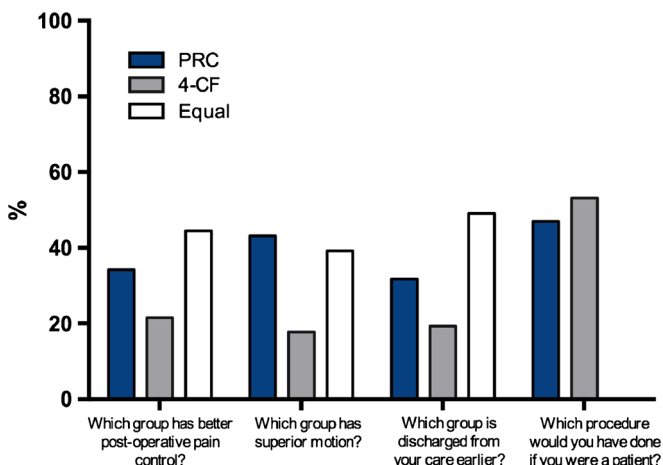


Fig. 3. Wrist degenerative joint disease survey results. Hand therapists were queried regarding perceived differences between proximal row carpectomy (PRC) and 4-corner fusion (4-CF) in terms of pain control, wrist range of motion, and time to discharge. They were also asked what procedure they would elect to have performed in a hypothetical situation.

Discussion

Hand therapists’ opinions present a novel source for evaluating outcomes of procedures commonly performed by hand surgeons. When two surgical options have similar reported outcomes in the literature, the CHT viewpoint may be useful to both surgeons and patients alike when contemplating the ideal procedure. CHTs are a highly experienced and specialized group. The credentialing process requires, in addition to an occupational or physical therapy degree, a minimum of 5 years of clinical experience, over 4000 h of direct hand therapy practice, passing an examination, and regular recertification [4]. Given their expertise and unique perspective, we feel their assessment of patient outcomes provide another valuable source of data to hand surgeons regarding management of CTS, thumb CMC OA, and wrist DJD.

This study has some limitations. The CHTs surveyed represent a subset of the providers nationwide, and like all surveys, it is unclear how well these responses reflect the overall opinions within the field. Additionally, therapy is usually focused and most frequently performed in the early postoperative period, so perhaps these opinions are more reflective of the early and intermediate patient outcomes and are unlikely to fully capture long-term results. No outcome scores, measurements, or formal evaluations were included, and the comparisons relied upon the experience of the CHTs and accuracy of their responses. CHT opinions are likely formulated based on the patients they treat, and given that only a minority of patients sees a therapist following CTR, there is a possibility of selection bias. Procedures for wrist DJD are comparatively rare relative to CTR and CMC OA procedures. Additionally, the indications are heterogeneous, which may limit conclusions that can be drawn from directly comparing 4-CF and PRC.

Carpal tunnel syndrome is the most commonly surgically treated compression neuropathy, with over 600,000 releases performed annually in the USA [2]. Given similar outcomes

between endoscopic and open CTR, the most recent American Academy of Orthopedic Surgeons clinical practice guidelines for carpal tunnel syndrome “recommend surgical treatment of carpal tunnel syndrome by complete division of the flexor retinaculum regardless of the specific surgical technique” [5]. Several recent surveys have queried hand surgeons regarding their surgical management of carpal tunnel release and have found rates of endoscopic CTR between 20–36% [6, 8, 12]. Endoscopic CTR is being increasingly performed [13], the reasons for which are unclear, but have been reported to include decreased operative time [11], higher relative value unit (RVU) rate [3], or patient perception and preferences [13, 14].

Our survey results reflect previously reported frequencies of open versus endoscopic CTR, as 67% of postoperative patients seen by CHTs had an open procedure versus 33% having an endoscopic CTR. In the present study, similar to other reports [11, 14], pain and incisional tenderness were found to be superior following endoscopic CTR in the period that they were evaluated by the CHTs. However, despite this favorable assessment of early endoscopic outcomes, the majority of CHTs (68%) would interestingly prefer their own CTR to be performed via an open technique. The reason for this discrepancy is unclear and is possibly due to the strong and impactful negative experience resulting from the infrequent, but notable complications more commonly seen following endoscopic release (e.g., neurologic injury). As one CHT wrote in the comment section, “I have seen one cut median nerve from an endoscopic release in 25 years, and this terrible risk outweighs any benefit.”

Evidence for optimal surgical management of CMC OA is also plentiful though inconclusive [15]. Surgical treatment most commonly involves trapeziectomy, which is variably followed by ligamentous reconstruction with or without interposition, hematoma distraction arthroplasty with or without pinning, or one of various synthetic arthroplasties [1]. We chose to compare soft tissue reconstructions (LRTI and suspensionplasties) with trapeziectomy alone and distraction pinning—the three most commonly performed procedures by ASSH hand surgeons according to a 2010 member survey [1]. We also included TightRope CMC suspension as this was introduced after the aforementioned survey and has outcomes being increasingly reported [9, 10, 16]. Finally, we included an “other” designation to capture various infrequently utilized techniques.

A 2015 review from the Cochrane Database analyzed 11 randomized controlled trials for outcomes and adverse events seen following seven different surgical procedures for CMC OA and was “unable to demonstrate that any technique confers a benefit over another technique in terms of pain and physical function [15].” Our results show no conclusive differences in outcomes as assessed by CHTs, as the preferred outcomes closely mirror the frequency of the reported incidence (Fig. 2). In other words, the therapists tended to prefer the procedures they saw most in their practices. This correlates well with the concept that all techniques perform well, and this would be witnessed by the therapists postoperatively.

The available literature regarding optimal surgical management of SLAC and SNAC wrists with PRC and midcarpal/4-CF salvage procedures is also inconclusive. A

systematic review collated 52 articles examining outcomes of 1798 SLAC or SNAC wrists who had undergone PRC or 4-CF [7]. Despite individual trial biases, pain relief, grip strength, and subjective outcomes were similar following both techniques. The authors concluded that PRC may provide slightly improved range of motion without the non-union and symptomatic hardware issues specific to 4-CF.

In the present study, many CHT respondents observed outcomes to be equivalent in terms of pain control (44%), motion (39%), and time to discharge (49%). Of the CHT respondents who favored one technique, PRC was more often deemed to be superior to 4-CF in terms of pain control (34 versus 22%), motion (43 versus 18%), and earlier discharge (32 versus 19%). One possible explanation for these differences is that 4-CF tends to be immobilized for a longer period of time while the fusion consolidates, which could account for the differences observed by CHTs in the early postoperative period. Ultimately, despite these subtle differences, therapists were split when selecting their own treatment in a hypothetical scenario, with very similar proportions selecting PRC (47%) and 4-CF (53%).

In conclusion, CHTs’ knowledge and experience provide a unique set of opinions and subjective data regarding several controversial surgical topics in the field of hand surgery. CHTs spend significantly more time than surgeons with patients in the early postoperative period and potentially get a more objective, honest, and thorough assessment of the postoperative course, the patient’s function, and level of comfort. Despite inherent limitations, this survey study reports experiences from essential members of the hand surgery perioperative team—the hand therapists—and provides valuable insight and information that may be worthwhile to surgeons and patients alike.

Compliance with Ethical Standards

Conflict of Interest: Joseph J. Schreiber, MD and Susan Clark, BS have declared that they have no conflict of interest. Jeffrey Yao, MD reports personal fees from Arthrex, Smith and Nephew Endoscopy, BME, Trimed, McGinley Orthopedics, and grants from Medartis, outside the work.

Human/Animal Rights: All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008 (5).

Informed Consent: N/A

Required Author Forms Disclosure forms provided by the authors are available with the online version of this article

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