Surgeon Preference, Influence, and Treatment of Thumb Carpometacarpal Arthritis

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Zachary Deutch¹, Steven R. Niedermeier¹, and Hisham M. Awan¹

Abstract

Background: The purpose of this study was to evaluate current surgical practice patterns, the factors that influence these patterns, and overall trends in the treatment of thumb carpometacarpal osteoarthritis. **Methods:** An online survey containing 14 questions was sent to all active members of the American Society for Surgery of the Hand. Information on demographics and treatments was collected. Results were anonymously uploaded to an online spreadsheet. **Results:** A total of 823 responses were recorded. Trapeziectomy with ligament reconstruction and tendon interposition (LRTI) using whole flexor carpi radialis was the most popular technique at 37.44%. In all, 26.38% of surgeons with fewer than 5 years of experience utilize trapeziectomy with suture suspension (bone anchor based or tendon based); 55.76% choose a particular procedure because of “Personal Clinical Experience” over “Current Evidence” and “Training.” In addition, 24.17% of surgeons who have been practicing for longer than 5 years have changed procedures in the last 5 years. In the United States, 97.2% of hand surgeons prescribe either oxycodone or hydrocodone postoperatively compared with just 23.75% of international hand surgeons. **Conclusions:** The results show that trapeziectomy with LRTI remains the most popular treatment of choice. The use of trapeziectomy with suture suspension is on the rise, particularly in younger surgeons. International hand surgeons rely more on current evidence, utilize less postoperative therapy and opioid medications, and change procedures more often than US hand surgeons.

Keywords: CMC arthritis, trapeziectomy, ligament reconstruction, tendon interposition, survey

Introduction

Carpometacarpal (CMC) arthritis of the thumb is the most common form of osteoarthritis in the hand and fairly prevalent with estimates as high as 15% in adults aged above 30.^{6,11} CMC arthritis is particularly frequent in postmenopausal women with upward of one-fourth of women affected by the condition.^{1,3} In addition, the risk of CMC arthritis is also known to increase as one ages. According to one study, the prevalence of CMC arthritis in individuals older than 80 years was close to 90%.³ Thus, optimizing treatment of CMC arthritis is of tremendous importance.

Multiple surgical techniques are available to surgeons who treat CMC arthritis. Some of the most common techniques include trapeziectomy, trapeziectomy with tendon interposition ± ligament reconstruction (LRTI), CMC arthrodesis, implant arthroplasty, metacarpal osteotomy, and arthroscopic debridement. To date, no procedure has consistently been shown to be superior despite many being well described in the literature.¹² Nevertheless, most surgeons continue to prefer a technique that includes some form of LRTI, and most data continue to use LRTI as the gold stan-

dard procedure by which other techniques are compared. However, there has been growing evidence that LRTI is associated with greater complications, such as scar tenderness, sensory change, and regional pain syndromes compared with simpler techniques like trapeziectomy only.^{9,15-17}

Two papers have previously examined trends in the treatment of CMC arthritis, both of which occurred more than 5 years ago.^{4,18} In both papers, at least 60% of physicians who responded said they use trapeziectomy with LRTI as their primary treatment of choice. The purpose of this study was to investigate whether there have been any changes in surgeon preferences in treating end-stage CMC arthritis. This includes surgical technique as well as postoperative treatment such as therapy, length of immobilization,

¹The Ohio State University Wexner Medical Center, Columbus, USA

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Corresponding Author:

Hisham M. Awan, The Hand and Upper Extremity Center, The Ohio State University, 915 Olentangy River Road, Suite 3200, Columbus, OH 43212, USA.

Email: hisham.awan@osumc.edu

and pain medications. We also hope to identify any underlying influences on physician treatment choices (ie, region, practice setting, experience, etc).

Materials and Methods

An online survey consisting of 14 questions was created and sent to members of the American Society for Surgery of the Hand (ASSH; $n = 3354$). Permission was granted by the ASSH website committee to distribute the survey to members using the electronic mailing list. Results of the study were uploaded anonymously to an online spreadsheet to organize the results. Members were given 2 months to respond to the survey, and a follow-up reminder email was sent at the midpoint. This study was exempt from institutional review board approval at our institution.

Demographic information included region of practice (South, Midwest, West, Northwest, Northeast, and International), years in practice, volume of surgeries treating CMC arthritis performed within a given year, specialty training (orthopedic surgery, plastic surgery, general surgery, and other), and practice setting (academic/university hospital, community hospital, and private practice). Ten options were given to participants for the surgical procedure they preferred when treating CMC arthritis. Finally, several questions regarding anesthesia use during surgery, postoperative use and length of physical therapy, postoperative pain medication, and length of immobilization were asked. Of the 14 questions originally included, 1 question, which asked surgeons which procedure they performed 5 years ago, was excluded from the results due to a clerical error (Table 1).

Data were exported to Microsoft Excel (Redmond, Washington) for analysis. Frequency distributions for all variables were created. Bivariate and trivariate analyses were utilized for practice variables and demographic data. When appropriate, categories were combined (ie, South, Midwest, West, Northwest, and Northeast combined to "US"). All statistical analyses were computed using a 2-sided z test with alpha of .05 as a threshold for significance. Unless otherwise specified, a P value is comparing a given statistic with the grand total.

Results

A total of 823 responses were recorded out of 3354 surgeons known to be members of the ASSH. Our distribution of location, specialty, and years of experience is similar to other similar studies.^{4,7,18} The vast majority of respondents were trained in orthopedic surgery (83.41%), perform 11 to 50 cases per year (62.06%), and work in a private practice setting (62.14%). More results on immobilization and sedation are presented in the Appendix, available in the online version of the article.

Table 1. All Survey Results.

	Total responses	% Total responses
Q1: In which region do you practice?		
South	197	23.8
Midwest	177	21.4
West	154	18.6
Northeast	152	18.4
Northwest	46	5.6
International	102	12.32
Q2: In which specialty were you trained?		
Orthopedic surgery	690	83.4
Plastic surgery	100	12.1
General surgery	38	4.4
Q3: How many years have you been practicing?		
0-5 y	164	20.1
6-15 y	213	26.1
16-25 y	263	32.2
Greater than 25 y	177	21.7
Q4: How many surgeries do you perform per year to treat CMC arthritis?		
0-10	142	17.2
11-50	513	62.11
51-100	146	17.7
Greater than 100	25	3.0
Q5: In what type of setting do you practice?		
Academic/university hospital	179	21.7
Community hospital	134	16.2
Private practice	512	62.1
Q6: Which procedure do you currently perform to treat end-stage CMC arthritis in the majority of your patients?		
Trapeziectomy only (hematoma arthroplasty) with or without pinning	59	7.1
Trapeziectomy with LRTI using half FCR	152	18.3
Trapeziectomy with LRTI using whole FCR	310	37.4
Trapeziectomy with APL suspensionplasty	128	15.4
Trapeziectomy with suture suspension (ie, TightRope or other suture)	103	12.4
CMC arthrodesis	5	0.6
Implant arthroplasty (any type)	14	1.7
Metacarpal osteotomy	0	0
Arthroscopic debridement	4	0.5
Other	54	6.5
Q7: Among the options listed below, which one best depicts your reasoning for your choice in question 6?		
The procedure is what I primarily did during my training	181	21.9
Current evidence suggests that this technique has the best outcomes and the lowest complication rate	128	15.5
The procedure is what my group agreed would be performed in our practice	8	1.0
The compensation for the procedure is higher compared with others	2	0.2
Other	47	5.69
Q8: If you have been practicing longer than 5 years, is your current preferred treatment choice in question 6 the same as it was 5 years ago?		
Yes, it is the same	509	62.6
No, it is different	162	19.9
I have not been practicing for 5 years	142	17.5
Q9: If you or a loved one had end-stage CMC arthritis, which procedure would you want to be performed on you or your loved one?		

(continued)

Table 1. (continued)

	Total responses	% Total responses
Trapeziectomy only (hematoma arthroplasty) with or without pinning	57	6.9
Trapeziectomy with LRTI using half FCR	154	18.7
Trapeziectomy with LRTI using whole FCR	300	36.4
Trapeziectomy with APL suspensionplasty	120	14.6
Trapeziectomy with suture suspension (ie, tight rope or other suture)	109	13.2
CMC arthrodesis	5	0.6
Implant arthroplasty (any type)	24	2.9
Metacarpal osteotomy	0	0
Arthroscopic debridement	6	0.7
Other	50	6.1
Q10: How long do you require your patients to be fully immobilized?		
I do not require my patients to be immobilized	19	2.31
2 wk or less	156	18.9
Between 2 and 4 wk	261	31.67
Between 4 and 6 wk	372	45.2
Greater than 6 wk	16	1.9
Q11: What type of anesthesia do you primarily use during your procedure?		
IV sedation with local	13	1.6
Bier block	36	4.35
General	337	40.8
WALANT	5	0.6
Regional block with sedation	425	51.5
Other	11	1.3
Q12: Do you usually recommend postoperative hand therapy?		
Yes	649	78.9
No	146	17.7
Unsure	5	0.6
Other	23	2.8
Q13: What type of postoperative pain medication do you normally prescribe to patients after surgery?		
Hydrocodone + derivatives	408	49.3
NSAIDs	58	7.0
Oxycodone + derivatives	323	39.0
Non-narcotics (excluding NSAIDs)	27	3.3
Other	12	1.5

Note. CMC = carpometacarpal; LRTI = ligament reconstruction and tendon interposition; FCR = flexor carpi radialis; APL = abductor pollicis longus; IV = intravenous; WALANT = wide-awake local anesthesia with no tourniquet; NSAIDs = nonsteroidal anti-inflammatory drugs.

Treatment of Choice

There was a direct correlation between the number of procedures performed and choosing trapeziectomy with LRTI using whole FCR. Among the 25 physicians who perform more than 100 surgeries per year, 52% utilize trapeziectomy with LRTI using whole FCR in comparison with 23.57% of the 140 surgeons who perform 0 to 10 surgeries per year ($P = .0035$). Among the nontraditional procedures that do not include trapeziectomy as a component of the procedure, implant arthroplasty was the only procedure that appeared to increase in surgeons who perform the most procedures compared with the grand total (8% vs 1.7%; $P = .0225$).

Choice of procedure seems to be less dependent on the experience of the surgeon (Table 2). Among surgeons with

0 to 5 years of experience, 35.58% employ trapeziectomy with LRTI using whole FCR compared with 28.16% of surgeons with greater than 25 years of experience ($P = .105$). Trapeziectomy with suture suspension, conversely, is significantly more common in newer surgeons, with 26.38% of surgeons with 0 to 5 years of experience opting for this technique ($P < .001$ compared with both “Grand total” and “Greater than 25 years”). Nonetheless, trapeziectomy with LRTI using whole FCR still remains the most popular procedure within surgeons with 0 to 5 years of experience.

With regard to training, orthopedic surgeons are significantly more likely to perform trapeziectomy with LRTI using whole FCR and much less likely to perform trapeziectomy with LRTI using half FCR when compared with plastic surgeons (41.08% vs 18% and 14.33% vs 37%, respectively; $P < .001$ for both).

When asked which procedure a surgeon would prefer to be performed on himself or herself or a loved one, surgeons greatly prefer the procedure they perform on their patients. For each given procedure, at least 90% of surgeons who perform the procedure would want the technique they selected to be performed on himself or herself if he or she were to have end-stage CMC arthritis, with the exception of CMC arthrodesis.

Within the United States, region does not appear to be a significant factor in procedure choice.

Changes in the Last 5 Years

Among physicians who have been practicing for longer than 5 years ($n = 656$), 24.17% have changed procedures in the last 5 years (Tables 3 and 4). The procedure switched to the most among this group was trapeziectomy with suture suspension followed by trapeziectomy with abductor pollicis longus (APL) suspensionplasty, and trapeziectomy only. Trapeziectomy with LRTI using whole FCR, the most common overall procedure, made up just 14.91% of this group. Only 6.21% of surgeons who have changed procedures in the last 5 years switched to arthroscopic debridement, CMC arthrodesis, or implant arthroplasty.

Postoperative Therapy

Overall, 78.61% of surgeons recommend postoperative therapy. Younger surgeons are more likely to utilize therapy. A large number (90.18%) of surgeons with 0 to 5 years of experience recommend therapy ($P = .0007$). In contrast, only 67.24% of surgeons with greater than 25 years of experience recommended therapy ($P = .0013$). In addition, volume also appeared to have an inverse relationship with use of postoperative therapy but was not shown to be significant. No relationship was identified between practice setting and use of postoperative therapy.

Table 2. Procedure Choice Versus Experience.

	0-5 years (%)	16-25 years (%)	6-15 years (%)	Greater than 25 years (%)	Total (%)
Arthroscopic debridement	0.00	0.77	0.00	1.15	0.49
CMC arthrodesis	0.00	0.38	0.94	1.15	0.61
Implant arthroplasty (any type)	1.23	3.45	0.47	1.15	1.70
Other (please specify)	1.84	6.13	5.16	12.07	6.44
Trapeziectomy only (hematoma arthroplasty) with or without pinning	6.13	3.83	9.39	9.20	7.17
Trapeziectomy with APL suspensionplasty	14.11	15.71	16.90	14.37	15.43
Trapeziectomy with LRTI using half FCR	14.72	21.84	12.21	22.99	18.23
Trapeziectomy with LRTI using whole FCR	35.58	41.76	42.25	28.16	37.42
Trapeziectomy with suture suspension (ie, TightRope or other suture)	26.38	6.13	12.68	9.77	12.52
Total	100	100	100	100	100

Note. CMC = carpometacarpal; APL = abductor pollicis longus; LRTI = ligament reconstruction and tendon interposition; FCR = flexor carpi radialis.

Table 3. Change in Procedure Preference Among Physicians Who Have Practiced 5 Years or More.^a

	My preference changed over the last 5 years and I now use this procedure (%)	My preference did not change over the last 5 years and I still use this procedure (%)	Total (%)
Arthroscopic debridement	50.00	50.00	100
CMC arthrodesis	60.00	40.00	100
Implant arthroplasty (any type)	38.46	61.54	100
Other (please specify)	18.75	81.25	100
Trapeziectomy only (hematoma arthroplasty) with or without pinning	51.02	48.98	100
Trapeziectomy with APL suspensionplasty	30.77	69.23	100
Trapeziectomy with LRTI using half FCR	8.00	92.00	100
Trapeziectomy with LRTI using whole FCR	9.52	90.48	100
Trapeziectomy with suture suspension (ie, TightRope or other suture)	77.27	22.73	100

Note. CMC = carpometacarpal; APL = abductor pollicis longus; LRTI = ligament reconstruction and tendon interposition; FCR = flexor carpi radialis.

^aFor example, among surgeons who have been practicing for longer than 5 years and currently utilize trapeziectomy with suture suspension, 77.27% have changed to this procedure from a different procedure in the last 5 years.

When looking at individual surgeries, trapeziectomy with suture suspension is associated with the highest use of postoperative therapy (87.38% vs 78.61%; $P = .0374$). The nontraditional procedures are all associated with no therapy prescribed. Collectively, postoperative therapy was recommended by only 47.83% of surgeons who perform arthroscopic debridement, CMC arthrodesis, or implant arthroplasty ($P < .001$).

Immobilization

Overall, slightly more than 75% of surgeons immobilize their patients between 2 and 6 weeks. Trapeziectomy only is associated with the longest immobilization periods, with 6.78% of surgeons who perform this procedure opting for immobilization longer than 6 weeks ($P = .0158$) and only

1.69% recommending less than 2 weeks ($P = .0008$). In contrast, trapeziectomy with suture suspension is linked with significantly shorter immobilization times. More than half (54.37%) of surgeons who perform this procedure immobilize patients for 2 weeks or fewer ($P < .0001$), and only 17.48% immobilize between 4 and 6 weeks ($P < .0001$).

Volume, training, experience, and practice setting all appear to have minimal association with length of immobilization.

Pain Medication

While close to 90% of the surgeons prescribe either hydrocodone or oxycodone (including their derivatives), there were several differences based on procedure type. Most

Table 4. Breakdown of Current Procedure Preference for Surgeons With 5 Years or More Experience And Who Have Changed Their Preferences Versus Surgeons With the Same Level of Experience And Who Have Not Changed Their Preference.^a

	My preference changed over the last 5 years and I now use this procedure (%)	My preference did not change over the last 5 years and I still use this procedure (%)
Arthroscopic debridement	1.24	0.40
CMC arthrodesis	1.86	0.40
Implant arthroplasty (any type)	3.11	1.58
Other (please specify)	5.59	7.72
Trapeziectomy only (hematoma arthroplasty) with or without pinning	15.53	4.75
Trapeziectomy with APL suspensionplasty	19.88	14.26
Trapeziectomy with LRTI using half FCR	6.21	22.77
Trapeziectomy with LRTI using whole FCR	14.91	45.15
Trapeziectomy with suture suspension (ie, TightRope or other suture)	31.68	2.97
Total	100	100

Note. CMC = carpometacarpal; APL = abductor pollicis longus; LRTI = ligament reconstruction and tendon interposition; FCR = flexor carpi radialis.

^aFor example, among surgeons who have been practicing for longer than 5 years and who have changed procedure preference in the last 5 years, 31.68% utilize trapeziectomy with suture suspension.

Table 5. Experience Versus Preference for Pain Medication.

	Hydrocodone + derivatives (%)	Non-narcotics (excluding NSAIDs) (%)	NSAIDs (%)	Other (%)	Oxycodone + derivatives (%)	Total (%)
0-5 y	41.72	0.61	1.23	0.61	55.83	100
16-25 y	54.41	2.68	6.90	2.30	33.33	100
6-15 y	49.30	1.41	5.63	0.47	43.19	100
Greater than 25 y	47.70	8.62	13.22	2.30	28.16	100
Total	48.97	3.16	7.05	1.46	39.25	100

Note. Compared with the grand total of 7.05%, 13.22% of surgeons with greater than 25 years of experience prescribe NSAIDs ($P = .0068$), most of which comes at the expense of oxycodone and its derivatives. While 47% of surgeons with more than 25 years of experience prescribed hydrocodone and its derivatives (compared with 48.97% of grand total), only 28.16% prescribe oxycodone and its derivatives ($P = .006$). In comparison, newer surgeons are much more likely to prescribe narcotics. More than 97.5% of surgeons with 0 to 5 years of experience prescribe either hydrocodone or oxycodone, compared with just 88.21% of the grand total ($P < .001$). More specifically, newer surgeons appear to prefer oxycodone (55.835% compared with 39.25% of grand total; $P < .001$) compared with hydrocodone. NSAIDs = nonsteroidal anti-inflammatory drugs.

notably, nonsteroidal anti-inflammatory drugs (NSAIDs) were prescribed by a significantly higher percentage of surgeons who perform trapeziectomy only than by the grand total (20.34% vs 7.05%; $P = .0003$). When comparing the 2 most popular procedures, trapeziectomy with LRTI using whole FCR and half FCR, narcotic use is significantly greater in surgeons who utilize whole FCR (96.4% vs 86.6%; $P < .001$).

Surgeons with more experience are more likely to utilize medications other than narcotics. Compared with the grand total of 7.05%, 13.22% of surgeons with greater than 25 years of experience prescribe NSAIDs ($P = .0068$), most of which comes at the expense of oxycodone and its derivatives. While 47% of surgeons with greater than 25 years of experience prescribed hydrocodone and its derivatives (compared with 48.97% of grand total), only 28.16% prescribe oxycodone and its derivatives ($P = .006$). In com-

parison, newer surgeons are much more likely to prescribe narcotics. More than 97.5% of surgeons with 0 to 5 years of experience prescribe either hydrocodone or oxycodone, compared with just 88.21% of the grand total ($P < .001$). More specifically, newer surgeons appear to prefer oxycodone (55.835% compared with 39.25% of grand total; $P < .001$) compared with hydrocodone (Table 5).

Reasoning

When asked for the reasoning for their procedure choice, the vast majority, 55.4%, cited "Personal Clinical Experience," followed by "The Procedure Is What I Primarily Did During My Training" and "Current Evidence" at 21.87% and 15.43%, respectively. Only 2 out of 823 people said they performed a particular procedure because "The Compensation is Higher," and both surgeons

Table 6. Breakdown of Reasoning for Procedure Preferences.^a

	Current evidence suggests the technique has the best outcomes and lowest complication rate (%)	Other (%)	Personal clinical experience (%)	The compensation for the procedure is higher compared with others (%)	The procedure is what I primarily did during my training (%)	The procedure is what my group agreed would be performed in our practice (%)	Total (%)
Arthroscopic debridement	75.00	0.00	25.00	0.00	0.00	0.00	100
CMC arthrodesis	0.00	0.00	80.00	0.00	0.00	20.00	100
Implant arthroplasty (any type)	21.43	14.29	64.29	0.00	0.00	0.00	100
Other (please specify)	9.43	13.21	62.26	0.00	15.09	0.00	100
Trapeziectomy only (hematoma arthroplasty) with or without pinning	69.49	5.08	15.25	0.00	10.17	0.00	100
Trapeziectomy with APL suspensionplasty	8.66	9.45	61.42	0.79	18.11	1.57	100
Trapeziectomy with LRTI using half FCR	9.33	2.67	58.00	0.00	27.33	0.67	100
Trapeziectomy with LRTI using whole FCR	10.06	1.95	55.52	0.00	32.14	0.32	100
Trapeziectomy with suture suspension (ie, TightRope or other suture)	18.45	12.62	62.14	0.97	2.91	2.91	100
Total	15.43	5.71	55.41	0.24	21.87	0.97	100

Note. CMC = carpometacarpal; APL = abductor pollicis longus; LRTI = ligament reconstruction and tendon interposition; FCR = flexor carpi radialis.

^aFor example, among surgeons who perform "trapeziectomy only," 69.49% selected "Current Evidence."

actually picked different procedures (APL suspensionplasty and suture suspension). Surgeons who practice in an academic setting were much more likely to select "Current Evidence" than surgeons who work in private practice (20.79% vs 13.98%; $P = .0318$).

Among the "Personal Clinical Experience" subgroup, the procedures chosen closely mirrored the grand total. For surgeons who selected "The Procedure Is What I Primarily Did During My Training," the majority perform trapeziectomy with LRTI using whole FCR, followed by trapeziectomy with LRTI using half FCR. Conversely, among surgeons who listed "Current Evidence," trapeziectomy only made up the largest group, followed by trapeziectomy with LRTI using whole FCR and trapeziectomy with suture suspension.

When grouping by procedure type, most surgeons who perform trapeziectomy with LRTI using whole FCR do so because of "Personal Clinical Experience." Only 10.06% of surgeons who perform this procedure do so because of "Current Evidence." Results were similar for trapeziectomy with LRTI using half FCR. In comparison, most surgeons who perform trapeziectomy only do so because of "Current Evidence" and few listed because of "Personal Clinical Experience" (Table 6).

Physicians who selected their procedure due to "Current Evidence" are also more likely to prescribe either nonnarcotic medications or NSAIDs. NSAIDs and non-narcotic medications make up 18.88% of prescribed pain medications for these individuals compared with 10.2% for the

grand total ($P = .0041$). In contrast, for the surgeons who selected their procedure because "The Procedure Is What I Primarily Did During Training," NSAIDs and nonnarcotic medications accounted for just 1.11% of respondents ($P < .001$).

International Versus the United States

Trapeziectomy with LRTI using whole FCR, by far the most prevalent procedure overall, is significantly less popular internationally than in the United States (13.86% vs 40.78%; $P < .0001$). Arthroscopic debridement, CMC arthrodesis, and implant arthroplasty are all more common internationally. Combined, these 3 procedures make up just 1.4% of US procedures compared with 12.87% internationally ($P < .0001$). Trapeziectomy only is significantly more popular internationally than in the United States (13.86% vs 6.1%; $P = .0043$). Trapeziectomy with LRTI using half FCR is also much more popular internationally than in the United States (25.74% vs 17.19%; $P = .0372$).

Within specialties, international orthopedic surgeons are much less likely than their US counterparts to perform trapeziectomy with LRTI using whole FCR (16.44% vs 44.02%; $P < .001$). Instead, international orthopedic surgeons have a much greater preference for the nontraditional procedures of arthroscopic debridement, CMC arthrodesis, or implant arthroplasty (15.07% vs 1.63%; $P < .001$).

International trends in procedure choice also mimic surgeons' preference for what procedure they would want to be

performed on themselves or a loved one. In the United States, trapeziectomy with LRTI using whole FCR was the most preferred surgery to be performed on himself or herself or a loved one if he or she had end-stage CMC arthritis at 39.5%. However, only 12.87% of international surgeons would want this procedure to be performed on himself or herself or a loved one ($P < .001$). In addition, 10.91% of international surgeons would want implant arthroplasty performed on them or a love one, compared with just 1.8% of US surgeons ($P < .001$).

International surgeons who have been practicing for longer than 5 years are more likely to have changed procedures in the past 5 years compared with US surgeons (33% vs 22.7%, $P = .0251$).

International surgeons also appear to rely less on their training and more on current evidence when choosing a particular surgery. Compared with just 13.59% of US surgeons, 27.77% of international surgeons listed "Current Evidence" as the reasoning for their preferred procedure ($P = .0002$). Furthermore, just 7.92% of international surgeons listed "Training" as the main factor in their decision compared with 23.85% of US surgeons ($P = .0003$). "Personal Clinical Experience" still made up the largest percentage of international respondents at 53.5%.

With regard to anesthesia, international surgeons prefer regional block with sedation over general anesthesia in comparison with US surgeons. Only 28.71% of international surgeons use general anesthesia compared with 42.16% of US surgeons ($P = .0102$). Although the relationships were not significant, international surgeons also utilize a higher percentage of intravenous sedation with local and wide-awake local anesthesia with no tourniquet compared with all other US regions.

International surgeons immobilize their patients for a shorter period of time compared with US surgeons. Specifically, 60.4% of international surgeons immobilize their patients between 0 and 4 weeks compared with just 49.1% of US surgeons ($P = .0321$).

When choosing postoperative therapy, international surgeons recommend therapy significantly less than their US counterparts (63.36% vs 80.85%; $P < .001$).

Finally, one of most dramatic differences between the US and international surgeons is in postoperative pain medication. US surgeons overwhelmingly reported prescribing either hydrocodone or oxycodone, while international surgeons are much more likely to prescribe NSAIDs or non-narcotic medications (Table 7).

Discussion

As expected, surgeries that include trapeziectomy with LRTI remain the most popular treatment choices for the treatment of thumb CMC arthritis. Specifically, a large portion of hand surgeons, particularly US orthopedic hand

Table 7. US Versus International Preferences for Pain Medication.

	International (%)	The United States (%)	Total (%)
Hydrocodone + derivatives	5.94	54.92	48.97
Nonnarcotics (excluding NSAIDs)	21.78	0.55	3.16
NSAIDs	48.51	1.25	7.05
Other	5.94	0.83	1.46
Oxycodone + derivatives	17.82	42.30	39.25
Total	100	100	100

Note. NSAIDs = nonsteroidal anti-inflammatory drugs.

surgeons, appear convinced that trapeziectomy with LRTI using either whole or half FCR is the best option. However, compared with previous studies that attempted to look at trends in CMC arthritis treatment, fewer surgeons appear to be utilizing these techniques.^{6,11}

Use of trapeziectomy with suture suspension is on the rise. Among surgeons who have been practicing for longer than 5 years and have not changed procedures in the last 5 years ($n = 505$), only 2.97% utilize trapeziectomy with suture suspension. Thus, the majority of surgeons utilizing this procedure are either newer in practice (0-5 years of experience) or have switched to using this procedure in the last 5 years. One of the primary benefits of this procedure is that it is minimally invasive and allows early mobilization (2 weeks or fewer).⁵

Furthermore, trapeziectomy only does not appear to be any more popular than in previous studies. Although long-term studies are lacking, trapeziectomy only is the procedure linked with fewest complications.³ However, the results of this study demonstrate that hand surgeons do not appear to be convinced that this is the case. Only 15.53% of surgeons who have changed procedures in the last 5 years have changed to trapeziectomy only. Moreover, only 6.92% of surgeons would want trapeziectomy only to be performed on himself or herself or a loved one if he or she had CMC arthritis. Finally, alternative procedures like arthroscopic debridement, CMC arthrodesis, and implant arthroplasty still remain unpopular among hand surgeons in the United States but have become more common internationally.

Upward of 90% of surgeons surveyed said they would want the surgery they perform on their patients to be performed on himself or herself or a loved one if he or she had CMC arthritis. For the remainder, it would be interesting for to see why physicians would want another procedure to be performed on him or her.

One of the unique aspects of this study was our attempt to understand the reasoning behind clinician's individual decisions. It is not surprising that surgeons who selected current

evidence for their reasoning prefer trapeziectomy only. Among physicians who listed “The Procedure Is What I Primarily Did During My Training,” there was a substantial preference for trapeziectomy with LRTI using whole FCR.

Pain medications are a popular topic of interest, especially in the United States, where the opioid epidemic has been well documented both in the literature and mainstream media.^{2,13,14} This is particularly important in orthopedic surgery, where a patient’s initial reason for visit is most often related to pain.¹⁰ We were surprised to discover that younger surgeons are significantly more likely than older physicians to prescribe narcotics. Perhaps this demonstrates that surgeons who have been practicing for longer periods of time have more experience with the negative effects of opioids on their patients.

Finally, the most unexpected finding in our survey was the difference in preferences between hand surgeons in the United States and those who practice outside of the country. One potential confounding variable to this relationship is practice setting. Many international countries have some form of universal health care. Thus, international physicians have an infrastructure that promotes practice in an academic setting instead of private practice. In our survey, 46.53% of international hand surgeons practice in an academic hospital setting as compared with just 18.2% of US hand surgeons. Physicians who practice in an academic setting are perhaps more likely to engage in research and thus make clinical decisions based on literature as demonstrated in our survey.⁸ Nevertheless, practice setting alone cannot explain all the difference in practice patterns. The difference in opioid usage internationally and in the United States is striking. The reasoning behind these differences is likely multifactorial and beyond the scope of this article.

A topic not fully investigated in this article is the impact of training on surgeon preference. Although our study separated surgeons by training (orthopedic, general, and plastic), we did not ask whether the physicians surveyed had fellowship training in hand surgery. Comparing practice parameters of orthopedic, fellowship-trained hand surgeons with non-fellowship-trained orthopedic hand surgeons would be interesting. In addition, we did not differentiate surgeons who were trained primarily in an academic/university setting from surgeons who trained primarily in a community setting. A question in future survey papers could be “What procedure was primarily performed to treat end-stage CMC arthritis during your training?” and “Is the procedure you currently employ to treat CMC arthritis the procedure that you performed the most during training?”

This study has several limitations. First, only 24.8% of surgeons who are active members of ASSH responded to our questionnaire. This response rate is lower than the 2 previous studies that looked at trends in CMC arthritis. As with any survey that does not utilize scientific sampling methods, there is the risk that physicians who responded to the survey do not accurately represent the true population of surgeons who operate on CMC arthritis patients. This is especially true

of the international population, which is likely very heterogeneous. In addition, surgeons were required to make only 1 choice for each question and are limited in most of our questions to the responses offered. It is very possible that surgeons utilize different techniques and treatment decisions that are individualized to each of their patients. Our study also did not address the issue of availability for certain practice parameters. For example, some smaller practices may not recommend postoperative therapy because there may be no access within a reasonable distance. Finally, this survey is prone to recall bias, particularly in areas such as volume of procedures performed or length of immobilization.

Our results show that trapeziectomy with LRTI remains the most popular treatment of choice. The use of trapeziectomy with suture suspension is on the rise, particularly in younger surgeons. International hand surgeons rely more on current evidence, utilize less postoperative therapy and opioid medications, and change procedures more often than US hand surgeons.

Ethical Approval

This study was approved by our institutional review board.

Statement of Human and Animal Rights

This article does not contain any studies with human or animal subjects.

Statement of Informed Consent

Informed consent was obtained when necessary.

Declaration of Conflicting Interests

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