HAND (2010) 5:415–422
DOI 10.1007/s11552-010-9275-7

ORIGINAL ARTICLE

A survey to determine current practice patterns in the surgical treatment of advanced thumb carpometacarpal osteoarthrosis

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Published online: 3 June 2010

Abstract
Background The purpose of this study was to determine current practice patterns and examine the influence of recent evidence in the surgical treatment of advanced thumb carpometacarpal (CMC) osteoarthrosis.
Methods A survey was sent to 2,536 American Society for Surgery of the Hand members. Information regarding specialty training, years of experience, annual cases performed, treatment of choice, technique, and postoperative immobilization was collected. Respondents were asked whether their current treatment of choice differs from what they performed 5 years ago and about the importance of ligament reconstruction and "interposition" to thumb CMC arthroplasty success.
Results One thousand twenty-four respondents completed the survey (40% response rate). Treatment of choice was trapeziectomy with ligament reconstruction and tendon interposition (68%), regardless of specialty training, years of experience, and annual cases performed. Over 70% favored treatment that was not different from what they performed 5 years ago. Less than 3% of respondents perform a trapeziectomy alone; only 14 surgeons have changed to this procedure in the last 5 years. Only 35% of the 822 respondents who perform a ligament reconstruction and 14% of the 764 respondents who perform an interposition believe those techniques are "extremely important" to thumb CMC arthroplasty success.
Conclusions Despite recent evidence that suggests neither ligament reconstruction nor tendon interposition confers any additional benefit over trapeziectomy alone, few respondents have converted to the simpler procedure. Either the current evidence is not convincing enough to drastically change practice patterns, or other factors apart from this evidence have a greater influence on surgical decision-making for advanced thumb CMC osteoarthrosis.

Keywords Evidence-based medicine · Osteoarthrosis · Practice patterns · Survey · Thumb carpometacarpal joint

Introduction

Surgery to address osteoarthrosis of the thumb carpometacarpal (CMC) joint is arguably one of the most commonly performed operations by hand surgeons worldwide. A recent epidemiologic study showed that radiographic evidence of severe thumb carpometacarpal osteoarthrosis increases with age in both men and women, starting in the fifth decade in women and in the sixth decade in men [17]. Although the prevalence of symptomatic osteoarthrosis is much less than that observed radiographically, a substantial number of patients undergo operative intervention to alleviate pain and increase function.

Between 2003 and 2008, over 160 articles pertaining to osteoarthrosis of the thumb CMC joint (by search terms "thumb carpometacarpal osteoarthrosis" OR "basal joint osteoarthrosis" OR "trapeziometacarpal osteoarthrosis" in www.pubmed.org) were published internationally. The spectrum of original papers addresses anatomy, basic science, biomechanics, epidemiology, diagnosis, prognosis, treatment, and rehabilitation. Surgeons continue to develop innovative ways to treat advanced thumb CMC osteoarthrosis.

Electronic supplementary material The online version of this article (doi:10.1007/s11552-010-9275-7) contains supplementary material, which is available to authorized users.

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Clinical results have been reported for novel forms of suspensionplasties, synthetic interposition materials, various prosthetic devices, and arthroscopic techniques. Within this same period of time, several prospective studies and systematic reviews of evidence were also published. Clearly, treatment of this clinical problem is of tremendous interest and importance to the hand surgery community.

The assortment of recently described techniques coupled with the sheer amount of articles on this topic suggests that the optimal surgery has yet to be realized. A 2004 review of 18 comparative studies by Martou and associates deemed that no procedure to address thumb CMC osteoarthrosis had proven conclusively better than another [11]. The next comprehensive systematic review was performed by Wajon and colleagues the following year; however, they evaluated seven comparative studies of higher quality evidence and included several prospective, randomized studies which had not been published at the time of the previous review. The authors proclaimed an increased rate of complications in patients who underwent procedures other than trapeziectomy. Otherwise, when comparing trapeziectomy, trapeziectomy with interposition arthroplasty, trapeziectomy with ligament reconstruction, trapeziectomy with ligament reconstruction and tendon interposition, and joint replacement, no procedure demonstrated any superiority over another in terms of pain, range of motion, strength or patient-reported outcome [20]. Shuler also summarized the evidence on this topic in a succinct recent review in which similar conclusions were made [16].

The primary purpose of this study was to elucidate current practice patterns among hand surgeons in the surgical treatment of thumb CMC osteoarthrosis. Beyond this straightforward purpose, however, we sought to indirectly examine the influence of recent literature, to ascertain whether current recommendations regarding trapeziectomy alone have altered the decision-making of practicing hand surgeons and to provide a springboard for discussion regarding the future management of evidence in the field.

Materials and Methods

Topic Identification and Hypothesis Generation

There is no published study that examines practice patterns in the surgical treatment of thumb CMC osteoarthrosis. After careful review of the existing literature regarding this condition, a number of interesting questions were generated. (1) In light of the increasing number of surgical treatment options to address thumb CMC osteoarthrosis, is the "classic" trapeziectomy with ligament reconstruction and tendon interposition (LRTI) the most frequently performed procedure? (2) What is the favored treatment of surgeons who perform the most cases per year? (3) Are any alternate techniques, such as arthroscopic procedures or prosthetic arthroplasty, gaining in popularity? (4) Given the emerging evidence that neither ligament reconstruction or tendon interposition confer additional measurable benefit over trapeziectomy alone, how many surgeons have been convinced enough to change their treatment of choice to the simpler procedure in the last five years? (5) Do surgeons that continue to perform ligament reconstruction and/or interposition believe these are critical aspects to the operation? (6) Is the ubiquitous advice of our academic leaders being heeded and implemented—that evidence-based practice holds the key to improved patient outcomes and professional success? (7) While the virtues of evidence-based medicine are being extolled, is the freedom to exercise independent judgment being slowly stripped away from the art of hand surgery, such that practice guidelines and standards will ultimately dictate our practices?

Study Design and Administration

A 12-question multiple-choice web-based survey entitled "Current Practice Patterns in End-Stage Thumb CMC Arthritis" was designed and generated through a professional online service to assure confidentiality and anonymity (Appendix 1). An online link to the survey was sent electronically to 2,536 members of the ASSH. Retired, international, and candidate members were included. Personal spam email filters prohibited approximately 100 members to receive the survey. Ten members declined participation, proclaiming themselves as pediatric specialists who did not treat thumb CMC arthritis. Finally, the provided email list from the society did not separate candidate members-in-training from those in practice. An assumption was made that these particular individuals would decline participation based on the wording of the questions (such as the second question, "How many years have you been in practice?").

A second reminder email was sent 2 weeks following the first request, in order to capture more respondents. Nothing more than the overt purpose of the study was revealed to the respondents in order to reduce bias and elicit more spontaneous answers and commentary. The entire survey was presented on a single colorful Web page and could not be submitted without answering all of the questions. Information regarding specialty training, years in practice, annual cases performed, favored treatment, technique details, and postoperative immobilization was collected. Additionally, respondents were asked whether their current treatment of choice differs from what they performed 5 years ago for the same problem. Inquiries about the importance of "ligament reconstruction" and "interposition"

to the success of thumb CMC arthroplasty were the only questions of subjective nature. A free-response item concluded the survey. A pilot test was conducted among 15 hand surgeons at our institution to obtain feedback and increase validity. A number of additional questions were entertained; however, a conscious effort was made to keep the survey as short as possible to effectively address the aforementioned questions while maximizing the number of respondents. A comprehensive list of answers to the multiple-choice questions was not feasible; therefore, several questions offered an "other" option with a write-in box. An early technical glitch that disallowed this possibility was corrected expediently. For those respondents who reported the glitch and commented about what they would have answered if capable, the author was ultimately able to make these individual changes to increase the accuracy of the final results. The survey was closed 30 days after the first submission was received.

Data Analysis

The survey responses were collected by the professional online service, and the results were only accessible to the author through password protection. The online service enabled "filters" to be selected for tabulation of subsets of data. For instance, the responses of all orthopedic surgeons could be easily separated from the responses of plastic surgeons and general surgeons to determine any differences among specialty training. Similar filters were utilized to determine the influence of years in practice, annual case load and other combinations. The subjective importance of ligament reconstruction and "interposition" was examined with opinion-based questions. In line with previously published survey studies [12, 13, 22], this project was not intended to be scientific by design, and statistical analysis was not performed.

Results

Member Characteristics

Responses were collected from 1,024 respondents (40% response rate). Most respondents had residency training in orthopedic or plastic surgery (Table 1) and reported more than 10 years of clinical experience (Table 2). Ninety percent of respondents perform 50 or fewer procedures annually (Table 3).

Table 1 Specialty: in which specialty were you primarily trained?

Response	Percent (%)	Response count
Orthopedic surgery	82.9	849
Plastic surgery	13.2	135
General surgery	3.9	40

Table 2 Experience: how many years have you been in practice?

Response	Percent (%)	Response count
0–5 years	19.2	197
5–10 years	14.5	148
10–20 years	30.8	315
20+ years	35.6	364

Treatment of Choice

A short clinical vignette was designed to determine how surgeons surgically treat a typical adult with advanced thumb CMC arthritis (Table 4). The treatment of choice for approximately 68% of respondents was open trapeziectomy with LRTI. The second most popular choice was open trapeziectomy with ligament reconstruction alone. Just under 3% of respondents perform an open trapeziectomy alone with another 5% reporting the use of hematoma and distraction arthroplasty as described by Meals [8]. In over 70% of respondents, their treatment of choice had not changed from what they performed 5 years ago for the same problem (Table 5).

Ligament Reconstruction

Approximately 10% of respondents never perform a ligament reconstruction in the setting of thumb CMC osteoarthrosis. For the surgeons that do utilize this technique, the vast majority choose either a whole or half FCR tendon graft (Table 6). Two-thirds stabilize the graft by creating a bone tunnel and suturing the graft to itself or to local tissue (Table 7). The subjective importance of ligament reconstruction to the success of thumb CMC arthroplasty is presented in Table 8.

Table 3 Annual case load: estimate the number of surgical procedures that you perform annually for the treatment of end-stage CMC arthritis.

Response	Percent (%)	Response count
1–10	19.5	200
11–25	40.6	416
26–50	29.9	306
51–100	8.5	87
More than 100	1.5	15

Table 4 Favored treatment: what is your current surgical treatment of choice for end-stage thumb CMC arthritis (Eaton Stage 3 or 4) in a non-laborer over the age of 50?

Response	Percent (%)	Response count
Open trapeziectomy only	2.9	30
Open trapeziectomy with ligament reconstruction	12.9	132
Open trapeziectomy with tendon interposition	5.5	56
Open trapeziectomy with ligament reconstruction and tendon interposition (LRTI)	67.6	692
Open trapeziectomy with hematoma distraction arthroplasty	5.0	51
Open trapeziectomy with interposition of dermal allograft or synthetic material	1.8	18
CMC arthrodesis	0.7	7
Arthroscopic partial trapeziectomy with or without interposition	0.7	7
Arthroscopic complete trapeziectomy with or without interposition	0.1	1
Silicone arthroplasty	0.3	3
Ceramic arthroplasty	0.2	2
Metallic arthroplasty	0.4	4
Other	2.1	21

Interposition

Approximately 13% of respondents never perform an "interposition" of material in the setting of thumb CMC arthroplasty. For the surgeons that do utilize this technique, the vast majority use tendon autograft for their interposition (Table 9). The subjective importance of interposition to the success of CMC arthroplasty is presented in Table 10.

Pinning

Only 25% of respondents utilize pins as part of their procedure of choice. When pinning is incorporated, a majority of surgeons leave the pins in place for 4–5 weeks (Table 11).

Immobilization

The most frequently chosen length of postoperative immobilization was 4 weeks. Over 75% of respondents fully immobilize their patients for 4 weeks or more. Less than 2% of surgeons have decided not to immobilize their patients at all (Table 12).

Table 5 Change of treatment: does your current treatment of choice differ from what you performed 5 years ago for the same problem?

Response	Percent (%)	Response count
Yes, it differs	15.8	162
No, it does not differ	71.2	729
I was not in practice 5 years ago	13.0	133

Table 6 Ligament reconstruction graft: if you perform a ligament reconstruction as part of your CMC arthroplasty, what do you use in the primary setting?

Response	Percent (%)	Response count
I don't perform a ligament reconstruction	10.4	106
APL	13.9	142
1/2 FCR	29.7	304
whole FCR	42.3	433
ECRL	1.2	12
Palmaris longus	1.5	15
Other graft	1.2	12

Influence of Specialty Training

LRTI was the treatment of choice regardless of specialty training (68% for orthopedic surgeons, 63% for plastic surgeons and 75% for general surgeons). The major difference between orthopedic and plastic surgeon respondents was the tendon graft of choice. Orthopedic surgeons use a whole FCR tendon graft most commonly (45%), while plastic surgeons use a half FCR tendon graft more often (39%). Plastic surgeons also utilize pinning techniques more often than orthopedic surgeons (36% vs. 24%).

Influence of Years in Practice

Once again, LRTI was the procedure of choice regardless of years in practice. The least experienced surgeons tend to do less cases annually (82% perform less than 25) and immobilize their patients longer (82% immobilize 4 weeks or more).

Influence of Number of Annual Cases

For surgeons who do more than 50 cases a year (roughly one per week), 92% were orthopedic surgeons and over 50% had more than 20 years of experience. Approximately two-thirds choose LRTI, while only 6.9% favored either

Table 7 Graft stabilization: if you perform a ligament reconstruction, how do you stabilize the graft?

Response	Percent (%)	Response count
I don't perform a ligament reconstruction	10.8	110
Bone tunnel with suture repair tendon-to-tendon or tendon to local tissue (e.g., capsule)	66.1	677
Bone tunnel with suture anchor	3.6	37
Suture repair without bone tunnel	10.7	110
Suture anchor without bone tunnel	5.8	59
Other form of stabilization	3.0	31

Table 8 Importance of ligament reconstruction: how important is a ligament reconstruction to the success of CMC arthroplasty?

Response	Percent (%)	Response count
It is not important at all	8.1	83
It has very little importance	11.9	122
It is somewhat important	50.4	516
It is extremely important	29.6	303

Table 10 Importance of interposition: how important is an "interposition" to the success of CMC arthroplasty?

Response	Percent (%)	Response count
It is not important at all	15.2	155
It has very little importance	27.1	278
It is somewhat important	45.4	465
It is extremely important	12.3	126

open trapeziectomy alone or hematoma distraction arthroplasty. Approximately 75% immobilize their patients between 4 to 6 weeks postoperatively and less than 20% utilize pinning techniques. Interestingly, over 80% of these respondents believe ligament reconstruction is somewhat or extremely important while over 50% believe interposition has very little or no importance to the clinical success of thumb CMC arthroplasty. Finally, 84% of these surgeons are performing the same procedure that they did 5 years ago for the same problem.

Importance of Ligament Reconstruction and Interposition

Interestingly, of the 822 respondents who perform a ligament reconstruction as part of their favored treatment, only 35% believe it is "extremely important" to the success of thumb CMC arthroplasty. Similarly, of the 764 respondents who perform some form of interposition as part of their favored treatment, only 14% believe it is "extremely important" to the success of thumb CMC arthroplasty.

Early Mobilization

For the surgeons who immobilize their patients for 2 weeks or less postoperatively, 62% had more than 10 years experience but 85% did fewer than 50 procedures annually. Once again, LRTI was the procedure of choice (68%). Over 70% of these respondents use suture repair of their ligament reconstruction with or without a bone tunnel.

Table 9 Interposition material: if you perform an "interposition," what do you use?

Response	Percent (%)	Response count
I do not perform an interposition	13.2	135
Tendon	77.1	790
Hematoma	2.9	30
Dermal allograft (GRAFTJACKET)	1.0	10
Synthetic material (Artelon)	1.4	14
Gelfoam	2.9	30
Other form of interposition	1.5	15

Influence of Recent Evidence on Treatment

Only 162 respondents (16%) had changed their treatment of choice from what they were performing 5 years prior to the survey. Over 75% of this group had more than 10 years of experience. One-quarter of these respondents had changed to LRTI, while another one-quarter had changed to open trapeziectomy and ligament reconstruction alone. The next most popular change was to hematoma distraction arthroplasty (19%). Only 9%, or a total of 14 surgeons, have changed to trapeziectomy alone. Still, 65% responded that ligament reconstruction is somewhat or extremely important and 43% responded that interposition is somewhat or extremely important.

Discussion

This survey represents the highest number of respondents (N=1,024) of any ASSH survey published to date. Given the abundance of recently published articles on novel techniques and the popularity of this survey, it is clear that thumb CMC osteoarthrosis remains an important topic for hand surgeons worldwide. It may also indicate that the optimal surgical treatment of this condition has yet to be realized.

Non-respondent bias is a limitation of all study research. Many potential responses were missed because of personal spam email filters. Another limitation was the inability to separate possible responses from candidate members still in training. The clinical vignette may not represent the

Table 11 K-wire pinning: choose the statement below that best describes your position on K-wire pinning as part of your procedure of choice.

Response	Percent (%)	Response count
I do not use pinning as part of my procedure	74.7	765
I pin for 3 weeks or less	5.7	58
I pin for 4–5 weeks	16.8	172
I pin for 6 weeks or more	2.8	29

Table 12 Postoperative immobilization: how long do you FULLY immobilize your patients after CMC arthroplasty?

Response	Percent (%)	Response count
I do not immobilize my patients	1.7	17
2 weeks or less	11.2	115
3 weeks	10.0	102
4 weeks	35.7	366
5 weeks	14.5	148
6 weeks	26.1	267
7 weeks	0.0	0
8 weeks or more	0.9	9

"perfect patient" to solicit a treatment of choice. Finally, the opinion-based questions may have been more reliable with a less-biased scale such as "Strongly agree", "Agree", "Neutral", "Disagree" or "Strongly Disagree" as suggested by Chung [9].

One of the most enlightening aspects of this survey was elicited by additional comment sections after four of the questions and the 193 free-item responses collected at the end of the survey. It was here that many surgeons indicated that not all "ligament reconstructions" are created equal. This survey did not differentiate between techniques for ligament reconstruction, such as those described by Weilby [21], Littler and Eaton [3], Thompson [19], or Kleinmann [6]. It follows that not all LRTI procedures exactly mimic the classic description by Burton and Pellegrini [1]. Many variables and permutations of procedures are at play in the surgical treatment of thumb CMC osteoarthrosis. Seventeen surgeons reported the use of a biotenodesis interference screw and five reported the use of a mini-tightrope to stabilize their ligament reconstructions, although neither of these applications is reported in the literature. Multiple forms of synthetic and allograft interpositions are being utilized without large studies to prove their safety and efficacy. The comprehensive list of free-item commentary is included in the Appendix.

Returning to the list of questions that this survey was designed to answer:

1. *In light of the increasing number of treatment options to address thumb CMC osteoarthrosis, is the "classic" trapeziectomy with ligament reconstruction and tendon interposition (LRTI) the most frequently performed procedure?* This survey demonstrates that the conceptual LRTI remains the most popular treatment of choice regardless of specialty training, years in practice and number of annual cases performed.
2. *What is the favored treatment of surgeons who perform the most cases per year?* A filter was applied to isolate the responses of the 102 surgeons who reported performing more than 50 cases annually. Surgeons who do the most cases still choose LRTI most frequently (67%) and most have not changed from 5 years prior to the survey (84%). In this group, pinning is not popular (20%), but immobilization of between 4 and 6 weeks is commonplace (75%). These individuals are stronger proponents of ligament reconstruction than interposition, as 80% believe ligament reconstruction is somewhat or extremely important to the success of thumb CMC arthroplasty while only 47% reported the same relative importance for interposition.
3. *Are any alternate techniques, such as arthroscopic procedures or prosthetic arthroplasty, gaining in popularity?* Eight surgeons apply arthroscopic techniques and nine use prosthetic arthroplasty as their treatment of choice. An additional five surgeons listed pyrocarbon hemiarthroplasty as their preference in the commentary section, since it was not specifically included in the options. Another 18 are using non-autologous material interposition for their treatment of choice, such as silicone, allograft cartilage or fascia lata, polyurethaneurea (Artelon; Small Bone Innovations, Morrisville, PA) and acellular dermal allograft (Graftjacket; Wright Medical Technology, Arlington, TN). Some of these were reported with slightly greater frequency when the question "If you perform an interposition, what do you use?" was introduced. Based on isolation of the group who has changed their treatment of choice in the last 5 years, the procedure that seems to have gained the most relative ground is hematoma and distraction arthroplasty (19.1% of the 162 respondents).
4. *Given the emerging evidence that neither ligament reconstruction or tendon interposition confer additional measurable benefit over trapeziectomy alone, how many surgeons have been convinced enough to change their treatment of choice to the simpler procedure in the last five years?* In their systematic reviews of the literature, neither Martou et al. [11] or Wajon et al. [20] found evidence to support one procedure over another. If trapeziectomy alone is a simpler and quicker operation, causes less complications, and produces the same clinical outcome, the logical effect of these reports could have been a transformation of practice patterns from longer, more complicated yet clinically equivalent techniques. On the contrary, in the interval since these reviews, only 16% (N=162) of respondents had changed their treatment of choice. Of this group, nearly 50% (N=80) had changed to either trapeziectomy with ligament reconstruction or LRTI. Despite the conclusions of the above systematic reviews, only 9% (N=14) of respondents reported changing to trapeziectomy alone. Although over 1,000 people responded to this

survey, the pertinent evidence was only mentioned a few times in the free-response item.

5. *Do surgeons that continue to perform ligament reconstruction and/or interposition believe these are critical aspects to the operation?* The relative importance of the aforementioned techniques seems less than one might think when considering how prevalent these entities were reported as part of the surgeon's treatment of choice. Only 35% of the 822 respondents who perform a ligament reconstruction and 14% of the 764 respondents who perform an interposition believe those particular techniques are "extremely important" to the success of thumb CMC arthroplasty. It is possible that surgeons recognize that neither ligament reconstruction nor interposition has been shown to confer any additional benefit over trapeziectomy alone, which may in part explain the reluctance to assign "extremely important" to each despite how often they are performed. Instead, it was more popular for respondents to choose "somewhat important" in this study.
6. *Is the ubiquitous advice of our academic leaders being heeded and implemented—that evidence-based practice holds the key to improved patient outcomes and professional success?* When it comes to surgery for advanced thumb CMC osteoarthrosis, other factors apart from evidence-based medicine must be influencing current practice patterns. This survey was not designed to investigate what those factors might be, but rather to prove that current evidence has not led to an overwhelming transformation to simpler procedures amongst hand surgeons. In addition to reviewing the literature, surgeons make treatment decisions based on their training, clinical experience and personal bias for or against certain procedures. The results of a survey administered to American Orthopaedic Association meeting participants 2 years ago support this statement. Although 94% of respondents incorporated evidence-based medicine into their decision-making, only 18% believed randomized controlled trials were able to answer a majority of important clinical and research questions. Two-thirds believed there was a lack of evidence relevant to their clinical practice, and a greater majority believed that future advances in orthopedic surgical care would be derived from prospective cohort studies rather than randomized controlled trials. Interestingly, when asked what type of evidence they used in clinical decision-making, the highest percentage of participants cited *personal experience*, above randomized controlled trials, case–control studies, case series and expert opinion [15].

In an interesting look at practice patterns in distal radius fracture treatment by candidates for Part II American Board of Orthopaedic Surgery examination over the time frame 1999–2007, the authors discovered a striking surge in open treatment among young surgeons despite a lack of support for such a strategy by surgeon-perceived outcome measures [7]. A survey of the Dutch Orthopaedic Association indicated that competence in evidence-based terminology and awareness of resources was strongly associated with younger age, less than 10 years of experience, a PhD degree, and an academic appointment [14]. Of the 345 survey respondents with less than 10 years of experience in this survey, roughly 2% (N=8) currently perform a trapeziectomy alone as their treatment of choice for advanced thumb CMC osteoarthrosis. After removing the surgeons who were not in practice 5 years ago, only 19% of this group had changed their treatment in that time interval. A meager four had changed to trapeziectomy alone and only nine had changed to hematoma and distraction arthroplasty.

7. *While the virtues of evidence-based medicine are being extolled, is the freedom to exercise independent judgment being slowly stripped away from the art of hand surgery, such that practice guidelines and standards will ultimately dictate our practices?* This is an important question to consider. Systematic reviews and meta-analyses are being published with greater frequency. The American Academy of Orthopaedic Surgeons (AAOS) has now published four Clinical Practice Guidelines, including two regarding the diagnosis and treatment of carpal tunnel syndrome [4, 5]. Most of the recommendations in these reports receive a Grade C (poor-quality evidence for or against recommending intervention) or Grade I (insufficient or conflicting evidence not allowing a recommendation for or against intervention). Eight more guidelines are being developed by the AAOS, including one recently published treatment of distal radius fractures [10]. The Cochrane database (www.cochrane.org/index.htm) continues to expand in exponential fashion despite many of their reviews simply concluding that "insufficient evidence exists to support any recommendations." While the advantages of summarizing current evidence for easy review and implementation cannot be argued for reducing bias, improving patient care, and directing future research, more rigid practice standards could be a bane to physicians and surgeons across disciplines. As the American healthcare payment system undergoes transformation from payment for the volume of services rendered to the quality of healthcare outcomes, the importance of evidence-based decision-making will be enhanced. Szabo summarized it best, "It is important to recognize that whoever controls guidelines thus controls medicine and ultimately the flow of money" [18].

Yet medicine is an imperfect science and no evidence is truly absolute. There is obviously a spectrum of evidence quality, even among our highest Level-1-rated studies. The best prospective, double-blinded, randomized controlled trials cannot control for all variables, and they can never take into account individual surgeon skill. Technical mastery of a particular procedure is not always reproducible. The results of this study suggest that the "best available evidence" for the treatment of advanced thumb CMC osteoarthrosis is not convincing enough to drastically alter the decision-making of a vast majority of respondents to this questionnaire. In the most recent focused review of the literature for thumb CMC osteoarthrosis treatment, Shuler et al. points out the limitations of even our highest quality studies for this clinical problem: validated outcomes, power analysis and blinded assessment [16]. We are merely in the advent of the evidence-based medicine era, however, the publication of clinical practice guidelines makes it seem like we have been producing consistent, high-quality evidence for decades. In the largest prospective, randomized controlled trial regarding thumb CMC osteoarthrosis to date, recruitment of patients began in 1992 and the study was not published until 2004 [2].

This survey provides valuable data regarding current practice patterns in the surgical treatment of thumb CMC osteoarthrosis. Despite recent evidence that suggests neither ligament reconstruction nor tendon interposition confers any additional benefit over trapeziectomy alone, very few survey respondents have recently converted to the simpler procedure. Either the current evidence is not convincing enough to drastically change practice patterns, or other factors apart from this evidence have a greater influence on current surgical decision-making for advanced thumb CMC osteoarthrosis. Maybe the clear-cut advice of one respondent should be the real guiding force for this condition at present: "I think you should probably do what works best for you."

Acknowledgment This work was supported by a grant from the Raymond M. Curtis Research Foundation, The Curtis National Hand Center, Baltimore, Maryland

Conflict of interest Lance M. Brunton and E.F. Shaw Wilgis declare that they have no conflict of interest.

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