

Patients With Thumb Carpometacarpal Arthritis Have Quantifiable Characteristic Expectations That Can Be Measured With a Survey

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Abstract

Background Although patient expectations associated with major orthopaedic conditions have shown clinically relevant and variable effects on outcomes, expectations associated with thumb carpometacarpal (CMC) arthritis have not been identified, described, or analyzed before, to our knowledge.

Questions/purposes We asked: (1) Do patients with thumb CMC arthritis express characteristic expectations that are quantifiable and have measurable frequency? (2) Can a survey on expectations developed from patient-derived data quantitate expectations in patients with thumb CMC arthritis?

Methods The study was a prospective cohort study. The first phase was a 12-month-period involving interviews of

42 patients with thumb CMC arthritis to define their expectations of treatment. The interview process used techniques and principles of qualitative methodology including open-ended interview questions, unrestricted time, and study size determined by data saturation. Verbatim responses provided content for the draft survey. The second phase was a 12-month period assessing the survey for test-retest reliability with the recruitment of 36 participants who completed the survey twice. The survey was finalized from clinically relevant content, frequency of endorsement, weighted kappa values for concordance of responses, and intraclass coefficient and Cronbach's alpha for interrater reliability and internal consistency.

Results Thirty-two patients volunteered 256 characteristic expectations, which consisted of 21 discrete categories. Expectations with similar concepts were combined by eliminating redundancy while maintaining original terminology. These were reduced to 19 items that comprised a one-page survey. This survey showed high concordance, interrater reliability, and internal consistency, with weighted kappa values between 0.58 and 0.78 (95% CI, 0.39–0.78; $p < 0.001$); intraclass correlation coefficient of 0.94 (95% CI, 0.94–0.98; $p < 0.001$), and Cronbach's alpha values of 0.94 and 0.95 (95% CI, 0.91–0.96; $p < 0.001$). The thumb CMC arthritis expectations survey score is convertible to an overall score between 0 to 100 points calculated on the basis of the number of expectations and the degree of improvement expected, with higher scores indicating higher expectations.

Conclusions Patients with thumb CMC arthritis volunteer a characteristic and quantifiable set of expectations. Using responses recorded verbatim from patient interviews, a clinically relevant, valid, and reliable expectations survey was developed that measures the physical and psychosocial expectations of patients seeking treatment for CMC

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Each author certifies that his or her institution approved the human protocol for this investigation, that all investigations were conducted in conformity with ethical principles of research, and that informed consent for participation in the study was obtained.

This work was performed at the Hospital for Special Surgery, New York, NY, USA.

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arthritis. The survey provides a calculable score that can record patients' expectations. Clinical application of this survey includes identification of factors that influence fulfillment of these expectations.

Level of Evidence Level II, prospective study.

Introduction

Patients with thumb carpometacarpal (CMC) arthritis have symptoms of varying degrees of pain and dysfunction that do not necessarily correlate with the degree of radiographic arthritic changes [9, 14]. The symptoms and threshold of dysfunction for seeking treatment appear variably dependent on patient- and disease-specific factors [26, 33, 36] which potentially affect the quality and number of expectations that patients have when offered treatment. Factors such as personal preference, aversion to medical intervention, and professional recommendations likely affect the decision to undergo treatment. Because patients' perspectives have become a major component of assessing outcome, patients' expectations also have become incorporated in the creation of quality reporting schemes [11, 13, 20, 27, 28, 37]. Identification of expectations offers tangible participation in a shared decision-making process when an array of different treatment options is available. Understanding what generates or influences patients' expectations and identifying what patients expect may allow greater convergence of the priorities and goals held by patients and surgeons [13, 20, 27, 28, 37]. This may be fundamental to optimizing patient satisfaction.

Although thumb CMC arthritis is a common debilitating condition of the hand, patients' expectations associated with the treatment of this condition have not been investigated before, to our knowledge. Defining and measuring expectations that are specific to thumb CMC joint arthritis offers a framework against which objective and subjective results can be calibrated. A survey that can identify expectations that are discordant with the proposed treatment allows providers an opportunity to reconcile these areas of discordance before proceeding with treatment. This study was designed to identify these expectations and to test whether a survey comprised of patient-derived content could reproducibly and reliably serve as a systematic method to quantify the number and degree of patient expectations.

Study Questions

The hypothesis of our study was that a rigorously developed survey can capture the spectrum of expectations and the degree of expected improvement that patients have

when seeking treatment for CMC joint arthritis. We asked the following questions: (1) Do patients with thumb CMC arthritis express characteristic expectations that are quantifiable and with measurable frequency? (2) Can a survey developed from patient-derived content measure the expectations of patients with thumb CMC arthritis with reproducibility, reliability, and consistency?

Patients and Methods

The design of this investigation was modeled after prior surveys that assessed expectations for other common orthopaedic conditions [5, 10, 16, 19, 21–24]. The study was a prospective cohort validation study and was performed in the clinical practices of four different orthopaedic hand surgeons in one institution. Institutional review board approval and patient informed consent were obtained. Study participants were recruited in two phases of the study.

Phase 1. Interviewing Patients and Analyzing Patients' Expectations

This first phase involved identifying, enrolling, and obtaining consent from eligible patients to participate in an interview structured using open-ended questions without constraints to time. Patients were eligible if they received a diagnosis from the participating orthopaedic hand surgeon investigator, with thumb CMC arthritis as the isolated condition for which they were seeking evaluation and treatment. Diagnosis was based on clinical information including physical examination and plain radiographs. Patients were excluded if they were not English-speaking; were unable to provide informed consent; had another condition that according to the patient equaled or superseded the pain arising from the thumb CMC joint (eg, carpal tunnel syndrome, metacarpophalangeal joint pain or arthritis, trigger thumb, and DeQuervain's tendinitis); received treatment (including prescription medications or injections) administered by a licensed healthcare provider within 90 days of enrollment; or chose not to participate.

From 2010 to 2011, 32 patients who met the inclusion criteria were enrolled. Fourteen of the 46 initially identified patients were excluded because of a delayed decision not to participate, potentially confounding diagnosis, or treatment administered less than 90 days before presentation. Of the patients who were interviewed, 17 chose to later receive an injection, whereas 15 chose to plan for surgery. The mean age of the patients was 64 years (range, 46–85 years) and 25 (78%) were women. The duration of symptoms ranged from 1 month to 12 years. The dominant side was the

affected side in 42% of patients, the nondominant side was the affected side in 29%, and both sides were affected in 29%.

Phase 2. Assembling the Draft Survey and Testing the Survey for Reliability

Phase 2 involved drafting the survey, having a multispecialty panel of physicians assess the face validity of the survey, and then having patients complete the draft survey on two separate occasions. Patients enrolled in Phase 2 fulfilled the same eligibility criteria as described for Phase 1, but were newly recruited. From 2012 to 2013, 40 patients met the inclusion criteria, and four patients did not sufficiently complete the second survey, resulting in 36 participants enrolled in this phase. The mean age of the patients was 64 years (range, 43–82 years), and 29 (80%) were women. Of those who were interviewed, 19 chose to later receive an injection, whereas 17 chose to plan for surgery. Patients included for Phase 1 and Phase 2 had similar demographic and clinical characteristics (Table 1).

All patients in Phase 2 responded to every item of the draft survey and completed the survey twice separated by 5 to 7 days. Patients who chose surgery completed the first survey a mean of 34 days before surgery (range, 13–56 days). Patients who chose injection received the injection after they completed two surveys consecutively.

Patient interviews took place before receiving the preferred chosen treatment and greater than 90 days after having received prior treatment, even if treatment were received on the contralateral side for the same condition. After each interview in Phase 1, or after each survey administration in Phase 2, subsequent treatment could be either an injection of cortisone (with either triamcinolone or betamethasone) or electively scheduled thumb CMC joint arthroplasty (involving trapeziectomy with or without ligament reconstruction and without any other additional procedures).

Variables, Outcome Measures, Data Sources, and Bias

Phase 1. Interviewing Patients and Analyzing Patients' Expectations

Patients were interviewed either in person or by telephone and before receiving details regarding the specific non-surgical and surgical treatment options that currently exist (to minimize an effect of external bias). Interviews were performed using qualitative methodology techniques. This involved interviewing subjects without constraints to time and asking the following questions that allowed for open-

Table 1. Demographic and clinical characteristics*

Characteristic	Phase 1 (n = 32)	Phase 2 (n = 36)	p value
Age* (years), mean \pm SD	64 \pm 10	64 \pm 10	> 0.999
Range	46–85	43–82	
Gender			
Male	7 (22%)	7 (19%)	0.008
Female	25 (78%)	29 (81%)	
Race/ethnicity			
White	30 (94%)	32 (89%)	> 0.999
Latino	1 (3%)	1 (3%)	
Black	0 (0%)	0 (0%)	
Other	1 (3%)	3 (8%)	
Marital status			
Married	19 (59%)	24 (67%)	0.685
Single	8 (25%)	5 (14%)	
Widowed	4 (13%)	5 (14%)	
Other [†]	1 (3%)	2 (5%)	
Education			
High school graduate	3 (9%)	0 (0%)	0.057
Some college	2 (6%)	3 (8%)	
College graduate	7 (22%)	18 (50%)	
Postgraduate	8 (25%)	8 (22%)	
Other [†]	12 (38%)	7 (20%)	
Work status			
Full- or part-time	13 (41%)	19 (53%)	0.157
Retired	14 (44%)	16 (44%)	
Other [†]	5 (15%)	1 (3%)	
Hand dominance			
Right	29 (91%)	33 (92%)	0.541
Left	3 (9%)	2 (5%)	
Other [†]	0 (0%)	1 (3%)	

* Age was normally distributed based on Shapiro-Wilk's test ($p = 0.422$); [†]information not answered or missing.

ended responses: "What do you expect to result after treatment for your hand arthritis? After you have recuperated from your treatment, what do you expect will be different?" It was emphasized that the questions focused on what they expected, not what they hoped for. For expectations that were expressed in broad terms, patients were asked to provide details regarding what they actually expected. Patients were encouraged to cite as many expectations as they wished. Responses from interviews were recorded verbatim.

Recordings of interviews were reviewed to identify specific words that conveyed patient expectations and to count how often these words were stated. The entire process involved word-by-word analysis of the recorded responses, enumeration of frequently cited words, and

recognition of words that were unique to the condition [6, 31]. Through an iterative process, resonant concepts of expectations were identified.

Phase 2. Assembling the Draft Survey and Testing the Survey for Reliability

Each survey item was composed of patients' precisely stated words to represent the resonant concepts of expectations. The summation of these concepts comprised the draft survey. Expectations that were volunteered by less than 5% of the interviewed patients were excluded. The survey was prefaced by the question: "For each of the following, how much improvement do you expect after treatment for your thumb arthritis?", with response options of "back to normal, complete improvement," "a lot of improvement," "a moderate amount of improvement," "a little improvement," or "I do not have this expectation or this expectation does not apply to me."

In Phase 2, the draft survey was administered to a separate set of study participants, who as described previously, completed the surveys either in person or by mail on two separate occasions 5 to 7 days apart without any intervening treatment. To minimize external bias, patients were asked to complete the surveys before receiving detailed information on specific nonsurgical and surgical treatment options and after 90 or more days of receiving any prior treatment whether that treatment was received for the affected or for the contralateral side.

Statistical Analysis

In Phase 1 of the study, sample size was determined when the point of data saturation was achieved. Data saturation is a fundamental principle in qualitative methodology defined as the point of data collection where new data, and in this study that being expectations, no longer are being cited or expressed despite ongoing recruiting of additional study participants.

In Phase 2, the process of administering the draft survey on two separate occasions for each subject enabled analysis of test-retest reliability of the survey. Test-retest reliability indicates reproducibility or concordance of responses between the two sets of responses for each participant above that which could be the result of chance [18]. Concordance between the first and second administrations for each item was assessed with the weighted kappa statistic for ranked or ordinal data. The reliability of the survey score was assessed with the intraclass correlation (ICC) and the Cronbach's alpha. The ICC is a measure of the reliability of the measurements (from two or more raters) of continuous data when assignment of a pair of

values to a specific variable is random or lacks directional value [29]; Cronbach's alpha is a coefficient of consistency [7, 12]. The sample size for this phase with an intention to detect for a power of 0.8 based on a projected reliability coefficient of 0.9 with two measurements per subject was achieved with approximately 35 patients. Thus, Phase 2 required a minimum of 35 patients.

Endorsement for each survey item was defined as a checked survey response that was anything other than "I do not have this expectation or this expectation does not apply to me", indicating that that item connoted an expectation that the respondent held to some degree. The frequency of endorsement for each survey item was measured.

Generating the Final Survey and Survey Scoring

Twenty-one categories of patient-cited expectations were identified. Expectations that addressed similar concepts were combined, maintaining the original terminology while eliminating redundancy. This reduced the survey to 19 items (Appendix 1). These 19 items were reviewed by a panel consisting of primary care physicians, internists, rheumatologists, statisticians, and orthopaedic hand surgeons. The role of the panel was to affirm that the content of the survey reflected pertinent issues of patients seeking treatment for thumb arthritis of the hand. Thus, patient-specific content validity was established by acquiring items exclusively from patients, and clinically relevant content validity was affirmed by a diverse group of provider experts.

The inclusion of items for the final survey was based on clinical relevance, frequency of endorsement, weighted kappa values, ICC, and Cronbach's alpha. By convention, kappa values of 0.4 or less indicate slight to fair agreement; 0.41 to 0.6 indicate moderate agreement, and 0.6 or greater indicate substantial agreement [6, 31]. An item was retained in the final survey if the weighted kappa value was 0.6 or greater; an item with a weighted kappa value between 0.5 and 0.6 reflecting an expectation that was uniquely clinically relevant also was retained. Examples of the latter included expectations to start activities without first hesitating (Item 15), to perform tasks without depending on others (Item 17), to free the mind of constant awareness (Item 18), and to ease an emotion created by the arthritis (Item 19). Estimates of precision were calculated and reported as 95% CIs.

Survey scoring was based on an assignment of 4 points to every response of "complete improvement, back to normal", with descending order to 0 points for "I do not have this expectation or this expectation does not apply to me." The maximum number of items that applies to any

patient is 19. The overall score is obtained by summing all responses, dividing by the maximum possible score ($4 \times 19 = 76$), and multiplying by 100 (Appendix 2). Therefore, the possible score range is 0 to 100 points with a higher score indicating greater expectations.

Other Analyses. Correlations With Demographic and Clinical Characteristics

Demographic and clinical characteristics were compared between Phase 1 and Phase 2. Analysis of the comparison was performed with t-tests for continuous variables and chi-square tests for ordinal and ranked variables. Independent samples t-tests and chi-square (or Fisher's exact) tests were performed for normally distributed data, whereas Mann-Whitney U tests were performed for nonparametric continuous variables. All tests were conducted using two-sided hypothesis testing with the statistical threshold set to an alpha equal to 0.05 [3, 15].

Results

Phase 1. Interviewing Patients and Analyzing Expectations

In response to open-ended interviews, patients with thumb CMC arthritis expressed characteristic expectations that are quantifiable and have measurable frequency. Thirty-two patients volunteered 256 discrete expectations (median number of responses, 19; range, 1–19) that were grouped into 21 categories encompassing themes of pain, strength, activities, and psychosocial well-being (Table 2). With possible scores ranging from 0 to 4, the median amount of improvement expected was scored at 3.0 (range, 0–4), which corresponds to “a lot of improvement.”

Phase 2. Assembling the Draft Survey and Testing the Survey for Reliability

The 19-item survey instrument showed high reliability, good intrarater agreement, and high internal consistency. The median frequency of endorsement for the 19 survey items was 80% with a range from 55% to 96% (Table 3). The first and second survey administrations corresponded to a median weighted kappa value of 0.73 and a range of 0.58 to 0.84 (Table 3). The reliability between administrations for the overall score was similarly high with an ICC of 0.94 (95% CI, 0.88–0.97; $p < 0.001$). The survey was internally consistent with Cronbach's alpha coefficients of 0.94 (95% CI, 0.91–0.96; $p < 0.001$) for the first

administration and 0.95 (95% CI, 0.94–0.98; $p < 0.001$) for the second.

Of the 19 items, 17 had weighted kappa values of 0.6 or greater. Two items with weighted kappa values between 0.58 and 0.59 were retained because they were frequently endorsed (with 75% and 73% frequency) and were unique and specific to arthritis of the hand relative to previous expectations survey items [16–19]. These were survey items 13 and 17: “Complete activities without having to slow down or stop to take a break” (weighted kappa = 0.58) and “Carry out tasks without depending on other people” (weighted kappa = 0.59). The 19 items along with their response options reflecting the amount of improvement expected comprise the final Thumb Arthritis Expectations Survey (Appendix 1).

Findings of Other Analyses

There was no significant difference in the overall mean expectations score (and SD) of 76 ± 24 for the first administration and 76 ± 25 for the second administration (mean difference, 0.78; 95% CI, -3.83 to 5.41 ; $p = 0.880$). Based on scores from the first administration, women and men had similar scores of 70 ± 24 and 70 ± 22 , respectively (mean difference, 0.40; 95% CI, -18.94 to 5.79 ; $p = 0.307$). Scores were higher (ie, greater expectations) if the dominant side was affected (74 ± 25 versus 67 ± 26 ; mean difference, -6.57 ; 95% CI, -18.94 to 5.79 ; $p = 0.307$). Patients who selected surgery had higher expectations scores than those who did not have surgery (89 ± 15 versus 66 ± 23 , respectively; mean difference, -23.4 ; 95% CI, -35.47 to -11.30 ; $p < 0.001$).

Table 2. Themes and sample categories of corresponding patient expectations

Themes	Sample expectations
Pain	Relieve pain
	Both partially and completely
	Both temporarily and forever
	‘Just like my hip or knee replacement surgery’
Physical	Improve hand strength
	Improve my grip strength
	Improve my ability to open a jar
Activity-related	Improve my ability to do my job
	Improve my ability to go to the gym, play the guitar, play golf
	Start an activity without being hesitant or cautious
Psychosocial	Prevent my condition from getting worse
	Alleviate having to depend on others to open jars
	Free my constant awareness of my thumb and hand

Table 3. Frequency of endorsement and weighted kappa values for each expectation in the final survey

Expectation	Frequency	Weighted kappa	95% CI lower	95% CI upper	p value
1. Relieve pain	93%	0.711	0.523	0.898	< 0.001
2. Improve hand strength	93%	0.634	0.460	0.809	< 0.001
3. Improve ability to write, turn pages, type, or use your cell phone	89%	0.780	0.656	0.903	< 0.001
4. Improve ability to do fine, prolonged activities (for example, tie a knot)	89%	0.744	0.599	0.889	< 0.001
5. Improve ability to do basic activities that require some exertion (for example, open a jar, use a knife)	93%	0.664	0.490	0.837	< 0.001
6. Improve ability to drive	61%	0.836	0.708	0.965	< 0.001
7. If employed, ability to fulfill job responsibilities	54%	0.830	0.704	0.956	< 0.001
8. Improve ability to dress and manage personal care	80%	0.776	0.632	0.919	< 0.001
9. Improve ability to do jobs at home or around the house (for example, cooking, cleaning, yardwork, roofing)	80%	0.753	0.602	0.904	< 0.001
10. Improve ability to do simple things without having to accommodate or make adjustments	82%	0.752	0.595	0.910	< 0.001
11. Improve ability to work out at the gym or play a sport	76%	0.741	0.587	0.896	< 0.001
12. Improve ability to engage in a favorite activity, hobbies, or an instrument	75%	0.725	0.546	0.903	< 0.001
13. Complete activities without having to slow down or stop to take a break	75%	0.583	0.390	0.776	< 0.001
14. Improve ability to plan for social events or activities	69%	0.750	0.595	0.906	< 0.001
15. Start an activity without first hesitating or being cautious	80%	0.663	0.493	0.832	< 0.001
16. Prevent the hand condition from getting worse	95%	0.627	0.452	0.802	< 0.001
17. Perform tasks without depending on others	73%	0.591	0.386	0.796	< 0.001
18. Free mind of the constant awareness of the hand	89%	0.644	0.473	0.815	< 0.001
19. Ease an emotion that the hand condition creates (for example, sadness, anger, isolation)	64%	0.718	0.554	0.883	< 0.001

Discussion

This study identified expectations of patients seeking evaluation and treatment for thumb CMC arthritis that then were used to develop a survey to quantify and measure these expectations. Surveys on patient expectations have a potential to improve patient care because identification of expectations have been shown to enable individualized patient care, address areas for increased patient education and pre-surgical preparation, and promote shared decision-making when faced with numerous reasonable treatment options that appear vastly different or complex [19, 32].

This study was intentionally designed to apply standard techniques of qualitative methodology so that expectations were those that participants expressed voluntarily whether they were fundamental and obvious in the process of medical data collection, or personally private and not readily apparent to their surgeons. Specifically, the verbal composition of the survey was determined from frequently stated expectations using patients' own words recorded during interviews providing content for the survey; we

believe this feature shows the saliency of the patient perspective in the design of this study.

There are several limitations to this study. First, the participants were patients recruited from one hospital that might have unique demographic characteristics and therefore might not be representative of other patient populations. In addition, this study did not enable analyses to correlate expectations with demographic, geographic, and other major clinical characteristics; this is the subject of concurrent research. Second, Phase 1 interviews were done in person or by telephone, and these different interviewing modes might have affected responses. Nonetheless, there are studies that reported that interviewing modes are not statistically significant regarding health status questions [1, 35], and another that reported that the condition, including socially stigmatized behavior such as drug use [2], might contribute to why these modes of questioning result in differences in the quality of reporting. Third, to minimize response and scoring burden, the survey focuses on types of expectations and the amount of improvement expected and does not address

weighing or ranking expectations. Fourth, this study did not assess how expectations vary according to clinical characteristics, disease severity, or the presence of thumb deformities that arise secondarily to the CMC arthritis, including metacarpophalangeal joint instability and web-space adduction contractures. Moving forward, we hope to use this survey in continued related research to measure how these clinical features affect the number and degree of expectations.

Our study showed that patients have a characteristic set of expectations that encompass improvement along major categories of pain, physical symptoms, restoration of function, achievement of activity-related goals, and improvement in psychosocial well-being. Numerous studies assessing patients' perspectives of hand and upper extremity conditions have been published [4, 8, 17, 25, 30, 34], most of which target expectations involving nerve-related disorders [4, 17, 30, 34]. Most recently, Squitieri et al. [30] reported results of their pilot study on expectations of treatment in adolescents with neonatal brachial plexus palsy. Their study was distinct in the field of upper extremity surgery because it used techniques of qualitative methodology. However, it focused on a comparison between two existing outcome instruments to assess expectations. Our study is different from previous studies on expectations in that it reveals concepts of impairment specific to thumb CMC arthritis. Examples of these differences compared with those of the shoulder, hip, knee, and spine [21–24] are expectations to alleviate the patient's sense of dependency on others (Item 17), to start activities without first hesitating (Item 15), to free the mind of a constant awareness (Item 18), and to ease an emotion created by the arthritis (Items 19).

We tested and showed that a survey developed using patient-derived content with content validity supported by a high frequency of endorsement can be used to reproducibly, reliably, and consistently quantitate patient expectations. Additional features of the expectations survey were that it was limited to one page and displayed feasible usability, as every study participant was able to complete the survey fully. Although Kadzielski et al. [17] and Becker et al. [4] used validated tools to measure overall physical and psychosocial health parameters related

to expectations associated with carpal tunnel syndrome, their studies did not assess the reproducibility of their assessment of expectations and the applicability of their findings to other hand conditions.

Our study identifies patient expectations that are characteristic of thumb CMC arthritis. We developed a survey for thumb CMC joint arthritis using patient-derived content that enables a self-reportable method to record the physical and psychosocial aspects of patients' expectations. The survey generates a calculable and interpretable overall score, which reflects the number of items expected and the total degree of expected improvement. A survey on patient expectations supplements the hand and upper extremity surgeon's ability to provide patient-centered care and offers a practical and uniform method to record patients' expectations for a common condition that has various treatment options. It provides an itemized way for patients to identify and quantify what they expect, to serve as a catalog of what has been addressed before treatment, and to offer a written template for a discussion of goals. This is particularly useful for patients who otherwise would express their goals in vague, nonspecific terms. There are additional potential uses. Because factors such as (and not limited to) individual preference, past treatment, cyberspace content, word-of-mouth, and the delivery and context of professional medical advice likely influence the decision to undergo treatment and the associated expectations, this survey can be used to assess how these factors correlate with patient expectations. The decision-making process and specific choice of treatment likely correlate with expectations before and after treatment, which is another area of active investigation. Finally, the potential to use this survey before and after treatment as a means to determine whether expectations were fulfilled to thereby improve patient satisfaction by understanding when and why patients become dissatisfied after treatment is the focus and rationale to continue the study of patient expectations.

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Appendix 1: Hospital for Special Surgery Thumb Arthritis Expectations Survey

For the following, how much improvement do you expect after treatment for your thumb arthritis?

Please check the box that best describes your response to each item.

	Back to Normal	Not Back to Normal, But			Does Not Apply To Me
		Lots of	Moderate	A Bit of	
		Improvement			
Relieve pain					
Improve hand strength					
Improve ability to write, turn pages, type, or use your cellphone					
Improve ability to do fine, prolonged activities (for example, tie a knot)					
Improve ability to do basic activities that require some exertion (for example, open a jar, use a knife)					
Improve ability to drive					
If employed, ability to fulfill job responsibilities					
Improve ability to dress and manage personal care					
Improve ability to do jobs at home or around the house (for example, cooking, cleaning, yardwork, roofing)					
Improve ability to do simple things without having to accommodate or make adjustments					
Improve ability to work-out at the gym or play a sport					
Improve ability to engage in a favorite activity, hobbies, or an instrument					
Complete activities without having to slow down or stop to take a break					
Improve ability to plan for social events or activities					
Start an activity without first hesitating or being cautious					
Prevent my hand condition from getting worse					
Carry out tasks without depending on other people					
Free my mind of the constant awareness of my hand					
Ease an emotion that my hand condition creates (for example, sadness, anger, isolation)					

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Appendix 2: Thumb Arthritis Expectations Survey

Scoring

Thank you for your interest in the Thumb Arthritis Expectations Survey. The scoring for the survey is as follows:

- Record responses in reverse order so that:
4 = back to normal or complete improvement
3 = a lot of improvement

2 = a moderate amount of improvement
1 = a little improvement

0 = I do not have this expectation, or this expectation does not apply to me.

- Sum all responses.
The summed raw score ranges from 0 to 76.
- Transform the score to range from 0 to 100.
Transformed score = (raw score / 76) × 100.
- Report the transformed score.
Higher score indicates expecting more improvement for more items.

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References

- Aneshensel CS, Frerichs RR, Clark VA, Yokopenic PA. Telephone versus in-person surveys of community health status. *Am J Public Health.* 1982;72:1017–1021.
- Aquilino WS. Telephone versus face-to-face interviewing for household drug use surveys. *Int J Addict.* 1992;27:71–91.
- Armitage P, Berry B. *Statistical Methods in Medical Research.* 3rd ed. Boston, MA: Blackwell; 1994.
- Becker SJ, Makanji HS, Ring D. Expected and actual improvement of symptoms with carpal tunnel release. *J Hand Surg Am.* 2012;37:1324–1329.
- Bellacosa RA, Pollak RA. Patient expectations of elective foot surgery. *J Foot Ankle Surg.* 1993;32:580–583.
- Berkwits M, Inui TS. Making use of qualitative research techniques. *J Gen Intern Med.* 1998;13:195–199.
- Bland JM, Altman DG. Statistics notes: Cronbach's alpha. *BMJ.* 1997;314:572.
- Bogoch ER, Escott BG, Ronald K. Hand appearance as a patient motivation for surgery and a determinant of satisfaction with metacarpophalangeal joint arthroplasty for rheumatoid arthritis. *J Hand Surg Am.* 2011;36:1007–1014.
- Brown GD 3rd, Roh MS, Strauch RJ, Rosenwasser MP, Ateshian GA, Mow VC. Radiography and visual pathology of the osteoarthritic scaphotrapezio-trapezoidal joint, and its relationship to trapeziometacarpal osteoarthritis. *J Hand Surg Am.* 2003;28:739–743.
- Burton KE, Wright V, Richards J. Patients' expectations in relation to outcome of total hip replacement surgery. *Ann Rheum Dis.* 1979;38:471–474.
- Chow A, Mayer EK, Darzi AW, Athanasiou T. Patient-reported outcome measures: the importance of patient satisfaction in surgery. *Surgery.* 2009;146:435–443.
- Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika.* 1951;16:297–334.
- Ford EW, Huerta TR, Diana ML, Kazley AS, Menachemi N. Patient satisfaction scores and their relationship to hospital website quality measures. *Health Mark Q.* 2013;30:334–348.
- Glickel SZ. Clinical assessment of the thumb trapeziometacarpal joint. *Hand Clin.* 2001;17:185–195.
- IBM Corp. *IBM SPSS Statistics* Version 20.0. Armonk, NY, USA. Available at: <http://www-01.ibm.com/support/docview.wss?uid=swg24029274>. Accessed September 11, 2015.
- Iversen MD, Daltroy LH, Fossel AH, Katz JN. The prognostic importance of patient pre-operative expectations of surgery for lumbar spinal stenosis. *Patient Educ Couns.* 1998;34:169–178.
- Kadzielski J, Malhotra LR, Zurawski D, Lee SG, Jupiter JB, Ring D. Evaluation of preoperative expectations and patient satisfaction after carpal tunnel release. *J Hand Surg Am.* 2008;33:1783–1788.
- Kramer MS, Feinstein AR. Clinical biostatistics: LIV. The biostatistics of concordance. *Clin Pharmacol Ther.* 1981;29:111–123.
- Kravitz RL, Callahan EJ, Paterniti D, Antonius D, Dunham M, Lewis CE. Prevalence and sources of patients' unmet expectations for care. *Ann Intern Med.* 1996;125:730–737.
- Lutz GK, Butzlaff ME, Atlas SJ, Keller RB, Singer DE, Devo RA. The relation between expectations and outcomes in surgery for sciatica. *J Gen Intern Med.* 1999;14:740–744.
- Mancuso CA, Altchek DW, Craig EV, Jones EC, Robbins L, Warren RF, Williams-Russo P. Patients' expectations of shoulder surgery. *J Shoulder Elbow Surg.* 2002;11:541–549.
- Mancuso CA, Cammisa FP, Sama AA, Hughes AP, Girardi FP. Development of an expectations survey for patients undergoing cervical spine surgery. *Spine (Phila Pa 1976).* 2013;38:718–725.
- Mancuso CA, Salvati EA, Johanson NA, Peterson MG, Charlson ME. Patients' expectations and satisfaction with total hip arthroplasty. *J Arthroplasty.* 1997;12:387–396.
- Mancuso CA, Sculco TP, Wickiewicz TL, Jones EC, Robbins L, Warren RF, Williams-Russo P. Patients' expectations of knee surgery. *J Bone Joint Surg Am.* 2001;83:1005–1012.
- Mandl LA, Galvin DH, Bosch JP, George CC, Simmons BP, Axt TS, Fossel AH, Katz JN. Metacarpophalangeal arthroplasty in rheumatoid arthritis: what determines satisfaction with surgery? *J Rheumatol.* 2002;29:2488–2491.
- Patel TJ, Beredjickian PK, Matzon JL. Trapeziometacarpal joint arthritis. *Curr Rev Musculoskelet Med.* 2013;6:1–8.
- Ragab AA. Validity of self-assessment outcome questionnaires: patient-physician discrepancy in outcome interpretation. *Biomed Sci Instrum.* 2003;39:579–584.
- Rohrich RJ. Mirror, mirror on the wall: when the postoperative reflection does not meet patients' expectations. *Plast Reconstr Surg.* 2001;108:507–509.
- Shrout PE, Fleiss JL. Intraclass correlations: uses in assessing rater reliability. *Psychol Bull.* 1979;86:420–428.
- Squitieri L, Larson BP, Chang KW, Yang LJ, Chung KC. Understanding quality of life and patient expectations among adolescents with neonatal brachial plexus palsy: a qualitative and quantitative pilot study. *J Hand Surg Am.* 2013;38:2387–2397.
- Strauss A, Corbin J. *Basics of Qualitative Research.* 2nd ed. Thousand Oaks, CA: Sage Publications; 1998.
- Uhlmann RF, Inui TS, Carter WB. Patient requests and expectations: definitions and clinical applications. *Med Care.* 1984;22:681–685.
- Van Heest AE, Kallemeier P. Thumb carpal metacarpal arthritis. *J Am Acad Orthop Surg.* 2008;16:140–151.
- Wagner JP, Curtin CM, Gater DR, Chung KC. Perceptions of people with tetraplegia regarding surgery to improve upper-extremity function. *J Hand Surg Am.* 2007;32:483–490.
- Weeks MF, Kulka RA, Lessler JT, Whitmore RW. Personal versus telephone surveys for collecting household health data at the local level. *Am J Public Health.* 1983;73:1389–1394.
- Wolf JM, Delaronde S. Current trends in nonoperative and operative treatment of trapeziometacarpal osteoarthritis: a survey of US hand surgeons. *J Hand Surg Am.* 2012;37:77–82.
- Wright JG, Young NL. The patient-specific index: asking patients what they want. *J Bone Joint Surg Am.* 1997;79:974–983.