

Carpal Tunnel Syndrome: As Seen from the Perspective of the Patient

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Background: Carpal tunnel syndrome (CTS) is the most common nerve compression syndrome in the upper extremity and is one of the most common problems treated by hand surgeons. Despite its ubiquity—or perhaps because of it—there is a lack of unanimity regarding how best to treat CTS and what the options for treatment are. This study aimed to explore what patients find important when deciding on treatment of CTS in an effort to improve the physician–patient shared decision-making process.

Methods: An online crowdsourcing platform was used to recruit participants for this study. Study participants were first led through a clinical scenario in which the symptoms of CTS were explained. They were then asked a series of questions regarding what was important to them when deciding upon treatment. A Likert scale was used for responses.

Results: In total, 268 participant responses were included in the study. A majority of patients responded that all surveyed factors were either very important or important when considering treatment. The risk of surgery was most important, whereas postoperative pain was least important. The risk of surgery was significantly more important to patients than postoperative pain and time out of work. The cost of surgery was significantly more important to patients than postoperative pain.

Conclusions: Given the lack of consensus regarding an algorithm for the treatment of CTS, the patient's preference is increasingly important when formulating a treatment plan. The results of this study may better help physicians frame the discussion of treatment options for CTS with their patients. (*Plast Reconstr Surg Glob Open* 2023; 11:e5146; doi: [10.1097/GOX.0000000000005146](https://doi.org/10.1097/GOX.0000000000005146); Published online 20 July 2023.)

INTRODUCTION

Carpal tunnel syndrome (CTS) is the most common nerve compression syndrome in the upper extremity and is one of the most common problems treated by hand surgeons.^{1,2} Despite its ubiquity—or perhaps because of it—there is a lack of unanimity regarding how best to treat CTS and what the options for treatment are. Thus, it is important to engage the patient in the decision-making process. Knowing the concerns and questions patients have after being diagnosed with CTS and being aware of the importance patients attach

to their questions will allow physicians to anticipate and address the questions and thereby inform and educate their patients, ease their anxieties, and enhance the doctor–patient relationship. The aim of this study was to explore what patients find important when determining treatment for CTS.

METHODS

An online, survey-based study was performed through the use of a crowdsourcing website, Amazon Mechanical Turk (AMT). Participants for this study were randomly recruited through AMT. Studies have shown that AMT produces results similar to those of conventional surveying techniques, and the population surveyed is representative of the US internet population.^{3–5} Institutional review board approval was not obtained for this study, given that all patient information remained anonymous. The Declaration of Helsinki was followed.

AMT workers must be older than 18 years of age to participate on the platform. Survey participants are screened through AMT to ensure that the same individual

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cannot complete multiple responses. Only Mechanical Turk Masters were allowed to participate in this survey. Masters are individuals who have shown consistent high-quality responses across a wide variety of topics. Additionally, an attention check, question 5 below, was included to verify the quality of the responses. If a survey participant failed the attention check, their response was excluded. If a participant completed the survey and adequately responded to the attention check, they were compensated (\$0.50 per unique response) through the AMT platform for their time.

Scenario

Survey participants were provided with the following scenario:

Suppose that you have recently been experiencing numbness (diminished sensation) in your hands and fingers. Along with the numbness, you have experienced tingling (a feeling of “pins and needles”) in your hand. Also, you are awakened from sleep at night by numbness and tingling and pain in your hands and fingers. You experience clumsiness when using your hands, such as difficulty manipulating buttons or using a zipper.

You see a doctor—an orthopedic surgeon—who listens to your complaints and examines you.

You are given a diagnosis of carpal tunnel syndrome (a “pinched nerve” at the wrist).

You tell the doctor that your symptoms interfere with the quality of your life. You would like something done to make you feel better.

The doctor tells you that surgery (“carpal tunnel release”) is the treatment most likely to provide relief of your symptoms. We want to know whether additional information is important to you as you consider whether to proceed with surgery.

Survey Questions

Participants were presented with several questions and were asked to rate the level of importance for each question according to a Likert scale. Each question could be rated as very important, important, moderately important, slightly important, or unimportant.

Questions:

1. You are told that most patients have no complications after carpal tunnel surgery. However, no operation is risk-free. How important is it for you to know the risks of surgery?
2. Symptoms of carpal tunnel syndrome (numbness and tingling and pain) sometimes resolve on their own. How important is it to know if you can expect that symptoms might resolve without any treatment?
3. You understand that surgery (carpal tunnel release) is the treatment most likely to provide relief of symptoms. However, there are other methods of treatment that are sometimes tried (hand therapy, wrist splint, cortisone injection). How important is it for you to have these other methods discussed with you?

Takeaways

Question: What do patients find important when considering treatment options for carpal tunnel syndrome (CTS)?

Findings: Patients wish to be well informed when deciding on treatment options. They reported that the risk of surgery and cost of surgery were most important, whereas the expected postoperative pain and time out of work were least important.

Meaning: Given the lack of consensus regarding a treatment algorithm for CTS, a shared decision-making process with the patient is critical. Understanding what patients find most important when deciding on treatment options may help providers better frame their discussion with patients regarding CTS.

4. How important is it for you to know whether the cost of surgery is covered by your insurance before deciding whether to proceed with surgery?

5. Attention check.

Please do not answer. Please leave the answer blank.

6. How important is it for you to know how long it might take to recover following surgery? For example, how important is it for you to know how long you might be out of work or how long it might take for you to return to your regular activities?
7. How important is it for you to know the level of pain you might experience after carpal tunnel surgery?

Data Analysis

To determine if there were any significant differences in what was important to participants, responses were first given an integer value. A response of “very important” was given an integer value of 4; “important,” a value of 3; “moderately important,” a value of 2; “slightly important,” a value of 1; and “unimportant,” a value of 0. The mean, standard deviation, and median of responses to each question were calculated. Paired *t* tests were then run between all questions. A Bonferroni-adjusted significance level was then calculated to be a *P* value of 0.00238.

RESULTS

A total of 299 participants completed the survey via AMT. An estimated 31 participants (10%) were excluded because they failed the attention check questions, leaving 268 responses, which were included in the study.

Greater than 50% of participants answered that every topic regarding the treatment of CTS was either very important or important. The topic that was deemed to be most important by participants was the risk of surgery. An estimated 80% of respondents responded that this was very important or important to discuss, and both the mean and median value was greater than 3. The topic that was deemed to be least important, albeit still important, was postoperative pain. These results can be seen in [Figure 1](#) and [Table 1](#).

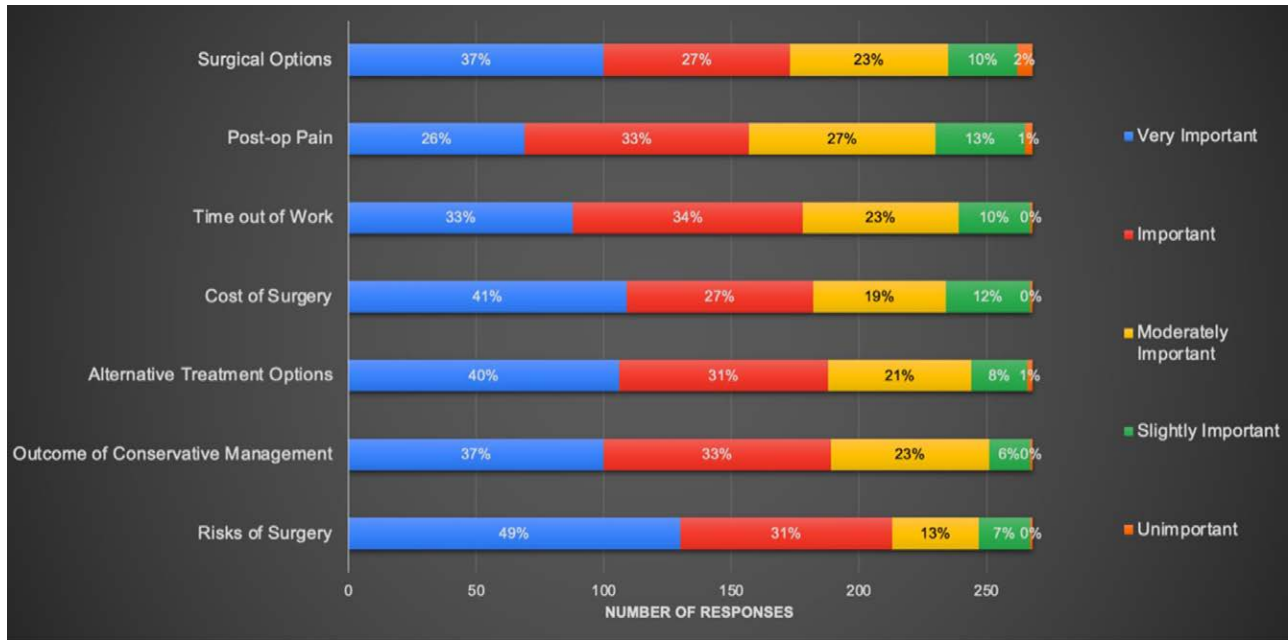


Fig. 1. What's important for patients in CTS treatment.

Table 1. Survey Results Presented as Integers

	Mean	SD	Median
Risk of surgery	3.23	1.81	3
Conservative management	2.85	1.75	2
Alternative treatment	2.98	1.74	2
Cost	3.08	1.71	3
Time out of work	2.76	1.69	2
Postoperative pain	2.6	1.57	2
Surgical options	2.99	1.69	2

On further statistical analysis, it was found that participants thought discussion of the risks of surgery was significantly more important to discuss than postoperative pain and time out of work. It was also found that participants thought discussion of the cost of surgery was significantly more important to discuss than postoperative pain. These results can be found in Table 2.

DISCUSSION

CTS is a symptomatic compression neuropathy of the median nerve at the wrist.⁶ CTS is the most commonly

diagnosed compression neuropathy in the upper extremity and is one of the most common musculoskeletal disorders of the upper extremity.⁷⁻⁹ It affects 3.7% of the general population.¹⁰ It is one of the leading causes of lost work time.¹¹ Patients with CTS typically complain of numbness and tingling in the hand, usually affecting the thumb, index, middle, and medial ring fingers.¹² Pain can accompany the numbness and tingling.¹ Patients may also describe motor weakness in the hand.¹³ Specifically, there may be loss of strong thumb opposition in advanced carpal tunnel syndrome.¹² Patients may note clumsiness and difficulty with fine motor tasks.¹⁴ History of complaints as noted above, and physical examination are often sufficient to make a diagnosis of CTS. The physical examination typically involves inspection for possible thenar muscle atrophy and sensory examination. Specific tests such as Phalen, Tinel, and Durkans tests are commonly performed. Electrodiagnostic studies can be obtained to confirm a diagnosis of CTS and quantify the severity of nerve compression.² However, the routine use of electrodiagnostic studies has been questioned.¹⁵ Further, electrodiagnostic findings may not correlate with level of

Table 2. P Values from Paired t Test Results

	Risk of Surgery	Conservative Management	Alternative Treatment	Cost	Time Out of Work	Postoperative Pain	Surgical Options
Risk of surgery							
Conservative management	0.0054						
Alternative treatment	0.0277	0.3354					
Cost	0.2293	0.0828	0.4520				
Time out of work	0.0000*	0.4476	0.0587	0.0130			
Postoperative pain	0.0000*	0.0311	0.0040	0.0001*	0.2087		
Surgical options	0.0373	0.2673	0.8919	0.4740	0.0418	0.0028	

*Indicated $P < 0.00238$ (Bonferroni-adjusted significance level).

symptoms.^{16,17} Nonetheless, electrodiagnostic studies are frequently obtained.¹⁸ Treatment choices for CTS can be surgical or nonsurgical, and recommendations are often made based on severity. Although there is no one universally agreed upon measure of CTS severity, there are assessment measures designed to evaluate hand impairment, including the DASH (disability arm, shoulder, hand) and Michigan Hand Outcomes Questionnaire. The Boston Carpal Tunnel Questionnaire (BCTQ) was designed specifically for carpal tunnel syndrome. It was designed to measure self-reported symptom severity and functional status in patients with CTS. One report concludes that it is a “valid, reliable, responsive, and acceptable instrument and should be included as a primary outcome measures...” when reporting treatment results for CTS.¹⁹ However, a recent article reached a different conclusion. Forcelini et al compared results of the BCTQ in patients with CTS who had varying degrees of CTS based on electrodiagnostic abnormalities, and concluded that the BCTQ “is not adequate to assess interpatient severity of median nerve entrapment on clinical practice.”²⁰ The BCTQ is designed to measure self-reported symptom severity and functional status, but these do not always correlate with actual nerve entrapment severity.

Treatment for CTS can be surgical or nonsurgical. What is less known is the natural history of untreated CTS. There are only a few studies that examine the natural history of untreated CTS. Resende et al reported on 12 patients with clinical and electrodiagnostic evidence of CTS that had declined surgery and had not taken antiinflammatory medications, and had not used splints or anesthetic infiltration.²¹ Twelve patients with involvement of 20 hands were followed up for between 4 and 9 years. All had nerve studies at the start and end of follow-up periods. Eight hands (seven patients) had improved clinical symptoms and nerve conduction studies. Ortíz-Corredor et al monitored 113 patients, who, based upon clinical examination and electrodiagnostic studies, were diagnosed with carpal tunnel syndrome.²² No treatment was administered (injection, splint, or surgery). Average follow-up was 2 years, and most patients remained stable or improved over time, leading the authors to conclude that conservative treatment (which, in this study, meant no treatment) “may be all that is needed in a selection of patients with this disorder.” Pency et al compared the long-term outcomes of patients with CTS who were scheduled for surgery but did not proceed with surgery to patients who underwent surgery.²³ Symptoms and function scores improved in both groups with superior outcomes in the surgical group. The authors concluded that “symptoms of carpal tunnel syndrome may improve without surgery, but further studies are needed to understand the natural history of the disease.”

Initial nonoperative treatment for carpal tunnel syndrome may include splinting, a cortisone injection into the carpal tunnel, and therapy. Wrist splints are often used as an initial treatment modality “for mild to moderate CTS due to its effortlessness, inexpensiveness, and admissibility.”²⁴ The 2016 AAOS clinical practice guideline notes “strong evidence” for use of splints.²⁵

Cortisone injection into the carpal tunnel is another common nonsurgical option. Atroshi et al report that methylprednisone injection into the carpal tunnel had a significant benefit in relieving symptoms at 10 weeks and reducing the rate of surgery 1 year after treatment.²⁶

Comparing night splints with corticosteroid injection, Chesterton et al reported that a single corticosteroid injection was superior to night resting splint at 6 weeks.²⁷ It should be noted that cortisone injection is not without risk. Local pain, skin depigmentation, and atrophy of the subcutaneous tissue are known adverse events.²⁸ The most serious complication is intraneural median nerve injection. Although there are case reports of median nerve injury following steroid injection, the incidence of nerve injury is unclear.²⁹⁻³¹

Karjalainen et al reviewed the efficacy of some frequently used nonoperative modalities. With regard to use of wrist braces (“orthoses”), the authors stated that “limited evidence supports small benefits from orthoses.”³² Despite this, the authors observed that splints are not likely to cause long-term harm and therefore “they can be tried as a first-line treatment particularly when people are not interested in undergoing interventions such as surgery, injections, or participating in supervised therapy.” Most patients with CTS typically prefer conservative management as the first therapeutic option.³³

Fernandez-de-las-Penas et al evaluated the effectiveness of a program of manual therapy versus surgery in women with CTS. Manual therapy includes but is not limited to, stretching of the palmar aponeurosis, stretching the transverse carpal ligament, and manual compression of the lumbricals. This was administered at three 30-min treatment sessions performed once per week. The authors reported that manual therapy and surgery have similar outcomes at long-term follow-up.³⁴

Mertz et al reviewed metrics used to assess outcomes after treatment for CTS. They found objective measurements were commonly reported, but patient-centered measurements such as return to work and sleep quality were rarely reported. They concluded that “further work is needed to determine *patients*’ [emphasis added] preferred method of measuring outcomes after treatment for carpal tunnel syndrome.” Similarly important is finding out what is important to patients before initiating treatment.

Roe et al compared a question prompt list with 35 hand-specific questions versus three generic questions in a prospective study.³⁴ The generic questions were:

1. What are my options?
2. What are the possible benefits and harms of the options?
3. How likely are each of these benefits and harms to happen to me?

The authors concluded that “in hand surgery, three generic questions were no different than the lengthy question prompt list with respect to patient involvement in their care.”

Kortlever et al investigated factors that affect how involved patients wish to be regarding decision-making in treatment of CTS. They found that patients prefer shared

decision-making, especially in the operative and postoperative periods.³⁵ No studies to our knowledge have investigated what information patients with CTS want to know when making shared decisions with their provider.

We posed several questions to participants in our study: questions we thought might be important to potential patients with a diagnosis of CTS. Knowing what information is considered important by our patients can facilitate the discussion process regarding treatment options after the diagnosis of CTS is made. We found that all the questions were considered very important or important by more than 50% of the participants in the study. Most important was the risks of surgery. Least important was postoperative pain. Participants found the risk of surgery to be significantly more important to discuss than time out of work and postoperative pain. Participants also found the cost of surgery to be significantly more important to discuss than postoperative pain. Nonetheless, the results of our study indicate that patients want to be very informed when considering treatment options. Touching on all of the topics survey participants were asked in our study would lead to well-informed patients who are satisfied with the shared decision-making process.

The three questions proposed by Roe et al would likely encompass all the questions posed in our survey except for the cost that may be incurred by the patient based on the decided-upon treatment.³⁴ The cost of different treatment options that is incurred by the patient is a complex entity that depends on many factors. These factors are difficult, and time-consuming, for a treating physician to parse out, during an office visit. Our study suggests that it is something important to patients when considering treatment options for CTS. It may behoove hand surgeons and their clinical staff to arrange resources that can help guide patients on what expenses they may occur, to increase patient satisfaction.

There are several limitations to our study. The first is that none of the study participants have actually experienced the symptoms of CTS. They were simply provided with information on the symptoms of CTS. If they were to experience the symptoms themselves, they may have different opinions on what is important when considering treatment. Second, the demographics of the study participants were not collected. It has been previously shown that the AMT worker population is representative of the general United States internet population, but this may not be representative of the population being treated for CTS.^{3-5,36,37} Third, the inclusion of a pay-per-response model could lead to a selection bias, as certain individuals may not have viewed our compensation as high enough to proceed with the survey. Lastly, the use of a Likert scale provided participants with closed-ended questions. The closed-ended questions may have led participants to respond that factors were more important than if the questions would have been asked open ended.

The results of this study, and the limitations of it, indicate the need for further study in this area. Future research should survey patients who have a diagnosis of CTS to

evaluate how their opinions relate to those from this study. Additionally, a decision aid could be created and validated to assist patients experiencing CTS and seeking treatment for it, similar to the BRECONDA decision aid for breast reconstruction.³⁸ Finally, additional questions should be investigated regarding patient opinions on different treatment options such as open versus endoscopic carpal tunnel release.

CONCLUSIONS

Given the lack of consensus regarding a treatment algorithm for CTS, shared decision-making with patients is evermore important. The results from this study suggest that patients considering treatment options for CTS desire to be informed about the different treatment options, the risks and benefits of each, and the cost they may personally incur from these options. With this information in mind, hand surgeons may be able to better inform patients, therefore increasing satisfaction for patients seeking treatment of CTS.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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