

# Predictors of Patient Satisfaction with Hand Function after Fasciectomy for Dupuytren's Contracture

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**Background:** This study examined patient satisfaction with hand function after fasciectomy for Dupuytren's contracture and determined which preoperative patient- and disease-specific factors predicted this satisfaction.

**Methods:** Demographics and disease-specific factors were assessed from a prospective cohort of 194 patients who completed the Michigan Hand Outcomes Questionnaire preoperatively and underwent limited fasciectomy between 2011 and 2014 at six hand surgery practice sites. To evaluate satisfaction with hand function, patients were asked to complete the Michigan Hand Outcomes Questionnaire during the first year after fasciectomy. After patients were classified into a satisfied and an unsatisfied category using the question that specifically pertains to satisfaction with hand function, the authors applied multivariate logistic regression modeling to identify independent predictors of patient satisfaction.

**Results:** At an average of 10 months (range, 6 to 12 months) after fasciectomy, 84 percent ( $n = 163$ ) of the patients were satisfied with their hand function. In multivariate analyses adjusting for the degree of postoperative residual contracture ( $p < 0.001$ ) and complications ( $p < 0.001$ ), a higher preoperative Michigan Hand Outcomes Questionnaire hand appearance subscore and male gender predicted a higher likelihood of becoming satisfied after fasciectomy. Other patient- and disease-specific factors did not show evidence for an association with patient satisfaction.

**Conclusions:** The findings of this study suggest that providers should consider assessing concerns about the appearance of the hand in patients with Dupuytren's contracture. They also highlight the importance of complication prevention and full contracture correction from the patient's perspective. (*Plast. Reconstr. Surg.* 138: 649, 2016.)

**CLINICAL QUESTION/LEVEL OF EVIDENCE:** Risk, III.

Dupuytren's disease is characterized by the development of cords that may contract and cause disfiguring flexion deformities.<sup>1</sup> Surgical fasciectomy remains the standard against which the results of all other techniques ought to be compared.<sup>2</sup> The technique effectively reduces contractures with acceptable complication rates

and provides a relatively low risk of recurrence.<sup>3</sup> However, outcomes that are good from a provider's perspective do not necessarily satisfy patients. It is important to identify the factors that matter most to patients in order to understand the patient perspective and maximize satisfaction rates.

Patient satisfaction is a broad yet increasingly important construct, and may be subdivided into different domains, such as satisfaction with the provider, convenience of care, and functional outcomes. In general, satisfied patients better adhere to treatment regimens, and are more compliant and more loyal toward providers.<sup>4</sup> Moreover, satisfaction data are increasingly used to judge the

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quality of surgical care.<sup>5,6</sup> Although our knowledge of the factors influencing patient satisfaction remains incomplete, what is evident is that it depends not only on the treatment delivered but also on patient factors, such as demographics, functional status, and pretreatment expectations.<sup>7,8</sup> Previous studies have reported variable satisfaction rates following fasciectomy,<sup>9</sup> but the factors contributing to this variation remain poorly understood.<sup>10,11</sup>

The aim of the present study was to identify preoperative factors that influenced satisfaction with hand function after fasciectomy for Dupuytren's contracture. Satisfaction with hand function is important, as the premise of the treatment is to restore hand function for patients. Preoperative factors were assessed because identification, before treatment, of those at risk of becoming unsatisfied may, for example, help providers to better address individual concerns or needs preoperatively, and prompt them to manage patients differently.

## PATIENTS AND METHODS

### Study Sample

After our local institutional review board approved our study protocol, we identified all patients who underwent fasciectomy for Dupuytren's contracture between 2011 and 2013 at six hand surgery practice sites using a prospectively maintained database that was designed for clinical and research purposes. Demographic and disease-specific characteristics derived from this database were age, sex, occupational status, comorbidities, current tobacco and alcohol use, family history of Dupuytren's disease, hand dominance, number of treated rays, bilateral disease, whether fasciectomy was performed for primary or recurrent disease, and degree of contracture.

We included all adult patients with a diagnosis of Dupuytren's contracture who underwent fasciectomy and who had the ability to complete the study questionnaire. Patients were excluded if they had a diagnosis of a hand condition or underwent a concomitant intervention (e.g., carpal tunnel release) on the affected side that could confound patient satisfaction. Patients undergoing treatment for recurrent disease were included if they met the other eligibility criteria.

### Primary Outcome: Patient Satisfaction with Hand Function

The Michigan Hand Outcomes Questionnaire was mailed to all study participants before and

between 6 months and 1 year after surgery. The minimum 6-month follow-period was decided on based on previous research showing that the majority of patients are functionally recovered after fasciectomy at this time point.<sup>12</sup> The Michigan Hand Outcomes Questionnaire is a thoroughly developed and sensitive hand-specific instrument that assesses six domains of hand function: overall hand function, activities of daily living, pain, work performance, hand appearance, and patient satisfaction, with scores ranging from 0 (poorest function) to 100 (best function). The fact that the Michigan Hand Outcomes Questionnaire includes a scale that assesses hand appearance increases the scope of this instrument.<sup>13</sup>

Satisfaction with hand function was assessed using one of the questions from the satisfaction domain of the Michigan Hand Outcomes Questionnaire that specifically asks patients about their satisfaction with overall hand function. Patients responded using a five-point Likert scale with the following possible answers: "very satisfied," "somewhat satisfied," "neither satisfied nor dissatisfied," "somewhat dissatisfied," or "very dissatisfied." We considered patients who selected "very satisfied" and "somewhat satisfied" as being satisfied with their hand function and all others as unsatisfied. Although dichotomization of ordinal data may result in some information loss, we decided on this approach for two important reasons. First, our purpose was to specifically focus on the difference between patients who had at least some degree of satisfaction and those who reported no satisfaction at all. Second, previous other investigators have successfully used this approach to identify determinants of satisfaction in other hand conditions.<sup>14</sup> Only the outcomes pertaining to the treated side were used.

### Clinical Outcomes

We anticipated that postoperative outcomes would influence patient satisfaction. To account for their possible influences, we assessed the occurrence of complications, whether a secondary procedure had been performed for recurrent contracture, and the degree of postoperative total residual contracture. The occurrence of complications and whether a revision procedure had been performed for recurrent disease within the follow-up period of the study was assessed through retrospective analyses of patients' health records and office charts. Because it was assumed that any type of complication could impact patient satisfaction, we included all complications noted, including neurapraxia, scar sequelae, wound healing

problems, wound infection, hematoma, tenosynovitis, edema, cold intolerance, sympathetic dystrophy, persistent pain, nerve division, and arterial injury. The degree of total residual contracture was assessed by certified hand therapists during visits occurring between 6 and 12 weeks after treatment by summing up the degree of active extension deficit at the metacarpophalangeal, proximal interphalangeal, and distal interphalangeal joint levels. Any hyperextension was converted to 0 degrees to prevent underestimation of the total degree of extension deficit. To improve the comparability between patients with a single affected versus those with multiple affected digits, we used the measurements pertaining to the most severely contracted digit.

### Statistical Analysis

Descriptive statistics included means and standard deviations for continuous variables and numbers for categorical variables. A power analysis determined that a sample of 160 patients would provide 80 percent power ( $\alpha = 0.05$ ,  $\beta = 0.20$ ) to detect a significant difference of 10 points in the Michigan Hand Outcomes Questionnaire overall hand function score between satisfied and unsatisfied patients and assuming a standard deviation of 18 points and a satisfied-to-unsatisfied ratio of 4:1.<sup>15</sup>

Preliminary analyses examined possible bivariate relationships between patient satisfaction with hand function and a diverse set of demographic variables; clinical factors; and the preoperative Michigan Hand Outcomes Questionnaire subdomain scores of overall hand function, ability to perform activities of daily living, work performance, satisfaction, and hand appearance using *t* tests for continuous variables and chi-square tests for categorical variables. Then, all factors showing a relationship ( $p < 0.10$ ) were included in multivariate logistic regression models (primary analyses) that accounted for the possible influences of postoperative outcomes on patient satisfaction to identify independent predictors of patient satisfaction. To explore possible mechanisms underlying the factors associated with satisfaction, interaction effects were assessed afterwards. Significance thresholds were set at  $p < 0.05$ .

## RESULTS

There were a total of 236 patients who underwent fasciectomy performed by one of the 16 hand surgeons from the participating sites. After excluding 42 patients based on our eligibility

criteria, 194 patients remained to form our study sample. Of these, all patients completed the question pertaining to satisfaction with overall hand function. The mean age in our study sample was  $63 \pm 9$  years, and 73 percent were men. At an average of 10 months (from procedure to survey completion; range, 6 to 12 months) after fasciectomy, 84 percent ( $n = 163$ ) of our study population were satisfied with their hand function and 16 percent ( $n = 31$ ) were unsatisfied. Satisfaction rates were not significantly different between the surgeons ( $p = 0.777$ ) and practice sites ( $p = 0.291$ ). The time from procedure to survey completion was similar between satisfied and unsatisfied patients ( $p = 0.648$ ).

Table 1 shows the bivariate associations between preoperative characteristics and patient satisfaction with hand function. More men were satisfied. Satisfied patients had, on average, higher preoperative Michigan Hand Outcomes Questionnaire hand appearance subscores compared with those who were unsatisfied. All other subscores, preoperative patient factors, and disease-specific characteristics—including occupational status, bilateral disease, recurrent disease, and the degree of preoperative contracture—showed no relationship with satisfaction.

As expected, postoperative outcomes influenced patient satisfaction. Satisfied patients had less residual total extension deficit (29 degrees versus 18 degrees;  $p < 0.001$ ) and a lower rate of complications (20 percent versus 52 percent;  $p < 0.001$ ) (Table 2). Notably, the incremental change in the degree of contracture was not related to satisfaction ( $p = 0.683$ ). Within the follow-up period of this study, none of the patients underwent a secondary procedure for recurrent contracture, which precluded inclusion of this outcome as a possible predictor in further analyses.

The most parsimonious multivariate model that accounted for the influence of the degree of residual contracture ( $p = 0.017$ ) and complications ( $p = 0.002$ ) on patient satisfaction accounted for 32 percent of the variation in satisfaction response. In this model, the Michigan Hand Outcomes Questionnaire hand appearance subscore remained as the only significant preoperative predictor of satisfaction with hand function, whereas gender approached significance (Table 3). More specifically, patients who had a higher preoperative hand appearance score of 10 points were approximately 1.4 times as likely to be satisfied with their hand function. Men, as compared with women, were approximately 2.5 times as likely to be satisfied.

**Table 1. Bivariate Associations between Demographics, Clinical Characteristics, and Self-Reported Outcomes at Baseline with Patient Satisfaction with Hand Function during the First Year after Fasciectomy\***

Variable	Satisfied	Unsatisfied	<i>p</i>
No. of patients	163	31	
Age, yr	65 ± 9	62 ± 9	0.172
Male sex	76	58	0.038
Occupational status	42%	36%	0.517
Diabetes	7%	10%	0.712
Smoking	4%	10%	0.158
Alcohol	4%	7%	0.616
Positive family history	50%	42%	0.442
Bilateral disease	37%	42%	0.635
Primary disease	70%	55%	0.100
Dominant side treated	52%	58%	0.731
No. of treated fingers	1.7	1.8	0.289
Joint level affected			
MP joint	44%	32%	0.218
PIP joint	79%	87%	0.306
Total extension deficit, degrees	70 ± 24	64 ± 36	0.248
MHQ subdomain score (0–100)			
Satisfaction	60 ± 24	52 ± 20	0.081
Activities of daily living	90 ± 14	87 ± 13	0.368
Overall function	67 ± 16	63 ± 13	0.228
Appearance	71 ± 19	58 ± 16	0.001
Work performance	83 ± 24	79 ± 21	0.293

MP, metacarpophalangeal; PIP, proximal interphalangeal; MHQ, Michigan Hand Outcomes Questionnaire.

\*Plus or minus values are means ± SD.

**Table 2. Complications, by Patient Satisfaction with Hand Function\***

Complication	Satisfied (%)	Unsatisfied (%)	<i>p</i>
No. of patients	163	31	
No complication†	131 (80)	14 (48)	<0.001
Neurapraxia	14 (9)	5 (16)	
Scar sequelae	8 (5)	3 (10)	
Wound infection	3 (2)	0 (0)	
Wound healing problems	3 (2)	3 (10)	
Edema	1 (1)	1 (3)	
Cold intolerance	0 (0)	1 (3)	
Sympathetic dystrophgia	0 (0)	1 (3)	
Persistent pain	0 (0)	1 (3)	
Stiffness	0 (0)	1 (3)	
Tenosynovitis	1 (1)	0 (0)	
Arterial injury	1 (1)	0 (0)	
Hematoma	1 (1)	0 (0)	

\*Values are numbers (%).

†There were no significant differences in the preoperative degree of contracture and joint levels involved between the two groups.

**Table 3. Preoperative Predictors of Satisfaction with Hand Function during the First Year after Fasciectomy from the Final Multivariable Logistic Regression Model, with Adjustment for the Postoperative Degree of Total Residual Contracture and Complications**

Predictor	OR (95% CI)	<i>p</i>
MHQ hand appearance subscore (per 10-point incremental change)	1.37 (1.12–1.62)	0.003
Male sex	2.54 (0.98–6.64)	0.056

MHQ, Michigan Hand Outcomes Questionnaire.

Further exploring the possible mechanisms underlying the effects of hand appearance on satisfaction, we found that the interaction effects between the preoperative hand appearance subscore and postoperative residual contracture ( $p = 0.482$ ) and complications ( $p = 0.604$ ) were not significant. The interaction effects between gender and residual extension deficit ( $p = 0.645$ ) and complications ( $p = 0.202$ ) on satisfaction were also not significant.

## DISCUSSION

The present study examined satisfaction with hand function and its determinants in patients undergoing fasciectomy for Dupuytren's contracture. Eighty-four percent of patients were satisfied during the first year after treatment. In light of the similar rates previously reported on fasciectomy,<sup>9,11,12</sup> this finding shows the effectiveness of fasciectomy from the patient perspective<sup>16</sup> yet implies that the procedure may not be fully meeting patients' needs.<sup>17</sup> We found that a higher preoperative Michigan Hand Outcomes Questionnaire hand appearance score and male sex predicted a higher likelihood of becoming satisfied after adjusting for the influence of postoperative outcomes. We found no relation between satisfaction and other patient- and disease-specific factors.

In this study, valuing appearance of the hand more positively before surgery was associated with



higher satisfaction with hand function afterward. This highlights the concern about appearance that hand patients with Dupuytren's contracture may have and the detrimental impact of such concerns on satisfaction. After all, the hand is prominently visible and fulfills a crucial role in interaction with our environment, physical expression, and social functioning.<sup>18,19</sup> Dupuytren's disease is characterized by the formation of contractures that may cause a variable degree of disfigurement and deformity,<sup>11,20</sup> which is further substantiated by the inverse correlation between the preoperative degree of contracture and the Michigan Hand Outcomes Questionnaire hand appearance subscore in the present study. Previous studies found that, among patients with other hand deformities, hand appearance significantly impacted their lifestyle because of feelings of anxiety, lowered self-esteem, and negative self-perceptions.<sup>19,21–23</sup> It may be that similar mechanisms contribute to the dissatisfaction of those who are concerned about the appearance of the hand in Dupuytren's disease.<sup>20,32</sup> In light of recent studies showing that hand appearance improves after fasciectomy,<sup>12,24</sup> it seems logical that, among those who have such concerns, satisfaction increases after their contractures and deformity have improved following the fasciectomy. We believe that these findings should raise awareness among hand surgeons for the concerns patients with Dupuytren's disease may have about the appearance of the hand and possibly their need for restoration of a more normal hand appearance in addition to the unquestionable importance of functional restoration.

We found that men were approximately 2.5 times more likely than women to be satisfied, which shows a gender disparity in satisfaction for which the underlying mechanisms are probably complex. Dupuytren's disease occurs less frequently in women,<sup>25</sup> and it could be that they have different attitudes toward the disease and its consequences. The few studies examining gender differences in Dupuytren's disease found primarily that clinical outcomes were better in men than in women.<sup>26,27</sup> Although this might explain why men were more satisfied, no such differences were found in the present study. Moreover, the negative interaction effect between gender and postoperative outcomes indicated that men and women were equally dissatisfied if a complication occurred or the degree of correction did not meet their expectation. As such, the forum is open for discussion as to why men were more satisfied after fasciectomy. Perhaps women experienced the impact of open fasciectomy more severely or they

had higher expectations before the procedure. Future studies that are qualitative in nature may clarify these questions. Until then, however, the gender difference in satisfaction found in this study underscores the need for providers to consider adjusting for such differences before presenting satisfaction data in Dupuytren's disease.

Less residual contracture was associated with higher rates of patient satisfaction, whereas the degree of contracture before and incremental change after surgery did not. This suggests that satisfaction depends more on the absolute postoperative result than the (potential) change in contracture. It also emphasizes the relevance of achieving full corrections from the patient's perspective. Furthermore, our study reinforces the importance of the prevention of complications, as they also had a detrimental effect on patient satisfaction. The finding that other patient factors, such as recurrence, did not influence satisfaction suggests that patient satisfaction depends on how Dupuytren's disease is experienced by each patient.

Strengths of this study include its prospective design and large sample size by virtue of the participation of six practice sites. This allowed for multivariate analyses to identify predictors of satisfaction, after taking into account the significant influences of postoperative outcomes. However, it also resulted in a high number of surgeons performing the procedures. Although the satisfaction rates between the surgeons and practice sites involved did not differ significantly in the present study, the possibility exists for performance bias (i.e., bias caused by performance variability between surgeons) to have influenced our findings.<sup>28</sup>

A second limitation is that patient satisfaction was assessed during the first year after fasciectomy, whereas most contractures tend to recur after this time horizon. As such, the extent to which levels of satisfaction change and its determinants remain similar over time remains unknown. Third, we only included patients undergoing fasciectomy, and thus our findings may not apply to patients undergoing less invasive techniques. Fourth, we did not assess psychological factors, although these have been previously linked to patient-reported satisfaction,<sup>29</sup> which merits further research in this area.<sup>30</sup> Finally, to increase the likelihood of finding predictors of patient satisfaction, we used the sensitive and well-validated hand-specific Michigan Hand Outcomes Questionnaire.<sup>4</sup> However, the Unité Rhumatologique des Affections de la Main is a more



### CODING PERSPECTIVE

Coding perspective provided by Dr. Raymond Janevicius is intended to provide coding guidance.

- 26121 Fasciectomy, palm only, with or without Z-plasty, other local tissue rearrangement, or skin grafting (includes obtaining graft)
- 26123 Fasciectomy, partial palmar with release of single digit including proximal interphalangeal joint, with or without Z-plasty, other local tissue rearrangement, or skin grafting (includes obtaining graft)
- 26125 Fasciectomy, partial palmar with release of single digit including proximal interphalangeal joint, with or without Z-plasty, other local tissue rearrangement, or skin grafting (includes obtaining graft); each additional digit (List separately in addition to code for primary procedure)

- If the Dupuytren's excision is limited to the palm, report code 26121.
- Excision of Dupuytren's of the palm and a single digit is reported with code 26123. Partial palmar fasciectomy including the ring finger, for example, is reported with code 26123 alone. Code 26123 includes palmar excision, so code 26121 would not be reported in addition.
- If Dupuytren's is excised in more than one digit, the add-on code, 26125, is reported for *each additional digit*. Thus, the excision of Dupuytren's of the left palm, middle finger, ring finger, and small finger is reported:

26123 Left middle finger  
 26125 Left ring finger  
 26125 Left small finger

- Code 26125 is an add-on code, so the multiple procedure modifier, 51, is not appended. Some payers, however, may require the digit modifiers:  
 26123-F2 Left middle finger  
 26125-F3 Left ring finger  
 26125-F4 Left small finger
- If skin grafts or local flaps are required for closure these are *included* in the Dupuytren's codes. Reporting codes 14040 and 15240, in addition to the Dupuytren's codes, would be unbundling.

recently developed questionnaire specific to Dupuytren's disease, which particularly focuses on the functional problems experienced by patients.<sup>31</sup> Investigators should consider incorporating the Unité Rhumatologique des Affections de la Main in future satisfaction studies, as this would increase our understanding of what factors affect satisfaction in Dupuytren's disease.

This study addresses a gap in knowledge regarding the determinants of patient satisfaction with hand function in Dupuytren's disease, which is essential for understanding the patient's perspective and improving satisfaction. Patient satisfaction was higher in patients who had higher self-rated hand appearance preoperatively, in men, and in those who had better postoperative outcomes. These findings show that providers should consider assessing concerns about the appearance of the hand in patients with Dupuytren's contracture. They also highlight the relevance of full contracture corrections and the prevention of complications for patients.

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