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Scientific/Clinical Article

Factors affecting functional recovery after surgery and hand therapy in patients with Dupuytren's disease

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ABSTRACT

Study design: Prospective cohort study.

Introduction: The evidence of the relationship between functional recovery and impairment after surgery and hand therapy are inconsistent.

Purpose of the study: To explore factors that were most related to functional recovery as measured by DASH in patients with Dupuytren's disease.

Methods: Eighty-one patients undergoing surgery and hand therapy were consecutively recruited. Functional recovery was measured by the Disability of the Arm, Shoulder and Hand (DASH) questionnaire. Explanatory variables: range of motion of the finger joints, five questions regarding safety and social issues of hand function, and health-related quality of life (Euroqol).

Results: The three variables "need to take special precautions", "avoid using the hand in social context", and health-related quality of life (EQ-5D index) explained 62.1% of the variance in DASH, where the first variable had the greatest relative effect.

Discussion: Safety and social issues of hand function and quality of life had an evident association with functional recovery.

Level of evidence: IV.

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Introduction

Impairment in hand function and restrictions in performance of daily activities are the motives for patients with Dupuytren's disease (DD) to seek medical care.¹ DD is a benign soft tissue disorder affecting the palmar fascia. DD causes impairment in hand function by finger joint contractures in one or several fingers, in one or both hands, with inability to extend the finger joints. Both surgical and non-invasive methods exist for correction of the extension deficit but the treatment does not cure the disease, and the rate of recurrence is high.^{2,3} Some surgeons recommend hand therapy after correction of the extension deficit, in order to maintain the gains in finger extension and to restore hand function.^{2,4}

For patients with DD, the most commonly reported outcome measures are change in extension deficit of the finger joints, and

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the Disability of the Arm, Shoulder and Hand (DASH) questionnaire.⁵ The extension deficit is a direct measure of the impairment whereas DASH is used to measure functional recovery, including impairments, activity limitations and participation restrictions.^{6,7} The relationship between these commonly used outcome measures for patients with DD is still unclear; significant but weak correlations has been shown⁸ as well as non-significant correlations between extension deficit and DASH score.^{9–12} This indicates that the degree of functional recovery is not dependent only on the severity of the contracture.¹¹

DD is a disease that mainly affects older men.¹³ Although age has not been shown to be significantly correlated with DASH,¹⁰ sex has^{14–16} with higher DASH scores (worse disability) among women.¹⁶ Furthermore, DD leads to consequences such as activity limitations, safety and social issues of hand function and quality of life issues.^{1,17–19} Higher DASH score has also shown to correlate with worse general health,²⁰ but the association between DASH and quality of life outcomes after fasciectomy for DD has not been investigated previously.

Previous research has highlighted the complexity of functional recovery and the need for further research on factors that influence

it.^{15,21} One aspect that is often overlooked in patient reported outcomes, but identified as important to patients with hand injuries, are emotional functions.⁷ For patients with DD, it could be assumed that improving the extension deficit would affect functional recovery measured with DASH. Yet, based on the weak and inconsistent evidence of this relationship, it seems likely that other factors may contribute to the change in how patients rate functional recovery after surgery and hand therapy.

Purpose of the study

To explore factors that were most related to functional recovery as measured by DASH in patients with Dupuytren's disease.

Methods

Study design

Longitudinal data were analyzed from a prospective cohort study that conducted measurements before treatment, and three months after surgery and hand therapy for patients with DD.

Participants

The study participants were recruited from a cohort study of hand function and quality of life among patients with DD. The patients were treated in one hand according a standard protocol with fasciectomy and postoperative hand therapy including active exercises and orthotic intervention.¹⁹ The patients were invited to the study in the order they were scheduled for surgery thus forming a consecutive sample. Inclusion criteria for the cohort study were having DD in one or several fingers of digit II–V, with an extension deficit of 60° or more in an isolated finger joint (metacarpophalangeal (MCP) or proximal/distal interphalangeal (PIP and DIP) joint only) or throughout a whole finger (MCP, PIP, DIP together). Additional inclusion criteria for the present study was to have complete DASH questionnaires from before and three months after surgery. Exclusion criteria were having treatment for another upper extremity disease or not speaking Swedish. Of 123 available patients, 24 did not meet the inclusion criteria for the present study, and 10 declined to participate. For four patients the measurements of range of motion were incomplete and four patients dropped out at the three-month follow-up. Finally, 81 patients, 71 men and 10 women, with a mean age of 68 ± 8 years were included in the present study. Table 1 summarizes the details of the study sample and type of intervention.

The Regional Ethical Review Board in Linköping, Sweden approved the study and all participants gave informed consent to participate in the study.

Procedures

Measurements were carried out before treatment (on the day of surgery) and three months after surgery and hand therapy. Two occupational therapists (OT) that were not involved in the post-operative hand therapy performed the measurements before treatment and three months after surgery. The same OT followed each patient, except for five patients living further away from the hospital, where local OTs specially trained for the study performed the follow-up measurements.

Measurements

Functional recovery was measured by the Swedish version of the DASH questionnaire. The 30 items are rated on a five-point scale

Table 1

Patient characteristics of the study cohort $n = 81$ and given intervention, presented in proportions (%)

Variables	<i>n</i>	%
Sex		
Male	71	88
Female	10	12
Diabetes		
Yes	9	11
No	72	89
Heredity of DD		
Yes	38	47
No	16	20
Unknown	27	33
Disease duration		
0–5 years	20	25
6–10 years	30	37
11–15 years	13	16
>15 years	18	22
Number of affected fingers		
One finger	64	79
Two fingers	13	16
Three fingers	4	5
DD bilateral		
Yes	58	72
No	23	28
Treated hand		
Right	43	53
Left	38	47
Operated fingers ($n = 102$)		
Index	1	1
Middle	8	8
Ring	28	27
Little	65	64
Type of surgery		
Fasciectomy	64	79
+Open palm ^a	8	10
+Volar release ^b	9	11
Complications during surgery		
Nerve injury	3	4
Blood vessel injury	0	0
Complications after surgery		
CRPS	4	5
Infection	6	7

^a Open palm technique was used if there was a shortage of skin or bad skin quality.

^b The volar plate of the PIP joint was removed if there was a residual extension deficit of 25–30° in the PIP joint after the fasciectomy.

(1 = no difficulty, 5 = unable), giving a total DASH score ranging from “0 = no disability” to “100 = severest disability.” The DASH was created as an outcome measure for different upper extremity disorders and is a reliable and valid instrument for patients with disorders affecting the arm, wrist and hand.^{20,22} The items in DASH have been analyzed in relation to the International Classification on Functioning, Disability and Health (ICF), and 27 of 30 questions in the disability/symptoms scale have been stated to cover the domains of body function, activity and participation.⁶ Normative values based on a general American population have been reported with an average of 10.1 (SD 14.68) in DASH score.²³ A change of 15 score points in DASH is considered as a clinical important change in patients with shoulder, wrist and hand disorders.²⁴

Range of motion (ROM): Range of motion in the present study refers to total active extension deficit and total active flexion of the finger joints only. Extension and flexion of isolated finger joints in the affected finger were measured with a goniometer according to guidelines.²⁵ The total active extension deficit was calculated as the sum of the maximum active extension deficit in the MCP, PIP and DIP joint. If hyperextension was present in the DIP joint, it was stated as 0° in the analysis to avoid an underestimation of the total active extension deficit. The total active finger flexion was calculated as the sum of the maximum active flexion in the MCP, PIP and

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