

Results of Partial Fasciectomy for Dupuytren Disease in 261 Consecutive Patients

J. Henk Coert, MD, Juan P. Barret Nérin, MD, PhD, and Marcel F. Meek, MD, PhD

Abstract: Many different surgical techniques are still being used for Dupuytren disease. The outcome of 558 consecutive operations with 1 technique was reviewed. Distinct subgroups were made to detect risk factors for a poor outcome and complications. The mean follow-up time was 7.3 years. Younger patients (first surgery before 45 years) were operated significantly more than older patients (after 45 years). Results of contracted proximal interphalangeal (PIP) joints were significantly worse than other joints. The overall complication rate was 26%. Nerve lesions occurred in 7.7%. Young age proved to be a prognostic factor for the total number of operations. The contracted PIP joints will lead to more complications and poorer result. The risk at nerve lesion, necrosis, and infection are higher for recurrent surgery. These findings can be used in advising patients.

Key Words: Dupuytren disease, risk factors, outcome

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Dupuytren contracture is caused by a pathologic palmar fascia that contracts and pulls the fingers into the palm.¹ Different surgical techniques have been propagated. Moermans^{2,3} proposed segmental aponeurectomy as a less extensive procedure for the treatment of Dupuytren disease to limit the incidence of wound complications and stiffness associated with more extensive dissections. Late results show surgery will give a long-lasting correction of the contracture. In hands without manifest progression, the results were even better than by the immediate postoperative ones.³ The extent of recurrences and contractures of hands without the disease was similar to other procedures. The type of operation does not appear to be related to the progression of Dupuytren disease.³

Surgical complications occur intraoperatively, as well as during the early and late postoperative periods: digital nerve injury, vascular injury, skin flap “buttonholes,” hematoma (seroma), swelling, infection, flare, wound dehiscence, recurrence, pseudoaneurysm, and inclusion cyst.⁴ Awareness

of these complications is necessary for hand therapy to proceed in a timely fashion to avoid postoperative stiffness.^{4,5} Quality of patient care is reflected in the recurrence and complication rates of the surgical treatment.⁶

The aim of this 8-year, single-institution, single-technique study is to evaluate the results and the risk factors for complications and poor outcome.

PATIENTS AND METHODS

All consecutive patients operated on for Dupuytren contracture at our department, from January 1990 until December 1997, were reviewed retrospectively. Patients operated elsewhere before they were referred to our clinic were excluded.

Demographic data (age, race, gender, dominance, diabetes, other immune diseases, rheumatic arthritis [RA], the presence of degenerative joint disease in digital joints [DJD], previous surgery performed on the diseased hand, and ectopic localizations) were included. Factors associated with Dupuytren disease (eg, smoking, alcohol abuse, and family predisposition) were compared with the group of patients without any risk factors (named “reference group”). A positive tabletop test or a minimal contracture of the metacarpophalangeal (MCP) of 40 degrees and/or 25 of the proximal interphalangeal (PIP) joint was considered an indication for surgery.

A total of 558 operations in 261 consecutive patients, 205 men and 56 women (male:female ratio 3.7:1), were performed in our institution. The gender ratio declined from 10 to 1 in younger patients to 0.5 to 1 in older patients. The latter is comparable with the normal Dutch population ratio (Table 1). The age of the patients ranged from 22.1 to 83.4 years (mean 55.2). Dupuytren disease was treated in 263 right hands, 293 left hands, and only twice in both hands at the same time. The mean follow-up time was 7.3 years (standard error of the mean [SEM] 0.44; range 0.3–48 years). Only 13% (34) of the patients had a follow-up time shorter than 2 years. Of those, 27 had 1 year, 7 patients had a half year, and only 1 patient had a follow-up of 3 months. No patients were lost to follow-up.

The operations were performed using loupe magnification. A straight incision over the cord was chosen in all patients. In the case of a contracture of the digit, 1 or more z-plasties were done as propagated by Moermans.³ Skin closure was done by interrupted nylon sutures. After application of the bandage, the tourniquet was let down. After 3

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Reprints: J. H. Coert, MD, Department of Plastic Surgery, University Hospital Groningen, Hanzeplein 1, PO Box 30.001, 9700 RB Groningen, The Netherlands. E-mail: jhcoert@hotmail.com.

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TABLE 1. Number of Patients and Male/Female Ratio

Age (years)	21–30	31–40	41–50	51–60	61–70	71–80	80–90
No. patients (261)	11	28	51	81	58	29	3
M/F ratio (3.7:1)	10:1	8.3:1	4.1:1	3.8:1	3.8:1	1.6:1	0.5:1
M/F ratio	1:1	1:1	0.9:1	0.8:1	0.9:1	0.7:1	0.5:1
Normal Dutch population							

days, a light bandage was applied and an active exercises regimen was begun. After 10 days, sutures were removed. Splinting was started for a tendency for a flexion contracture in the first weeks after surgery.

The duration of symptoms and the presence of pain were recorded. Restrictions during daily life (ADL) due to the contracture of the fingers were scored. The extent of the contracture for all MCP and interphalangeal (IP) joints was scored as the extension deficit measured in degrees with commercially available goniometer. If an arthrogenic contracture was involved, this was noted. The date and length of the operation, the digits corrected, and the experience level of the surgeon were scored. We listed possible complications and divided them into 10 categories. Arterial and nerve lesions, necrosis and infection, and complex regional pain syndrome (CRPS) were scored as major complications, whereas hematoma, seroma, late skin contractures, superficial skin necrosis, and pain not related to the dystrophy were scored as minor complications.

Postoperatively, the need for physical therapy, dynamic splinting, and aid of a hand therapist were scored. The number of operations performed for each patient and the time to follow-up were calculated. Subgroup analysis was performed for gender and predisposing factors.

For the statistical analysis of the results, Sigmatat software was used. For comparison of groups, the one-way analysis of variance (ANOVA) test was used. The Tukey test was used as correction test. For comparison of 2 groups, the *t* test was used (unpaired). Results were considered to be significant at a *P* level <0.05.

RESULTS

Seventy patients (27%) (53 men, 17 women) had a family predisposition for Dupuytren disease (DD). Ninety-one patients (35%) (78 men, 13 women) had tobacco abuse and 21 patients (8%) had alcohol abuse (19 men, 2 women). Other diseases are summarized in Table 2.

The average number (z-plasties, skin grafts, or DD) of operations for patients was 2.54 (men: 2.66; women: 2.09; *P* = 0.07). For patients with a family predisposition for Dupuytren contracture, the average number of operations was 2.9 (3.26 for men and 1.88 for women; *P* = 0.054). The difference between both groups was not significant (*P* = 0.194). If we compare patients younger and older than 45 years, we can find several differences (Table 3). Patients operated on for the first time before 45 years of age received significantly more operations than patients who were operated on after 45 years (*P* < 0.001). Patients with a positive family predisposition and an age

TABLE 2. Family Predisposition and Associated Diseases

Disease (%)	No. Patients	
	Male	Female
Family predisposition (27)	53	17
Tobacco abusers (35)	78	13
Alcohol abusers (8)	19	2
Peyronie disease (0.8)	2	0
Plantar fibromatosis (8.8)	20	3
Type I diabetes (3.4)	7	2
Type II diabetes (4.6)	8	4
Epilepsy (1.9)	4	1
Thyroid disease (1.1)	2	1
Meniere (0.8)	2	0
Hypercholesterolemia (0.4)	1	0
Renal disease (0.4)	1	0
Liver cirrhosis (0.8)	2	0
Bechterew disease (1.1)	3	0
Rheumatoid arthritis (2.3)	6	0
Degenerative disease finger joints (3.1)	3	5
Previously treated for trigger finger (1.9)	2	3
Previously treated for tendon injury (1.9)	5	0
Traumatic amputation of digit in past (0.8)	2	0
Previous carpal tunnel release (1.5)	1	3

TABLE 3. Age Differences

Variable	Patient Age ≤45 Years	Patient Age >45 Years
Number of patients	62 (52 M and 10 F)	199 (153 M and 46 F)
Average no. operations	3.8 (M: 4.0 and F: 2.4)*	2.2 (M: 2.2 and F: 2.0)
Family predisposition	14 (10 M and 4 F)	56 (43 M and 13 F)
Average no. operations	5.1 (M: 6.1 and F: 2.8)*	2.4 (M: 2.6 and F: 1.6)
* <i>P</i> < 0.001.		

younger than 45 received significantly more operations (5.1 operations against 2.4; *P* < 0.001).

The mean age at the first operation for our patient group was 56.1 years (SEM 0.89). The mean age at the first operation for men was 54.4 years (SEM 1.73); for women, 62.2 years (SEM 0.99). The difference between genders was significant for the whole group (*P* < 0.001), as well as in the so-called reference group (*P* = 0.014). The mean age at the first operation did not differ for patients with a family predisposition for Dupuytren disease, smokers compared with patients without any risk factors (Fig. 1).

The rates of complications for primary and recurrent surgery are listed in Figure 2. Arterial injury occurred 5 times, and in all cases the vessel was repaired. Minor complications contributed only a small part to the total number of complications. The overall complication rate was 26%. CRPS was seen in 4.5. Nerve lesions were scored in 7.7%. Complications after simultaneous surgery for carpal tunnel release, which occurred 10 times, were CRPS² and wound

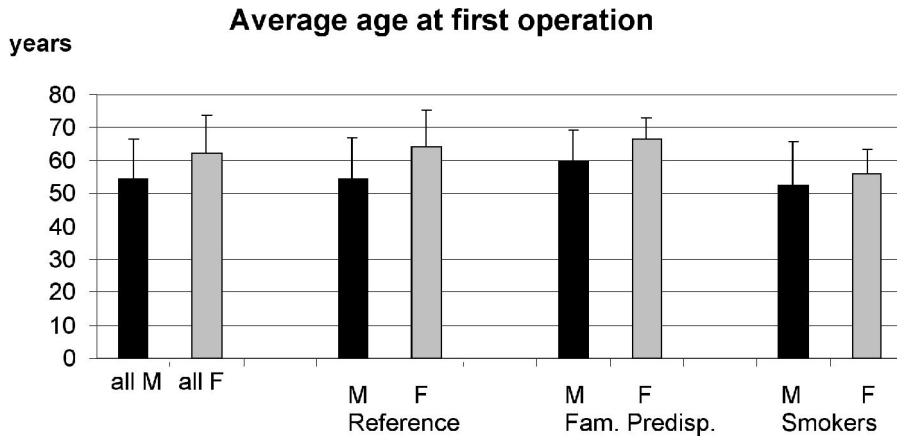


FIGURE 1. The mean age at which patients were operated for the first time. This age is given for all patients and for the distinct subgroups.

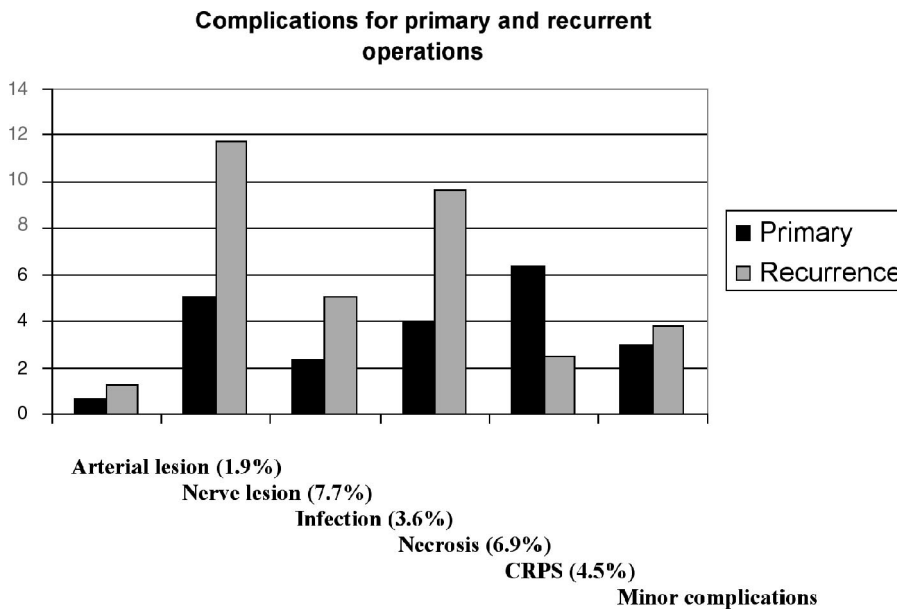


FIGURE 2. The percentage of major and minor complications that occurred during a primary or a recurrent operation.

infection.¹ Four amputations were performed, and in 2 of them a so-called small hand was created. At the time of surgery for recurrence of a Dupuytren cord, the risk to have a complication is increased except for CRPS.

Contractures were seen most frequently in the fourth and fifth fingers. The severity of the contracture (in percentage increase) was similar for patients with and without a family history. When a complication occurred, a significantly larger preoperative flexion contracture was noted in the PIP joint ($P < 0.001$). This did not apply for the MCP and DIP joints ($P = 0.81$ and $P = 0.16$, respectively) (Fig. 3). The mean postoperative gain of the MCP and DIP joints was, respectively, 94.2% and 89%. The PIP joint did significantly worse: 71.5% gain (Fig. 4A). The difference in gain between both MCP and DIP was significantly different from the PIP joint ($P < 0.001$ and $P = 0.010$, respectively). Figure 4B shows a trend for the gain of the PIP joint of the little finger that was smaller than for all other PIP joints. However, this was not significant (ANOVA: $P = 0.217$). After surgery for recurrent Dupuytren contracture, the postoperative gain in the

PIP joints remains less (68.2%) compared with the MCP and DIP joints (90.8% and 83.5%). The small difference in gain between primary and recurrent surgery for MCP contracture was significant ($P = 0.013$). This was not the case for PIP ($P = 0.118$) and DIP joints ($P = 0.122$). In conformity with these findings, the preoperative contracture in PIP joints increased at each consecutive operation. This was not the case for the MCP and DIP joints.

DISCUSSION

This paper describes a large series of 558 consecutive surgeries. It is a representative sample from the Dutch population. The highest incidence of surgery for Dupuytren contracture was seen in men between 50 and 70 years.¹ Twenty-seven percent of our patients had a family predisposition for Dupuytren disease compared with 12.5%⁷ to 26%⁸ in the literature. A positive family predisposition was seen more frequently in young patients (40%) than in old patients (8%).⁹ Patients underwent an average of 2.5 operations. Interest-

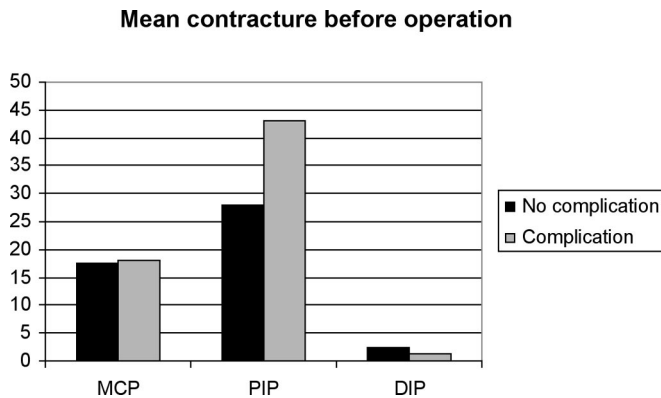


FIGURE 3. The mean preoperative contracture of the 3 finger joints. It is given for operations during which no complication occurred and for operations during which a complication occurred.

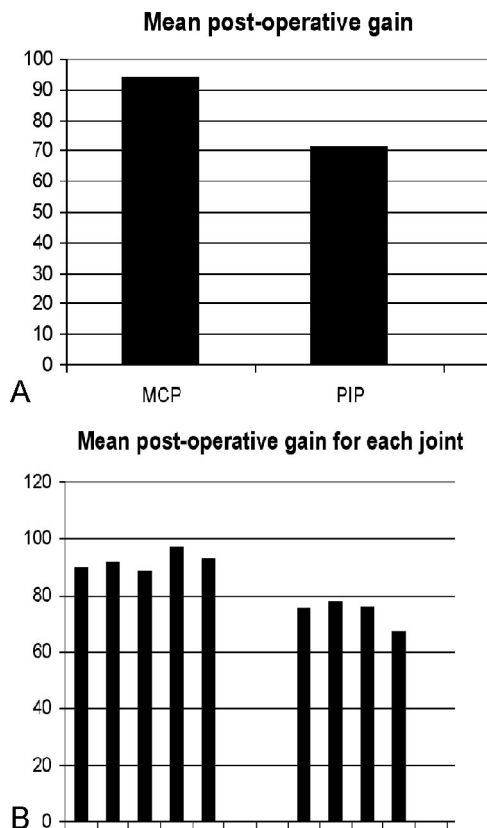


FIGURE 4. A, Mean postoperative gain in percentage terms for each of the 3 finger joints. B, Mean postoperative gain in percentage terms for each separate MCP, PIP, and DIP joint.

ingly, patients with a family predisposition were not operated on more frequently. In contrast, young age was a risk factor for a significantly higher number of surgical interventions. The combination of age and family predisposition did not increase. Although the disease was thought to be less aggressive in women, we could not support this as men and women underwent a similar number of operations. However, men

younger than 45 years were operated on significantly more than women. Young age may display a more “aggressive behavior,” supported by the average number of operations found in this paper.¹⁰⁻¹²

The mean age at first operation was around 56 years, as found by others.^{7,8} Women were significantly older than men at the time of their first surgery: sixth and fifth decade, respectively.^{7,10} Patients with known risk factors like a family predisposition and tobacco use did not differ from the mean age of the whole population. In smokers, smoking seems to have an effect on women: they were first treated at a younger age compared with the other groups (Fig. 1). However, this was not a significant difference as the number of women in this group was low (n = 3). The cords were located most often in the ring and little finger.^{3,7,8,13} If the parameters gender and family predisposition were included, the distribution remained the same. The overall rate of complications was 26%. In the literature, complication rates varied from 4% to 29%.¹⁴⁻¹⁶ Cools and Verstreken¹⁷ found an overall complication rate of 21%, excluding CRPS. The major complication rate concurs partly with the literature. The incidence of CRPS is comparable to other studies.¹⁵ The overall incidence of nerve lesions (7.7%) is high. For primary and recurrent surgery, the percentage was, respectively, 5% and 12%. Robins et al¹⁸ had no nerve lesions in 50 primary cases, and Makela et al⁸ had an incidence of 1%. Ebskov et al¹⁶ found an incidence of 9.6% in 52 primary cases and 4.2% in recurrent cases. For the minor complications, differences between primary and recurrent surgery could not be found. This did not apply for major complications (nerve lesion, infection, skin necrosis). Interestingly, for arterial lesions no difference in complication rates could be found. This could be caused by the small number (n = 5). On the other side, the discrepancy between nerve and arterial damage suggests that arterial injury was missed postoperatively as these structures are anatomically in close proximity. For CRPS, the primary operations showed a higher complication rate than for recurrent surgery. This has not been reported before. This could be explained by choosing for a nonoperative regimen after the primary surgery. It is known that there is an increased chance of flare-up of the CRPS after renewed surgery. If the partial fasciectomy was performed simultaneously with carpal tunnel surgery (10 times), almost 30% complications occurred: CRPS² and wound infection.¹ These numbers are comparable with Gonzalez and Watson,¹⁹ who described a 10% incidence of CRPS in 30 patients. If a complication occurred, in contrast to the metacarpophalangeal joint and the distal interphalangeal joint, only the PIP joint had a significantly larger flexion contracture than the rest of the group. For recurrent surgery, only the PIP joint showed a significantly higher preoperative contracture. Given these 2 findings, the contracted PIP joint seems to be a “tricky” joint. This could be explained by the superficial location of the neurovascular bundle at the PIP joint and the close relationship of the cords with these structures at this level of the finger.

The results after surgery (percentage gain of extension) were far better for the meta-carpophalangeal and distal interphalangeal joints than for the PIP joints. This concurs with

findings of flexion contractures due to other causes (eg, after thenar flaps for tip reconstruction): the PIP joint is not “forgiving.” Interestingly the little finger does worse. Although this was not significant, there was a trend. In surgery for recurrent contractures, these observations also apply for the PIP joint and the distal interphalangeal joint. The metacarpophalangeal joints do well in both clinical situations.

Concluding, this paper presents a large, single-institution, single-technique, representative patient follow-up. Risk factors have presented. These finding may benefit the clinician in treating and advising patients with Dupuytren disease.

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