

Prognosis in Dupuytren's disease

This is a retrospective study of 85 patients with Dupuytren's disease who were treated surgically and followed up for 1 to 7 years (average, 41 months). The overall recurrence after surgery was 34%. (J HAND SURG 1992;17A:312-7.)

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It is more than 150 years since Baron Dupuytren¹ described the condition that bears his name, and yet its precise cause remains unknown, although there is certain correlation with male gender,² inheritance,³ epilepsy,⁴ diabetes mellitus,⁵ and alcoholism.⁶ The role of oxygen free radicals in the pathogenesis of the disease has recently been advocated by Murrell.⁷

The literature has given little attention to the different prognostic factors that might influence the outcome of the disease. In fact, only a few good reports have addressed this subject.⁸⁻¹⁰ Unfortunately, these reports are conflicting, and we believe that analysis of the prognostic factors will further our understanding of the outcome of surgery.

Material and method

One hundred two patients had operations for treatment of Dupuytren's disease in the period from January 1981 to December 1986. Seventeen patients could not be traced. Thus 85 patients were available for this study. There were 74 men and 11 women (Fig. 1), and the average age at the time of the first operation was 57 years, with a range of 26 to 82 years. A total of 113 primary fasciectomy and 24 secondary fasciectomy were done or supervised by one surgeon (R. D. L.). The type of operation was partial fasciectomy, in which

surgical excision is limited to the apparently diseased fascial tissue. The duration of follow-up extended from 1 to 7 years and averaged 3.4 years.

The assessment was carried out by one person (R. F. A.) and divided into three main categories:

- A. The degree of correction of joint contracture. Improvement was judged by the percentage of correction in the angle of deformity at each joint (modified from Tubiana et al.¹¹). The results were analyzed and comparison was made between different variables.
- B. The hand's function was classified as excellent, good, fair, or poor (modified from Honner et al.¹² and Tubiana et al.¹¹).

Excellent denoted full flexion and extension of the fingers, full function, and no recurrence (100% improvement in joint contracture.) *Good* indicated slight limitation of flexion or extension; recurrence, if present, was too slight to interfere with normal activity (at least 75% improvement of joint contracture). *Fair* denoted limitation of flexion or extension with joint stiffness, recurrence or extension causing some limitation of hand's function (less than 75% improvement of joint contracture). *Poor* indicated no improvement in the initial range of movement or function, recurrence or extension causing serious loss of function (no improvement of joint contracture). A comparative study was made between the different prognostic factors. The significance of these variables in both categories A and B was established by the chi squared test.

- C. Recurrence and extension. Recurrence is defined as the appearance of Dupuytren's disease in an area already cleared by operation, whereas extension is defined as the appearance of the disease in an unoperated area of the hand.¹²

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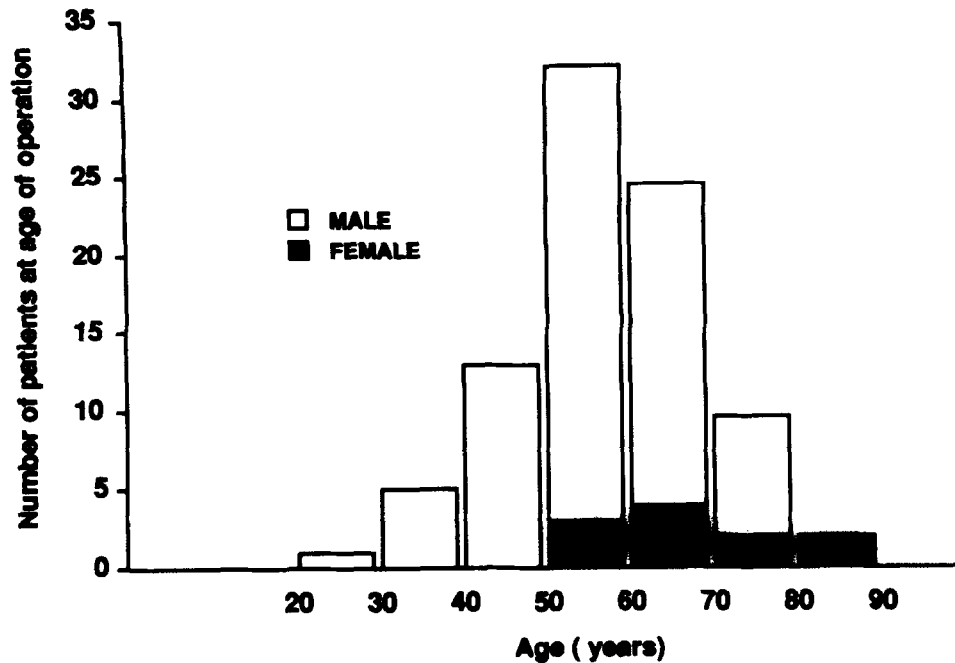


Fig. 1. Distribution of patient age and sex at time of operation.

Results and discussion

Improvement of joint contracture. Three main comparative studies were made under this category (Table I):

Joint affected. The metacarpophalangeal (MP) joint carries a much better prognosis than the proximal interphalangeal (PIP) joint in both primary ($p < 0.001$) and secondary fasciectomy ($p < 0.001$). This is not peculiar to Dupuytren's disease but is related to the anatomic arrangement of these joints. Tonkin et al.¹³ have summarized the anatomic difference between the metacarpophalangeal joint and the proximal interphalangeal joint. The MP joint is a ball-and-socket joint, and passive hyperextension is possible because of loose attachment of the palmar plate. The truncated shape of the metacarpal head determines that the collateral ligaments are at their greatest tension in flexion. Therefore a contracture of metacarpophalangeal joints occurs in a safe position. The PIP joint is a hinge joint, its palmar plate is firmly attached to the base of the middle phalanx and by strong check ligaments to the neck of the proximal phalanx. Therefore passive hyperextension is not possible in most persons. The collateral ligaments of the proximal interphalangeal joint are not lengthened in flexion, and they tend to contract and adhere if maintained in this position (Fig. 2).

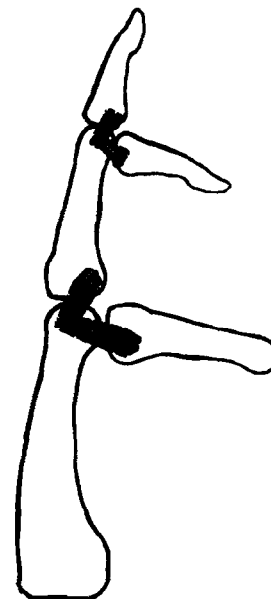


Fig. 2. The truncated shape of the metacarpal head and the eccentric origin of the collateral ligaments of the metacarpophalangeal joint determined that these ligaments are stretched to their maximum length when the joint is flexed, whereas flexion of interphalangeal joints causes shortening and contracture of their collateral ligaments.

Table I. The degree of correction of joint contracture

Prognostic factors	Joint	Number of joints		
		100% correction	Less than 100% correction	Total
Primary } fasciectomy	MP	113 (78%)	31	144
	PIP	46 (32%)	81	127
Secondary } fasciectomy	MP	11 (69%)	5	16
	PIP	2 (12%)	15	17
Small finger }	MP	49 (73%)	18	67
	PIP	16 (29%)	51	67
Ring finger }	MP	49 (80%)	12	61
	PIP	24 (49%)	25	49

Table II. The hand's function (results in 113 hands operated on)

Prognostic factors	Number of hands		Total
	Excellent-good result	Fair-poor result	
Age group			
20-59 yr	39 (57%)	29	68
60+ yr	25 (56%)	20	45
Sex groups			
Male	56 (56%)	44	100
Female	8 (62%)	5	13
Occupation			
Office	20 (59%)	14	34
Manual	44 (56%)	35	79
Number of rays involved in hand			
One	51 (67%)	25	76
More than one	13 (35%)	24	37
Length of time since operation			
12-18 mo	22 (76%)	7	29
19+ mo	42 (50%)	42	84
Etiologic factors			
Unknown	28 (55%)	23	51
Familial*	9 (53%)	8	17
Alcoholic†	12 (55%)	10	22
Multiple	9 (60%)	6	15
Epileptic†			7
Diabetic†			1

*Positive family history in first- and second-degree relatives.

†The diagnosis of diabetes mellitus and epilepsy was made from the history. The diagnosis of alcoholism was made with use of the Canterbury Alcoholism Screening Test.¹⁹ Note: Only limited numbers of epileptic and diabetic patients were involved. Therefore their results were not assessed.

Primary and secondary fasciectomy. Correction of the PIP joint contracture was more difficult and carried a poorer prognosis in secondary fasciectomy than in primary fasciectomy ($p < 0.05$) since the dissection is more difficult when the Dupuytren's tissue is intermin-

gled with scar tissue. MP joint contracture in secondary fasciectomy was not more difficult to correct than in primary fasciectomy ($p > 0.10$). This again stresses the fact that MP joint contracture occurs in a safe position.

Table III. Recurrence and extension in 113 hands operated on

	<i>Present but did not require operation (No. of hands)</i>	<i>Present and requiring operation (No. of hands)</i>	<i>Total</i>
Recurrence	21 (19%)	17 (15%)	38 (34%)
Extension	18 (16%)	7 (6%)	25 (22%)

Table IV. Finger and joint assessment

<i>Joint</i>	<i>Range of contracture (degrees)</i>	<i>Average preoperative contracture (degrees)</i>	<i>Average postoperative contracture (degrees)</i>	
			<i>3-6 months postoperative</i>	<i>Late postoperative</i>
<i>Small finger</i>				
MP	0-30	19	1	3
MP	31-60	49	4	6
MP	61+	82	13	20
PIP	0-30	19	7	20
PIP	31-60	47	27	34
PIP	61+	82	30	41
<i>Ring finger</i>				
MP	0-30	20	0	1
MP	31-60	47	2	5
MP	61+	80	8	15
PIP	0-30	16	2	8
PIP	31-60	48	9	22
PIP	61+	84	23	28

Note: Only limited numbers of thumbs and index and long fingers had surgical intervention, therefore the results for these three digits were not included in this table.

Finger affected. The small and ring fingers are the two most commonly affected fingers. Therefore, the results in these two fingers were separated, analyzed, and compared.

The PIP joint of the small finger carries a poorer prognosis than that of the ring finger ($p < 0.01$), but there was no significant difference between the results in the MP joints in the two fingers ($p > 0.10$).

The anatomic structures on the ulnar side of the hand had not been clarified in detail until the work of White¹⁴ and Barton,¹⁵ who reported that often there is a cord originating from the abductor digiti minimi in addition to the cord from the palmar fascia, causing the joint to contract. This is different from the other fingers in which the principal cause of the contracture is a cord coming from the palm.

Lamb and Kuczynski¹⁶ pointed out that unless the disease cord originating from the abductor digiti minimi is carefully removed, there is a strong tendency toward recurrence. Our statistical study confirmed that con-

tracture of the PIP joint of the small finger is the most difficult to correct.

The function of the hand (Table II). The following factors were analyzed and compared:

1. The age of the patient. The role of age in the prognosis of Dupuytren's disease remains a matter of dispute. Our statistical analysis confirmed that the age of the patient plays no significant role ($p > 0.50$). Legge and McFarlane¹⁰ found a similar result. Conflicting findings were reported by Hueston and Tubiana⁹ and Lamb and Kuczynski,¹⁶ who believe that the course of the disease is less virulent in elderly persons.
2. Gender. This is another controversial subject. The results of our study support Legge and McFarlane's observation¹⁰ that gender does not influence the prognosis ($p > 0.50$). This is contrary to the belief of Hueston and Tubiana⁹ that the disease progresses more slowly in females. Recently Zemel et al.¹⁷ found that women operated on for treatment of Du-

Dupuytren's disease are likely to have poorer results than men.

3. Occupation. Type of work did not appear to have any predictable effect on the result ($p > 0.50$).
4. The number of rays involved. We found that if more than one digit is involved in a hand the prognosis is worse ($p < 0.01$). This is logical because the greater the number of rays involved, the more extensive, and possibly the more aggressive, the disease. Therefore it is more difficult to excise.
5. The length of time since the operation. This factor affects the prognosis significantly ($p < 0.02$). This may be due to the fact that the longer the period since the operation, the more likely is a recurrence.
6. Etiological factors. Our findings confirmed that prognosis in patients with a positive family history or alcoholism is not worse than that in the other patients. Legge and McFarlane¹⁰ found that a family history of Dupuytren's disease did not have any predictable effect on the results.

Hueston^{8,9} observed many years ago that certain features of Dupuytren's disease indicate a more severe course of the disease and also a greater tendency for recurrence. These features include positive family history, early onset of the disease, bilateral involvement, and ectopic deposits (such as knuckle pads and plantar nodules). He referred to these patients as having a more severe diathesis. It would be very interesting if the same group of patients in our series could be reviewed in a few more years. This might establish whether such factors as family history, age, gender, and alcoholism, which appear not to be bad prognostic factors, will continue to carry the same prognosis, or whether it is a matter of time before they change their course to indicate a more aggressive diathesis.

Recurrence and extension (Table III). Recurrence was observed in 34% and extension in 22% of the patients. About two thirds of these cases of recurrence and extension did not require further operations. This emphasizes the fact that the presence of recurrence or extension does not necessarily mean that the patient is functionally incapacitated, but it shows that surgery does not always cure the disease. Tubiana and Leclercq (unpublished data) indicated that the rate of recurrence varies greatly in the literature (10% to 63%). In their experience with 8 to 14 years' follow-up there were 66% recurrences and 62% extensions. They found the length of time since the operation to be a very important factor.

We believe that surgical intervention should be contemplated as soon as the proximal interphalangeal joint

begins to contract. For the metacarpophalangeal joint, usually 30 degrees of contracture interferes with the hand's function sufficiently to justify operation, though good final outcome is expected in this joint with any degree of contracture (Table IV).

Summary of the prognosis

The following factors were analyzed: joint involved (MP joint and PIP joint), primary and secondary fasciectomy, finger involved (comparing the small and the ring fingers), age, gender, occupation, number of rays involved, length of time since the operation, and etiologic factors (familial and alcoholic).

Epilepsy and diabetes were not analyzed because of limited number.

Bad prognostic factors (variable of significance $p < 0.05$) were found to be the following:

1. The PIP joint.
2. Secondary fasciectomy. The PIP joint after secondary fasciectomy carries a worse prognosis than the PIP joint after primary fasciectomy.
3. The small finger. The small finger PIP joint carries a worse prognosis than the ring finger PIP joint.
4. The number of rays involved. The prognosis is worse if more than one ray is involved.
5. The length of time since operation. The longer the duration, the worse the prognosis.

Other factors that did not have any significant effect on the results were the MP joint, age, gender, occupation, family history, and alcoholic factor.

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Platelet-derived growth factor in Dupuytren's disease

This study investigated whether platelet-derived growth factor, a potent inducer of cell proliferation, was identifiable in association with myofibroblasts in Dupuytren's disease. Myofibroblasts in the hypercellular disease stages showed a strong reaction to platelet-derived growth factor antibody using light and electron microscopic immunochemical labels. Platelet-derived growth factor may play a role as a cellular signal for myofibroblast proliferation in the formation of the pathognomonic nodule in Dupuytren's disease. (J HAND SURG 1992;17A:317-23.)

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Dupuytren's disease is characterized by progressive, irreversible flexion of one or more digits. The work of Gabbiani and Majno¹ was the first to define the myofibroblast as the dominant cell type associated

with the formation of the pathognomonic nodule of the palmar fascia. Subsequently, the reports of many investigators²⁻⁶ have also shown increased amounts of type III collagen, fibronectin, and hexosamine glycosaminoglycan in affected palmar fascia. However, to date, the cause and pathogenesis of Dupuytren's disease are unknown.

It has long been recognized that, on a cell biological basis, Dupuytren's disease progresses through three stages. These stages have been defined by Luck.⁷ The first is the proliferative stage, in which cell density begins to increase in the palmar fascia. The second stage is the involutinal stage, in which cells proliferate in extreme numbers in the formation of the pathognomonic nodule. The third stage, termed the residual stage, is characterized by the inexplicable disappearance of cells with only contracted cords remaining. This cell response has been defined as a proliferation

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