

ORIGINAL RESEARCH ARTICLE

The impact of comorbidities on surgical outcomes in Dupuytren's disease

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ABSTRACT

Introduction: Dupuytren's disease is a progressive fibroproliferative condition characterized by collagen deposition and the formation of fibrous cords along the palmar fascia and flexor tendons of the fingers. This study investigates the impact of comorbidities on surgical outcomes in patients undergoing palmar fasciectomy for Dupuytren's disease.

Methods: A retrospective analysis was conducted on 109 patients who underwent palmar fasciectomy for Dupuytren's disease between September 2006 and November 2023. Demographic data, associated comorbidities, and surgical techniques were recorded. Surgical outcomes were assessed using the Duruöz Hand Index. Clinical results were classified as excellent, good, fair, and poor.

Results: The cohort consisted mostly of men (94 men, 15 women), with an average age of 59.22 years. The most common comorbidities were smoking (55%), manual labor (41.3%), hypertension (38.5%), and diabetes (31.2%). Clinical outcomes were excellent or good in 82.5% of patients. The recurrence rate was 1.8%, and the incidence of permanent deformity was 4.5%. The complication rate was 11%, with malignancy detected in 11% of patients, most notably colon cancer (7 patients).

Conclusion: Palmar fasciectomy for Dupuytren's disease is an effective surgical treatment with low recurrence and high success rates. However, comorbidities such as smoking and diabetes significantly impact surgical outcomes.

ARTICLE HISTORY

Received 27 May 2025
Accepted 25 August 2025
Published 23 October 2025

KEYWORDS

Dupuytren's disease;
palmar fasciectomy;
comorbidities; recurrence
rate; postoperative
complications

Introduction

Dupuytren's disease is a progressive fibroproliferative condition characterized by collagen deposition and the formation of fibrous cords along the palmar fascia and flexor tendons of the fingers. It is believed that a defect in wound repair initiates the fibrotic process of Dupuytren's disease [1]. Contemporary pharmacotherapeutic research aims to limit disease progression and prevent recurrence after treatment [2]. Therefore, targeting the underlying fibrotic pathophysiology is critical. This chronic condition predominantly affects the elderly population and is more common in men than women. Clinically, Dupuytren's disease causes flexion contractures in the fingers, significantly limiting hand function and daily living activities [3].

While the pathogenesis of Dupuytren's disease is not fully understood, genetic predisposition, environmental factors, and certain systemic comorbidities play significant roles in its onset and progression [4]. Approximately 80% of the contributing factors are believed to be genetic [2]. Conditions such as diabetes, epilepsy, chronic alcohol use, and smoking have been associated with Dupuytren's disease [5]. However, the impact of these comorbidities on complications and recurrence remains unclear.

Surgical treatment, particularly palmar fasciectomy, is commonly performed in advanced forms of the disease to correct deformity and restore hand function [6]. Despite surgery, recurrence rates and complications remain a significant challenge [7]. Understanding the role of comorbidities is crucial for improving surgical outcomes and long-term success.

This study aims to retrospectively evaluate the impact of comorbidities on complications and recurrence in patients who underwent palmar fasciectomy for Dupuytren's disease. Additionally, we analyze surgical outcomes using clinical parameters and functional scores to highlight the contribution of these factors to disease management.

Materials and methods

After obtaining approval from the institutional review board (i09-751-24), we retrospectively analyzed all consecutive patients who underwent primary palmar fasciectomy for Dupuytren's disease at the Hand Surgery Department of the Orthopedics and Traumatology Clinic of University Hospital between September 2006 and November 2023. Procedures were performed by experienced hand surgeons or supervised residents. Data were collected from the hospital's electronic records and reported in compliance with the 1975 Helsinki Declaration. Written and verbal informed consent was obtained from all patients.

Diagnosis

The surgical indication was a positive Hueston tabletop test with deformity significantly affecting daily activities. Additionally, a metacarpophalangeal flexion contracture exceeding 30° or any degree of proximal interphalangeal contracture was generally considered an

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indication for palmar fasciectomy [8]. Clinical findings included the number of affected fingers and the degree of preoperative deformity measured using a goniometer. Patients were classified according to the Tubiana classification based on these measurements.

Patient factors and comorbidities

Demographic data, including age, gender, diabetes, other chronic illnesses, and palmar findings (Dupuytren diathesis), were recorded. Factors contributing to Dupuytren's disease included family history, ectopic foci, prior hand surgeries, smoking, alcoholism, diabetes, epilepsy, antiepileptic medications, arthritis, liver failure, kidney disease, hypertension, hypercholesterolemia, thyroid dysfunction, heart and lung disease, malignancies, and occupational history. Patients with recurrent disease or surgeries performed by other specialists at external centers were excluded from the study.

Surgical technique

All procedures were performed under tourniquet control with general anesthesia or regional block, using surgical loupes for improved visualization. A Brunner-type zig-zag incision was employed (Figure 1), followed by careful elevation of skin flaps from the underlying tissue. Pathological cords were dissected proximally to distally, preserving neurovascular structures with vessel loops. In cases of intermetacarpal septal involvement, a three-dimensional dissection was performed, and affected Dupuytren's tissue was excised en bloc (Figure 2). Residual joint contracture necessitated releasing volar plates or collateral ligaments to achieve full extension of metacarpophalangeal or proximal interphalangeal joints.

To minimize tension during wound closure, corners of incisions were transversely extended, allowing for reverse V-Y advancement. After achieving hemostasis with 10 min of warm compress, a butterfly vacuum drain was placed, and the skin was closed with 4-0 and 5-0 nylon sutures. In some cases, skin grafts harvested from the forearm were applied to open wounds in the palm or fingers, secured with cross-sutured tie-over bolsters, which were removed after 5 days. In others, wounds were left for secondary healing.

Clinical evaluation

Surgical outcomes were classified as excellent (complete finger flexion and extension, full function, and no recurrence), good (mild

flexion or extension limitation not affecting normal activities), fair (functional limitations due to joint stiffness, recurrence, or extension restrictions), and poor (no improvement in contracture or function, significant recurrence, or extension-related functional loss) [9].

The Duruöz Hand Index (0–90) was used to assess hand disability in daily living activities [10].

Postoperative rehabilitation

Active finger exercises were initiated immediately postoperatively, and light dressings were applied after 1 week, followed by full active and passive range-of-motion exercises. Splinting was not utilized to prevent flexion contractures. Patients were periodically evaluated for residual deformity, wound healing, complications, and improvements in range-of-motion. Sutures were removed after 2–3 weeks, and patients were followed up for 6 weeks to 3 months, with additional visits scheduled in cases of recurrence or long-term complications.

In this study, statistical analyses were performed using Jamovi version 2.3.2. The normality of data distribution was evaluated using the Shapiro–Wilk test. Descriptive statistics for numerical data are reported as mean $\pm$ standard deviation and range (minimum–maximum values). Categorical data are presented as percentages.

Results

A total of 109 patients (94 men, 15 women) underwent partial or total fasciectomy. The mean age was 59.22 years (range: 32–85). The cohort included 47 left hands and 62 right hands, with an average follow-up duration of 2.95 years (range: 1–18). Predisposing factors and their associations are summarized in Table 1, highlighting smoking (55%), manual labor (41.3%), hypertension (38.5%), lung disease (32.1%), diabetes (31.2%), and heart disease (23.9%) as the most common risk factors.

Among malignancy cases (12 patients), 7 had colon cancer, 2 prostate cancer, 1 gastric cancer, 1 laryngeal cancer, and 1 breast cancer.

The distribution of affected fingers showed that the ring finger (55.6%) and little finger (32.1%) were the most frequently involved. According to the Tubiana classification, 77% of patients were classified as stage 1 or 2. Both palmar and digital fasciectomy were performed in 61.5% of cases. The average Duruöz functional score was 11.56. Clinical outcomes were excellent or good in 82.5% of patients. Complication rates were 11% (12/109), including pain and stiffness-

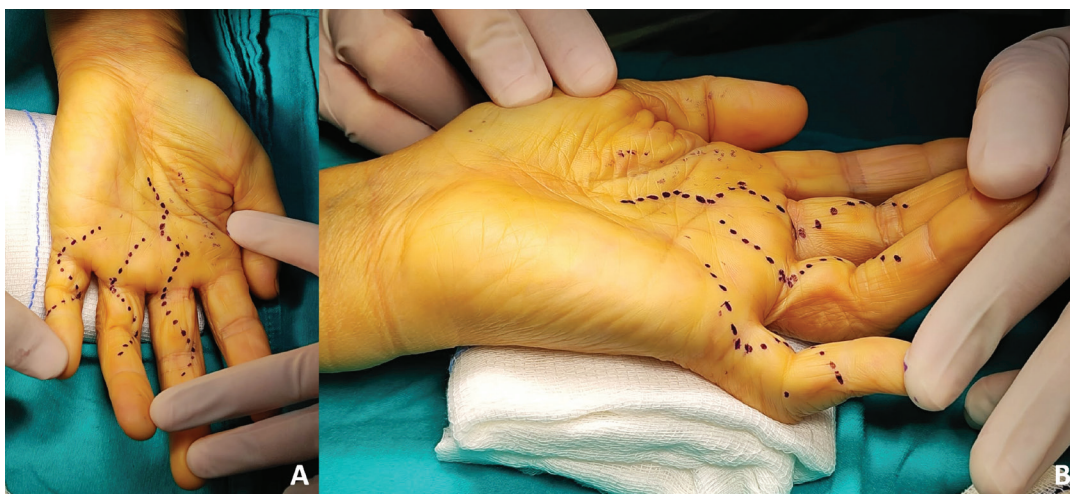


Figure 1. Planning of Brunner-type zig-zag incision for Dupuytren's surgery on the third, fourth, and fifth fingers.

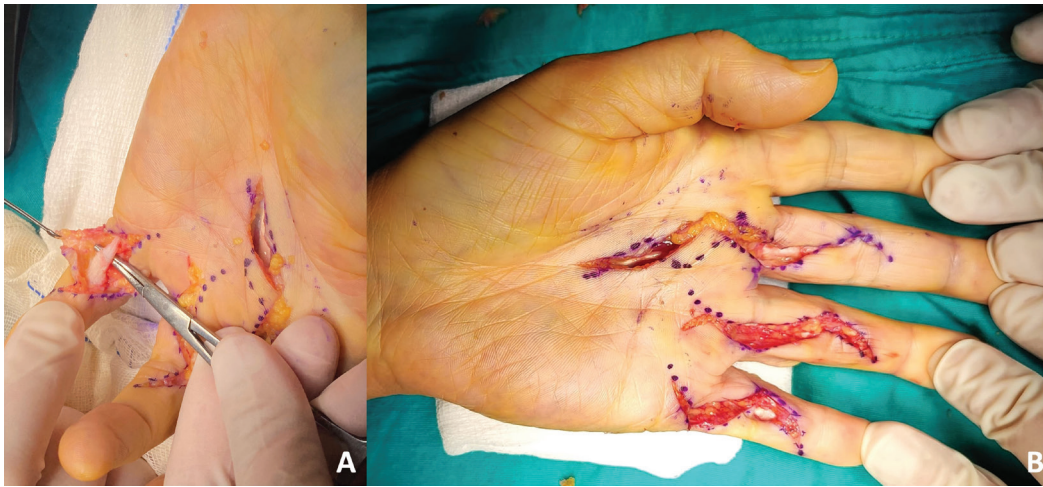


Figure 2. A: Dissection of the pathological cord in the fifth finger. B: Finger extension following surgery.

related issues such as possible complex regional pain syndrome (two cases), wound-related complications such as infections, wound dehiscence, and seroma formation (seven cases), and hematomas (three cases). These details are summarized in Table 2.

The recurrence rate was found to be 1.8% (2 out of 109 cases), while the residual deformity rate was 4.5% (5 out of 109 cases). In the group with residual deformity, 80% (four cases) had a deformity of 30° or less. These cases predominantly involved the fourth and fifth fingers. The most commonly observed comorbidities were diabetes mellitus (six patients), hypertension (five patients), heart disease (four patients), and lung disease (three patients). The details of patients who developed recurrence and residual deformity are shown in Table 3.

Discussion

Dupuytren's disease occupies a significant position among hand deformities that require surgical intervention due to its complex pathogenesis and high recurrence rate. In our study, we analyzed the effects of comorbidities on complications and recurrence in patients undergoing palmar fasciectomy. Our results indicate that systemic comorbidities, such as smoking, hypertension, diabetes, and lung

diseases, increase the risk of complications and can significantly affect surgical outcomes.

Consistent with the literature, our study identified male gender and advanced age as risk factors for Dupuytren's disease. However, these variables were not directly associated with postoperative complications or recurrence [11, 12]. On the other hand, conditions like smoking and diabetes were found to adversely impact wound healing, with chronic inflammatory processes particularly contributing to an increased risk of recurrence [13]. Notably, smoking impairs the healing of vascular structures, thereby increasing the risk of both wound complications and permanent deformity [14, 15].

The 11% malignancy rate observed in our study is noteworthy. This suggests a potential link between Dupuytren's disease and

Table 1. Demographic data and predisposing factors and their associations.

Age (years)	59.22 ± 10.47 (32 – 85)	Follow-up period (years)	2.95 ± 3.01 (1 – 18)
Gender		Family history	
Male	94 (86.2%)	Yes	10 (9.2%)
Female	15 (13.8%)	No	99 (90.8%)
Cigarette		Alcohol	
Yes	60 (55%)	Yes	16 (14.7%)
No	49 (45%)	No	93 (85.3%)
Manual Labor		Diabetes mellitus	
Yes	45 (41.3%)	Yes	34 (31.2%)
No	64 (58.7%)	No	75 (68.8%)
Hypertension		Heart disease	
Yes	42 (38.5%)	Yes	26 (23.9%)
No	67 (61.5%)	No	83 (76.1%)
Lung disease		Malignancy	
Yes	35 (32.1%)	Yes	12 (11%)
No	74 (67.9%)	No	97 (89%)
Antidepressants		Cholesterol disease	
Yes	5 (4.6%)	Yes	9 (8.3%)
No	104 (95.4%)	No	100 (91.7%)
Liver disease		Epilepsy	
Yes	0 (0%)	Yes	2 (1.8%)
No	109 (100%)	No	107 (98.2%)

Table 2. Distribution of affected fingers, Tubiana classification, surgical techniques, functional scores, and complication rates.

Side	
Left	47 (43.1%)
Right	62 (56.9%)
Finger	
2	1 (0.7%)
3	15 (11.1%)
4	75 (55.6%)
5	43 (32.1%)
Tubiana classification	
1	41 (37.6%)
2	43 (39.4%)
3	14 (12.8%)
4	11 (10.1%)
Fasciectomy	
Palmar	41 (37.6%)
Palmar + Digital	67 (61.5%)
Finger	0 (0%)
Amputation	1 (0.9%)
Open palm technique	
Yes	3 (2.8%)
No	106 (97.2%)
Skin Grafting	
Yes	2 (1.8%)
No	107 (98.2%)
Duruöz Score	11.56 ± 12.39 (0–65)
Clinical Score	
Excellent	64 (58.7%)
Good	26 (23.9%)
Fair	12 (11%)
Poor	7 (6.4%)
Complications	
Hematoma	3 (2.8%)
Infection, wound dehiscence, and seroma	7 (6.4%)
Pain and stiffness	2 (1.8%)

Table 3. The details of patients who developed recurrence and residual deformity.

Patient	Age	Smoking	Diagnosis	Finger	Comorbidity
1	60	Yes	Recurrence	3	Lung Disease, Diabetes Mellitus, Hypertension, Heart Disease
2	51	Yes	Recurrence	4–5	Diabetes Mellitus, Hypertension, Heart Disease
3	55	Yes	Residual deformity	4–5	Diabetes Mellitus, Hypertension
4	57	Yes	Residual deformity	5	Lung Disease, Diabetes Mellitus
5	76	No	Residual deformity	4–5	Hypertension, Heart Disease
6	46	Yes	Residual deformity	4–5	Lung Disease, Diabetes Mellitus, Hypertension, Heart Disease
7	42	No	Residual deformity	4	Diabetes Mellitus

certain malignancies. In particular, the association between colon cancer and Dupuytren's disease (seven patients) is striking. Close evaluation and vigilant postoperative follow-up are crucial for patients with a history of malignancy. Although there is limited literature on this subject, our observation signals an area that warrants further investigation. Both Dupuytren's contracture and malignancies involve a disruption in the regulation of cellular proliferation. Kuo et al. suggested that there might be a shared genetic risk between Dupuytren's contracture and cancer development [16]. According to a large-scale study, the incidence of cancer in patients with Dupuytren's contracture, excluding skin cancers, was found to be 7% [17].

In terms of surgical techniques, Brunner-type zig-zag incisions and meticulous dissection to preserve neurovascular structures were found to have a positive impact on functional outcomes. Despite the low recurrence rate of 1.8%, the minimal residual deformity and complication rates suggest that both surgical technique and patient factors must be considered together [18]. Additionally, while residual deformity is frequently encountered in clinical practice, confusion regarding the diagnosis of recurrence has been clarified in recent publications [19]. In cases where complete joint correction was not achieved, further investigation is needed into the long-term effects of additional procedures such as volar plate release or skin grafts. The impact of these additional interventions on the development of residual deformity remains unclear.

Dupuytren's disease is more frequently observed among individuals engaged in manual labor. In our study, 41.3% of the patients were employed in professions that require continuous use of the hands and exposure to physical stress, indicating that such occupations may contribute to the development of the disease. It is believed that prolonged hand use and microtraumas play a role in the pathogenesis of Dupuytren's disease [20]. This finding underscores the significance of occupational factors as important risk contributors to the development of the disease.

Regarding complications, complex regional pain syndrome and wound healing problems were the most frequently encountered. This emphasizes the importance of rehabilitation and patient education post-surgery. Early initiation of active exercises and careful wound care are critical in reducing these complications, though in diabetic patients, wounds can occasionally open [21]. A systematic review found that splinting did not provide additional functional benefits over hand therapy alone following fasciectomy for Dupuytren's

contracture [22]. Although splinting was not used in our study, literature suggests that this approach may have potential benefits in preventing flexion contractures [23, 24].

The retrospective design and single-center nature of our study limit the generalizability of our findings. Furthermore, when evaluating malignancy rates, it is challenging to determine whether these conditions were present preoperatively or emerged during the postoperative period. Prospective, multicenter studies with larger sample sizes may help to deepen our understanding of the systemic aspects of Dupuytren's disease and contribute to the development of more effective treatment protocols.

Conclusion

In conclusion, palmar fasciectomy for Dupuytren's disease is an effective surgical treatment with a low recurrence rate (1.8%) and high success rate (82.5%). However, comorbidities such as smoking and diabetes significantly affect surgical outcomes. The emergence of malignancy in 11% of patients suggests that Dupuytren's disease may have systemic implications.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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