

Short-term Outcomes of Partial Fasciectomy in Patients with Dupuytren's Contracture

Dupuytren Kontraktürü Olan Hastalarda Parsiyel Fasiektomi Cerrahisi Kısa Dönem Sonuçları

© Erdinç Acar

Ankara Bilkent City Hospital, Clinic of Orthopedics and Traumatology, Division of Hand and Upper Extremity Surgery, Ankara, Turkey

Abstract

Objectives: In this study, we aimed to evaluate short-term outcomes of partial fasciectomy in patients with Dupuytren's contracture.

Materials and Methods: A total of 29 patients who underwent partial fasciectomy between October 2019 and March 2022 were retrospectively analyzed. Demographic and clinical characteristics of patients, degree of contracture, functional outcomes, recurrence rate, and satisfaction rate were recorded. All patients underwent Q-DASH scoring. Complications such as wound infection and neurovascular injuries after surgery were evaluated.

Results: Of the patients, 26 were males and three were females. The median age was 57 (range, 40 to 74) years. The median follow-up was 12 (range, 11 to 17) months. Pathological examination result was compatible with fibromatosis. Maceration in the wound site was seen in two patients. The mean Q-DASH score is 7.36 (0-22.8). A butterfly drain was placed after surgery in all patients. No recurrence was observed. All patients were satisfied with the surgical treatment.

Conclusion: Partial fasciectomy is a useful treatment method with low recurrence and complication rates and high patient satisfaction rates in patients with Dupuytren's contracture.

Key Words: Dupuytren's Contracture, Partial Fasciectomy, Butterfly Drain

Öz

Amaç: Dupuytren kontraktürü ile kliniğimize başvurup parsiyel fasiektomi uyguladığımız hastaların kısa dönem sonuçları değerlendirildi.

Gereç ve Yöntem: Çalışmaya, Ekim 2019 ile Mart 2022 tarihleri arasında parsiyel fasiektomi cerrahisi uygulanan 29 hasta dahil edildi. Bu hastaların demografik ve klinik özellikleri, kontraktür dereceleri, fonksiyonel sonuçları, yineleme oranı ve memnuniyet oranları değerlendirildi. Tüm hastalara Q-DASH skorlaması uygulandı. Cerrahi sonrası yara yeri enfeksiyonu ve nörovasküler yaralanma gibi komplikasyonlar değerlendirilmiştir.

Bulgular: Hastaların 3'ü bayan, 26'sı erkek idi. Hastaların yaş ortalaması 57 (40-74). Hastalar ortalama 12 ay (11-17) takip edildi. Hastaların ameliyat sonrası patoloji sonuçlarında fibromatozis ile uyumlu bulgu elde edildi. İki hastada yara yerinde masserasyon izlendi. Ortalama Q-DASH puanı 7,36'dır (0-22,8). Hastaların tamamına, ameliyat sonrası kelebek dren yerleştirildi. Hastalarda yineleme izlenmedi. Hastaların tamamı, cerrahi tedaviden memnun kaldıklarını belirtti.

Sonuç: Dupuytren kontraktürü nedeni ile düzgün ve başarılı bir şekilde uygulanan parsiyel fasiektomi cerrahisi; nüks, hasta memnuniyeti ve nadir komplikasyon gelişmesi nedeni ile yararlı bir yöntem olduğu göz ardı edilmemelidir.

Anahtar Kelimeler: Dupuytren Kontraktürü, Parsiyel Fasiektomi, Kelebek Dren

Address for Correspondence/Yazışma Adresi: Erdinç Acar

Ankara Bilkent City Hospital, Clinic of Orthopedics and Traumatology, Division of Hand and Upper Extremity Surgery, Ankara, Turkey

Phone: +90 530 065 00 77 E-mail: erdal240@gmail.com ORCID ID: orcid.org/0000-0002-2154-0108

Received/Geliş Tarihi: 27.11.2022 Accepted/Kabul Tarihi: 09.01.2023

©Copyright 2022 Ankara University Faculty of Medicine

Journal of Ankara University Faculty of Medicine is published by Galenos Publishing House.

All content are under CC BY-NC-ND license.



Introduction

Dupuytren's contracture is a benign fibroproliferative disease of the palmar fascia characterized by flexion contracture of the fingers. It was first described by Guillaume Dupuytren in detail (1,2).

Although the exact etiology of Dupuytren's contracture is unclear, its incidence is high in male elderly in the North Europe, while it rarely affects Asian population. It has been thought that Dupuytren's contracture has a genetic mode of inheritance (3,4). In addition, its prevalence is higher in individuals with a history of alcoholism or smoking, renal and liver impairment, diabetes mellitus, and epilepsy (5,6).

The initial manifestations of Dupuytren's contracture include abnormal thickening and tightening of the skin in the palm. In later stages, nodules, contractures and pretendinous band may occur (7,8). The Tubiana's staging system is used for clinical staging of Dupuytren's contracture. It has been classified clinically by Tubiana in 3 stages as early, active and advanced stage. The predominant cell type is fibroblast in the early stage, myofibroblast in the active stage, and fibrocyte in the advanced stage. Clinically, nodules, contractures, and tendon-like bands are seen, respectively (8). Histopathological staging proposed by Luck classifies the disease into three stages: proliferative, involution, and residual (9).

Management of Dupuytren's contracture includes observation, non-operative management, and operative management (10). Non-operative management includes physiotherapy, radiation, steroids, anti-tumor necrosis factor agents and clostridium histolyticum collagenase (11-15).

Conservative treatment is first-line option in early stage (16). Surgery is indicated in the presence of a $\geq 30^\circ$ flexion contracture in the metacarpophalangeal (MCP) joint and painful nodules (17). Surgical treatment includes partial fasciectomy, total fasciectomy, fasciotomy, dermofasciectomy, and percutaneous needle fasciotomy (18,19). Partial fasciectomy is the most widely used method currently (20).

In the present study, we aimed to evaluate short-term outcomes of partial fasciectomy in patients with Dupuytren's contracture.

Materials and Methods

This single-center, retrospective study was conducted at the Clinic of Orthopedics and Traumatology of a tertiary care center between October 2019 and March 2022. A total of 34 fingers of 29 patients who underwent partial fasciectomy were included. Diagnosis was based on medical history and physical examination findings. The degree of contracture in the MCP

joint of the fingers with the highest contracture was measured using a goniometer preoperatively. Surgery was indicated in the presence of $\geq 30^\circ$ flexion contracture of the MCP joint with a painful nodule. All of our patients present as advanced stage according to the Tubiana classification. Patients who were operated in an external center, presence of $\geq 30^\circ$ flexion contracture of the MCP joint with a painless nodule and pediatric cases were excluded from the study. Demographic and clinical characteristics of patients, degree of contracture, functional outcomes, recurrence rate, and satisfaction rate were recorded. All patients underwent Q-DASH scoring. A written informed consent was obtained from each patient. The study was approved by the Ankara City Hospital, No. 1 Clinical Research Ethics Committee Presidency (Approval no: 2586, Date: 24.04.2022) and conducted in accordance with the principles of the Declaration of Helsinki.

Patient satisfaction was assessed using the visual analog scale with the scoring ranging between 0 and 10 (21): 1-3, very dissatisfied, 4-5, dissatisfied; 6-7, satisfied, and >7 very satisfied. Complications such as wound infection and neurovascular injuries after surgery were evaluated.

Surgical Technique

As a standard procedure, all patients were operated under regional anesthesia (block) and tourniquet. All operations were performed by a single hand surgeon. A Brunner skin incision was applied (Figure 1). A surgical loupe with 4.3 magnification was used. During surgery, digital arteries and nerves of both sides of the fingers were preserved (Figure 2). After hemostasis, the skin was anatomically closed using 4/0 prolene sutures. A butterfly drain was placed in all patients after surgery (Figure 3). All patients underwent partial fasciectomy. The fascia layers excised were sent for pathological examination. After wound dressing, bulky bandage (thick and compressive) was applied to the patients with 30 to 50° flexion contracture in the MCP joint before surgery (Figure 4), while short arm cast extending to the fingertip was applied to the patients with $\geq 50^\circ$ flexion contracture (Figure 5). The bulky bandage and short arm cast were applied for five days. In the postoperative day 1, active and passive finger movements were allowed. In the patients we applied splint, the splint was wrapped with an elastic bandage and the patients were informed about this. The patients were taught to re-wrap the splint with an elastic bandage after opening the elastic bandage and performing the movements. All patients and patient relatives were informed about the instructions for frequent mobilization to preserve the full range of motion. In the early postoperative period, the importance of full flexion and extension was emphasized with analgesic support.

Postoperatively non-steroidal anti-inflammatory drugs and oral antibiotherapy (cefazolin tablet 1 g, b.i.d.) were initiated for

one week. On day 5, bulky bandage and cast were removed and a smaller dressing was preferred to achieve full range of motion of the joint. Wound dressing was repeated every three days and terminated after suture removal. At week 3, sutures were removed and all patients were scheduled for follow-up at weeks 6 and 12 as the final visit (Figure 6). Our patients were evaluated in the outpatient clinic periodically at intervals of three and six months after the final visit.

Statistical Analysis

Statistical analysis was performed using the NCSS version 2007 and PASS version 2008 software (NCSS LLC, Kaysville, UT,



Figure 1: Intraoperative Brunner skin incision



Figure 2: Intraoperative bilateral digital artery and nerve exploration after partial fasciectomy

USA). Descriptive data were expressed in median (min.-max.) or number and frequency. A p -value of <0.05 was considered statistically significant.

Results

Of the patients, 26 (89.7%) were males and three (10.3%) were females. The median age was 57 (range, 40 to 74) years. The median follow-up was 12 (range, 11 to 17) months. The mean Q-DASH score is 7.36 (0-22,8). A single finger was affected in 24 patients, while two fingers were affected in five patients. The fourth finger was the most affected finger, followed by little finger and middle finger. Nineteen patients had right hand involvement, while 10 patients had left hand involvement. Demographic and clinical characteristics of the patients are shown in Table 1.

Pathological examination result was compatible with fibromatosis. Maceration in the wound site was seen in two patients ($p=0.08$). No recurrence was observed. On physical examination, it was considered as the absence of re-contraction in the fingers in the early period. All patients were satisfied and very satisfied with the surgical treatment (Table 2).

Discussion

Dupuytren's contracture is a progressive fibroproliferative condition, although its etiology remains unclear. Except for the early stage, surgical is usually the first-line treatment (22). Surgical treatment includes two types: fasciotomy and fasciectomy. The follow-up study showed a higher recurrence rate after 5 years in the percutaneous needle fasciotomy group



Figure 3: Butterfly drain set and biochemistry tube

(85% versus 21%) (23). During surgery, it is of utmost importance to release the contracture of the affected fascia and removal of the affected tissue. Several studies have suggested partial fasciectomy, which is a more widely used technique, in the treatment with varying recurrence and complication rates (24). The literature highlights the importance of proper incision, use



Figure 4: Preoperative flexion contracture of 30 to 50° in the MCP joint
MCP: Metacarpophalangeal



Figure 5: Preoperative flexion contracture of $\geq 50^\circ$ in the MCP joint
MCP: Metacarpophalangeal



Figure 6: The final image of flexion contracture

of loupes, intraoperative hemostasis, postoperative elevation, analgesic use, and active/passive range of motion exercises to reduce complication and recurrence (25). In a study, there was no significant difference in the recurrence rates between Brunner incision and Z-plasty incision (26). In our study, a Brunner skin incision was made and a surgical loupe was used in all patients. In addition, all patients and relatives were strictly instructed about the range of motion exercises after surgery. Our patients did not need Z-plasty.

On the other hand, surgical treatment of Dupuytren's contracture is associated with several complications including neuropraxia, digital artery and nerve injuries, infections, hematoma, and skin problems (27). In our study, maceration in the wound site was seen in two patients. In particular, skin infection due to hematoma and postoperative pain have been extensively reported in the literature. In the current study, we used a negative pressure drainage with a butterfly drain and biochemistry tube and no hematoma occurred in any of the patients. This system after surgery appears to be useful in the comparison of Penrose drain and/or mini-Redon drain which are routinely used in daily practice.

The most common risk factors of Dupuytren's contracture include alcoholism, smoking, renal and liver impairment, diabetes mellitus, epilepsy, myocardial infarction, and human immunodeficiency virus (28). In our study, smoking and diabetes mellitus were the most common risk factors.

There is no consensus on the use of splint after surgical treatment of Dupuytren's contracture in the literature (29,30).

Table 1: Demographic and clinical characteristics of the patients

Age, median (min.-max.)	57 (40-74)
Sex, n (%)	
Female	3 (10.3)
Male	26 (89.7)
Side, n	
Right/left	19/10
Dominant/Non-dominant	25/4
Complication, n (%)	2 (6.8)
Smoking, n (%)	18 (62)
Alcohol, n (%)	5 (17.2)
Diabetes mellitus, n (%)	12 (41.3)
Family history, n (%)	4 (13.7)

Table 2: Patient satisfaction

Patient satisfaction	
Very satisfied (8-10)	27
Satisfied (6-7)	2
Dissatisfied (4-5)	0
Very dissatisfied (1-3)	0

In our study, bulky bandage (thick and compressive) was applied to the patients with 30 to 50° flexion contracture in the MCP joint before surgery, while short arm cast extending to the fingertip was applied to the patients with $\geq 50^\circ$ flexion contracture. Both protocols were discontinued on postoperative Day 5. No additional splint was used in any of the patients. Based on our experience, we believe that early active and passive joint exercises and a thorough education for range of motion seem to be more successful than splint applications.

In the literature, recurrence and complications rates tend to increase in the long term after surgical treatment of Dupuytren's contracture. In a study with a median follow-up of 3.45 years, Högemann et al. (31) reported a recurrence rate as 10.8% and complication rate as 13.8%. In another study, Moermans (32) followed the patients for a median of 2.9 years and reported a complication rate of 5.6%. In our study, the median follow-up was 12 months and no recurrence was observed. Maceration in the wound site was seen in only two patients.

Study Limitations

The small number of patients and the absence of a control group are the limitations of the study.

Conclusion

In conclusion, partial fasciectomy is a useful treatment method with low recurrence and complication rates and high patient satisfaction rates in patients with Dupuytren's contracture. In addition, our surgical treatment seems to be a useful guide for long-term outcomes of patients with Dupuytren's contracture.

Ethics

Ethics Committee Approval: The study was approved by the Ankara City Hospital, No. 1 Clinical Research Ethics Committee Presidency (Approval no: 2586, Date: 24.04.2022).

Informed Consent: A written informed consent was obtained from each patient.

Peer-reviewed: Externally peer-reviewed.

Financial Disclosure: The author received no financial support for the research and/or authorship of this article.

References

- Lubahn JD. Dupuytren's Disease, In: Chapman MW (editor) Chapman's Orthopedic Surgery, Lipincot-Williams and Wilkins, Philadelphia, 2001; pp: 1735-46.
- Neligan PC. Plastic Surgery, Volume six, Hand and Upper Extremity, In: WAtt Andrew J. Leclercq Caroline, Management of Dupuytren's disease, 3rd edition: Elsevier, 2013, pp. 345-362.
- Ng M, Thakkar D, Southam L, et al. A genome-wide association in study of Dupuytren disease reveals 17 additional variants implicated in fibrosis. *Am J Hum Gen.* 2017;101:417-427.
- McFarlane RM. On the origin and spread of Dupuytren's disease. *J Hand Surg Am.* 2002;27:385-390.
- Broekstra DC, Groen H, Molenkamp S, et al. A systematic review and meta-analysis on the strenght and consistency of the associations between Dupuytren disease and epilepsy. *Plast Reconstr Surg.* 2018;141:367e-379e.
- Descatha A, Carton M, Mediouni Z, et al. Association among work exposure, alcohol intake, smoking and Dupuytren's disease in a large cohort study (GAZEL). *BMJ Open.* 2014;4:e004214.
- Rayan GM. Clinical presentation and types of Dupuytren's disease. *Hand Clinic.* 1999;15:87-96.
- Tubiana R. Evaluation od deformities in Dupuytren's disease. *Ann Chir Main.* 1986;5:5-11.
- Luck JV. Dupuytren's contracture; a new concept of the pathogenesis correlated with surgical management. *J Bone Joint Surg Am.* 1959;41:635-664.
- Rayan GM. Nonoperative treatment of Dupuytren's disease. *J Hand Surg Am.* 2008;33:1208-1210.
- Tureson C. The role of hand therapy in Dupuytren disease. *Hand Clin.* 2018;34:395-401.
- Keilholz L, Seegenschmiedt MH, Sauer R. Radiotherapy for prevention of disease progression in early-stage Dupuytren's contracture: initial and long-term results. *Int J Radiat Oncol Biol Phys.* 1996;36:891-897.
- Yin CY, Yu HM, Wang JP, et al. Long-term follow-up of Dupuytren disease after injection of triamcinolone acetonide in Chinese patients in Taiwan. *J Hand Surg Eur Vol.* 2017;42:678-682.
- Nanchahal J, Ball C, Davidson D, et al. Anti-tumour necrosis factor therapy for Dupuytren's disease: a randomised dose response proof of concept phase 2a clinical trial. *EBioMedicine.* 2018;33:282-288.
- Coleman S, Gilpin D, Kaplan FT, et al. Efficacy and safety of con-current collagenase clostridium histolyticum injections for multiple Dupuytren contractures. *J Hand Surg Am.* 2014;39:57-64.
- Ball C, Izadi D, Verjee LS, Chan J, Nanchahal J. Systematic review of non-surgical treatments for early Dupuytren's disease. *BMC Musculoskelet Disord.* 2016;17:345.
- McGruther DA. Dupuytren's contracture. In: Green's operative hand surgery. 6th ed. Philadelphia: Elsevier; 2005;159-185.
- Gelman S, Schlenker R, Bachoura A, et al. Minimally invasive partial fasciectomy for Dupuytren's contracture. *Hand.* 2012;7:364-369.
- Therkelsen LH, Skov ST, Laursen M, Lange J. Percutaneous needle fasciotomy in Dupuytren contracture: a register-based, observational cohort study on complications in 3331 treated fingers in 2257 patients. *Acta Orthop.* 2020;91:326-330.
- Desai SS, Hentz VR. The treatment of Dupuytren disease. *J Hand Surg Am.* 2011;36:936-942.
- Copay AG, Glassman SD, Subach BR, et al. Minimum clinically important difference in lumbar spine surgery patients: a choice of methods using the Oswestry Disability Index, Medical Outcomes Study questionnaire Short Form 36, and Pain Scales. *Spine J.* 2008;8:968-974.
- Denkler KA, Park KM, Alser O. Treatment options for Dupuytren's disease: Tips and Tricks. *Plast Reconstr Surg Glob Open.* 2022;10:e4046.
- van Rijssen AL, Ter Linden H, Werker PMN. Five-year results of a randomized clinical trial on treatment in Dupuytren's disease: percutaneous needle fasciotomy versus limited fasciectomy. *Plast Reconstr Surg.* 2012;129:469-477.
- Crean SM, Gerber RA, Graverand MP, et al. The efficacy and safety for of fasciectomy and fasciotomy for Dupuytren's contracture in European patients: a structured review of published studies. *J Hand Surg Eur.* 2011;36:396-407.
- Sennwald GR. Fasciectomy for treatment of Dupuytren's disease and early complications. *J Hand Surg Am.* 1990;15:755-761.
- Citron ND, Nunez V. Recurrence after surgery for Dupuytren's disease: a randomized trial of two skin incisions. *J Hand Surg Br.* 2005;30:563-566.
- Bulstrode NW, Jemec B, Smith PJ. The complications of Dupuytren's contracture surgery. *J Hand Surgery Am.* 2005;30:1021-1025.

28. Geoghegan JM, Forbes J, Clark DI, et al. Dupuytren's disease risk factors. *J Hand Surg Br.* 2004;29:423-426.
29. Jerosch-Herold C, Shepstone L, Chojnowski AJ, et al. Splinting after contracture release for Dupuytren's contracture (SCoRD): protocol of a pragmatic, multi-centre, randomized controlled trial. *BMC Musculoskelet Disord.* 2008;9:62.
30. Ebskov LB, Boeckstyns ME, Sorensen AI, et al. Results after surgery for severe Dupuytren's contracture: does a dynamic extension splint influence outcome? *Scand J Plast Reconstr Surg Hand Surg.* 2000;34:155-160.
31. Högemann A, Wolfhard U, Kendoff D, et al. Results of total aponeurotomy for Dupuytren's contracture in 61 patients: a retrospective clinical study. *Arch Orthop Trauma Surg.* 2009;129:195-201.
32. Moermans JP. Long-term results after segmental aponeurotomy for Dupuytren's disease. *J Hand Surg Br.* 1996;21:797-800.