

Original Article:

Selective Fasciectomy in Dupuytren's Contracture: An Experience of A Specialized Tertiary Hospital in Bangladesh

Md. Ashraful Islam¹, Ismat Ara Begum², Khandker Md. Nurul Arifeen¹, Manoshi Datta¹,
Sk. Mohammad Ali³, SM Yousuf Amin⁴, Md. Zahidul Haque Khan¹

Abstract

Background: Dupuytren's disease is a benign yet disabling, irreversible, progressive fibroproliferative condition affecting the palm and fingers, leading to flexion contracture of metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joints. **Objective:** To evaluate results of selective fasciectomy to correct the deformity of MCP and PIP joints and observe the complications. **Methods:** This cross-sectional study was done on 30 patients of Dupuytren's contracture treated by selective fasciectomy, between January 2015 and December 2018, in Department of Orthopaedic Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. Selective fasciectomy was done under brachial plexus block, tourniquet control and loupe magnification. Brunner zigzag incision was used. Indications for surgery was MCP flexion contracture more than 30° and any degree of PIP flexion contracture. Postoperatively hand was immobilised in extension of MCP and PIP joints for 2 weeks and then active and passive movements were encouraged and intermittent splinting for 10 weeks (only at night in last 6 weeks). **Results:** Among 30 patients, 24 (80%) patients were male, 6 (20%) were female; mean age was 62 years (56-74 years). 12 (40%) cases were bilateral, ring and little fingers involvement were seen in most cases (92%). Mean MCP correction was 53° and mean PIP correction was 34° (p<0.001). There were 3 digital nerve injuries peroperatively which were repaired/reconstructed and protective sensation regained in repaired nerve area at 1 year and 3 (10%) marginal skin loss postoperatively which healed secondarily. Superficial wound infection developed in 3 (10%) patients which healed on dressing and antibiotics. Complex regional pain syndrome developed in 2 (6.66%) patients which were mild and resolved on conservative management. 3 (10%) patients developed scar sequilae which were mild and resolved on conservative treatment. Radial digital artery injury was observed in 1 (3.33%); however, no ischaemic insult was observed postoperatively. 2 (6.66%) patients developed recurrence of the disease who were more than 70 years old; however, they declined further intervention. **Conclusion:** Selective fasciectomy is an easy and effective procedure with less complication to correct the deformities and improve the grip-strength significantly in Dupuytren's contracture patients.

Keywords: Dupuytren's contracture, selective fasciectomy, metacarpophalangeal joint, proximal interphalangeal joint.

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Introduction:

Dupuytren Disease is a common condition in Northern European countries¹; however, it is not uncommon in our country. It is a slowly progressive fibroproliferative disease of palmar fascia, leading to permanent flexion contracture

of fingers and palm, painful nodules, cord and poor hand function¹. Since its aetiology is poorly understood, its established risk factors are genetic predisposition, ethnicity, sex and age as well as weak environmental factors including smoking, alcohol intake, diabetes, hand trauma and manual labour². In Dupuytren's disease, there

1. Department of Orthopaedic Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka-1000, Bangladesh.
2. Department of Biochemistry, Popular Medical College, Dhaka-1209, Bangladesh.
3. Department of Orthopaedics, Jessore Medical College. Jessore-7400, Bangladesh.
4. Department of Orthopaedics, Barind Medical College Hospital, Rajshahi-6207, Bangladesh.

Correspondence to: Dr. Md. Ashraful Islam, Assistant Professor, Hand Surgery, Department of Orthopaedic Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka-1000, Bangladesh. Email: dr_ashraf007@yahoo.com

is transformation of normal palmar and digital fascial structures to thickened diseased cord through deposition of type 1 and type 3 collagen and contractile force generated by myofibroblast^{2,3}. Patient initially present with skin pits, nodules, or distortion of palmar creases, which may develop into cords, and these can cause joint contracture. Usually the primary complaint is progressive bending of a digit associated with a cord or nodule; this may affect patient's activities daily living^{3,4}. The Hueston table top test⁵ is positive, if a patient is unable to place a hand flat on a table, and usually reflects a contracture of more than 30° at the metacarpophalangeal (MCP) and/or proximal interphalangeal (PIP) joints. Multiple treatment strategies have been described to date⁶⁻¹³; however, open fasciectomy has historically been the gold standard treatment. Possible adverse effects of the surgery are vascular and nerve damage, delayed wound healing, scar problem, infection, complex regional pain syndrome and loss of finger flexion and extension^{14,16}. The primary goal of our study was to evaluate the results of selective fasciectomy in terms of its deformity and disability correction, improvement in hand functions complications and recurrence.

Methods:

A cross-sectional study was done on 30 patients of Dupuytren contracture involving 60 fingers in 12 bilateral hand who underwent selective fasciectomy in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, the largest specialized tertiary level hospital in the country, between January 2015 and December 2018. The patients were informed about their problems, treatment options, possible complications and outcomes. All of them gave consent to participate in the study. Demographic data including age, sex, handedness (right vs left), smoking status, alcohol use and diabetes were recorded. The severity of contracture was determined by following Revised Tubiana's Staging System¹⁷, which accounts for total flexion deformity in joints of a single affected digit. Our indications for surgery was 30 degrees of MCP flexion Contracture or any degree of PIP contracture. Mean follow up period was up to 1.5 years. Contracture at MCP and/or PIP joints were recorded with a finger goniometer both pre and postoperatively and at final follow up (Fig 1 & 2). The Disabilities of the Arm, Shoulder, and Hand Questionnaire (DASH), Swedish version: 30-item disability/symptoms scale giving a score ranging

from 0 equalling no disability to 100 equalling severest disability^{18,19} was used to assess the hand function.

During surgical procedure, regional anaesthesia was chosen and a Bruner-type incision was adopted to expose and remove the disease cord. Neurovascular structures, tendons and pulleys were protected. After excising the diseased fascia, for remaining contracture at MCP and PIP joints, volar plate, capsule and accessory collateral ligaments were sequentially released. Haemostasis was ensured after releasing the tourniquet. Tension free closure was our aim, if gap was less than 1 cm, it left open to heal by secondary intention. Volar slab was used to keep the MCP and PIP in extension for 2 weeks. Suture removal was done at 2 weeks. Then a removable extension splint was used for 6 weeks and active and passive ROM exercises started 4 times a day after removing the splint. Then the splint was used only at night for another 1 month. Subsequent visits were based on progression of improvement and compliance of the patients.

Assessment of sensibility were recorded before and after surgery and at final follow up by using two-point discrimination. Scar pliability was assessed on all follow-up occasions by visual inspection and palpation of the scar tissue. The scar tissue was graded on a subscale from the Vancouver Scar Scale²⁰. Complications and recurrence were noted.

Data were collected, assembled, and compiled. All data were presented systematically in tables. Qualitative data were expressed as frequency and percentage. Statistical analyses were done using the SPSS version 19.0 for Windows (SPSS Inc., Chicago, Illinois, USA). Paired t-test was used. Statistical significance was assumed at a P value of <0.05.

Results:

Mean age of patients was 62 years with a range of 56-74 years. Among 30 patients, 24(80%) were male and 6(20%) were female (Table 1). In 12 (40%) patients, there was bilateral involvement of the fingers. Dominant hand was involved in 20(66%) patients. Total number of involved fingers were 60. There was history of smoking in 16(53%) patients and diabetes mellitus was in 9(30%) patients. The little finger (only) was involved in 30(50%) cases, while ring and little fingers in 25(42%) and long, ring and little in 5(8%) cases (Table 1). Only in 20(33%) fingers,

there were involvement in PIP joints and in 40(67%) fingers both MCP and PIP joints were involved (Table 1). 25 patients were in Tubiana stage 2 (45°-90°) and 5 in stage 3 (90°-135°). The mean preoperative flexion deformity at PIP was 40° and postoperative finding was 6°. Therefore, the mean correction was achieved 34° ($p<0.001$). The mean preoperative flexion deformity at MCP was 60° and postoperatively found 7°. Hence, the mean correction was 53° ($p<0.001$) (Table 1). 85% of the patients reached a functional ROM ($>165^\circ$) at 12 months and 40% patients reached normal ROM ($>290^\circ$). Patients were satisfied with the remaining scar as per Vancouver Scar Scale 1 in 87% and 2 in 13% cases. Hand function fully recovered in 65% of the patients and much better in 35%. 85% of the patients were satisfied with hand function and the surgery. DASH score before surgery was 20 (17-25) and after 1 year was found 7 (6- 10).

Amongst the intraoperative complications 3(10%) patents had proper digital nerve injuries, 2 of which were radial (1 in long, 1 in ring), 1 was ulnar (in ring) at the level of proximal phalanx which were repaired/grafted immediately. 2(6.66%) patients developed neuropraxia in the postoperative period which was recovered at 8 weeks. 1(3.33%) patient had radial digital artery injury without any ischaemic insult. 3(10%) patients had superficial wound infection which resolved on dressing and antibiotics. 3(10%) patients had wound healing problems, skin edge necrosis or sloughing which was healed secondarily. 3(10%) patient had scar contracture subsequently improved with conservative treatment. 2(6.66 %) patient develop complex regional pain syndrome which were mild and resolved on conservative treatment without any secondary changes. 4(13%) patients developed post-operative stiffness which resolved mostly at 1-year, with extensive mobilization and physiotherapy. Most of the complications were in severe diseases when the PIP joint contracture was more than 60°. 2(6.66%) patients developed recurrence. However, there is no record of amputation (Table 2).

Table 1. Demographics and Contracture Characteristics (n=30)

Characteristics	Frequency (%)
Mean age (in years)	62
Male	24 (80%)
Female	6 (20%)
Comorbidities	
- Smoking	16 (53%)
- Diabetes Mellitus	9 (30%)
- Alcoholic	0 (0%)
Finger involved	60
Bilateral involvement	12 (40%)
Contracture characteristics	
- Dominant hand involved	20 (66%)
- Thumb	0 (0%)
- Index	0 (0%)
- Middle + Ring + Little	5 (8%)
- Ring + Little	25 (42%)
- Little	30 (50%)
Preintervention (mean)	
- MCP	60°±19.2°
- PIP	40°±12.7°
Postintervention (mean)	
- MCP	7°±2.2°
- PIP	6°±1.9°
Mean correction	
- MCP	53°±16.8°
- PIP	34°±10.7°

MCP Preintervention vs Postintervention $p<0.001$; PIP Preintervention vs Postintervention $p<0.001$; P value reached from paired t-test.

Table 2. List of complications

Complications	Frequency (%)
Intraoperative	
- Nerve division (digital)	3 (10%)
- Arterial injury (digital)	1 (3.3%)
Early postoperative	
- Infection	3 (10%)
- Neuropraxia	2 (6.6%)
- Sympathetic dystrophy	2 (6.6%)
- Skin slough	3 (10%)
Late postoperative	
- Scar sequelae	3 (10%)
Stiffness	4 (13%)
Recurrence	2 (6.66%)
Amputation	0 (0%)



Fig.1. from left: a) Preoperative 85° MCP flexion deformity (53 years old male); b) After operation; c) Full correction achieved postoperatively after 1 year.



Fig. 2. from left: a) Preoperative involving ring and little finger (67 years old male); b & c) During operation; d) After operation; e) Full functions achieved after 1 year.

Discussion:

The treatment options for Dupuytren disease currently vary in different settings. Surgical fasciectomy has historically been the treatment of choice, particularly for advanced contractures. In the 1970s, Rodrigo et al.² suggested that fasciectomy more reliably provided long-term improvement compared with fasciotomy. Studies have reported wide ranges of recurrence rates, from 20% up to 60%^{2,5,9}. Others have described more extensive resection including the skin, radical dermofasciectomy, with recurrence rates as low as 8%^{10,11}. This collective accumulation of historical studies has led to fasciectomy being established as the gold standard treatment for Dupuytren disease. This was reinforced in the trial done by van Rijssen et al.²¹, which showed fasciectomy provided better outcome, particularly for severe contracture of the MCP joints. However, patients treated with needle aponeurotomy reported significantly less postoperative pain. With the increasing desire to try less invasive measures,

many surgeons and patients prefer office-based procedures as an initial treatment. Though needle aponeurotomy is popular in some centres as initial treatment; however, we did not have experience of the technique. Recent randomized trials have reported recurrence rates of up to 42% to 68% with needle aponeurotomy^{3,7,8}. More recently, Scherman and colleagues⁸ reported that 33% of patients had a recurrence, defined as 30° or greater passive extension deficit, at 3-year follow-up after collagenase injection. However, collagenase injection is costly and not available in our setting. The DASH improved over time significantly from 20 (17-25) to 7 (6-10), and the scores at 12 months were very close to the normal. In our study, the DASH improved over time significantly from 20 (17-25) to 7 (6-10), and the scores at 12 months were close to normal, up to those in the general population based on the findings of Jester et al.²², as the mean value of 15 indicates an only moderately higher DASH score than that found in a non-clinical population on (n=716); with a DASH score of 13.0. At 12 months, the majority

of our patients had regained sufficient flexion to allow a functional ROM, that is, exceeding 165°. Reaching full ROM might not be a reasonable goal after surgery; instead, the overall goal should be to reach a level of improvement that allows for acceptable hand function²³. In our series, the intraoperative complication rates compared well with published data. Nerve transections quoted in the literature ranging from 1.5% to 7.8%, while arterial transections found in 0.8% to 9.8%, and infections reported from 1% to 3.4% cases^{16,23,24}. Neuropraxia found in 1%-3.7%^{16,23,24}. Moreover, Dias & Braybrooke²⁵ reviewed the outcomes of surgery in 1177 patients with a clear correlation between incidence of each reported complication and the severity of the initial deformity i.e. a greater deformity had more complications.

Conclusion:

Management of patient with Dupuytren contracture can be challenging, careful selection of appropriate procedure, careful tissue handling

and postoperative management are prerequisite for improvement in hand function. Patients need to know; surgery is not a cure but an attempt to restore function specially in severe deformity. Early rehabilitation and encouragement of independence with activities of daily living are strongly recommended.

Conflict of interest: The authors declare no conflict of interest.

Ethical approval issue: The study was approved by the Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh.

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Authors' contribution: Conception and design of the study: MAI, KMNA; Data collection and compilation: MAI, KMNA, MD, SMA, SMYA, MZHK; Data analysis: MAI, IAB; Critical writing, revision and finalizing the manuscript: MAI, IAB, KMNA, MD, SMA, SMYA, MZHK.

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