A Study of Outcome of Limited Fasciectomy in Patients with Dupuytrens Contracture

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Abstract: ***Background*:** Dupuytrens contracture is a fibro proliferative disorder of hand resulting in slowly progressive thickening and shortening of palmar fascia leading to finger flexion contractures. The disease usually affects the fourth and fifth fingers and common in elderly males. The disease progresses in 3 stages with varying clinical severity. The aim of treatment is to remove the contracture of the fascia, correct the flexion deformity and regain the finger function. The treatment options include nonsurgical and surgical methods. The surgical methods include fasciotomy, fasciectomy, dermofasciectomy. Fasciectomy is the commonly done surgical procedure and it can be either limited or radical fasciectomy.

Aims and Objectives: To study the outcome of limited fasciectomy in patients with Dupuytrens contracture

***Observations*:** It is a prospective study conducted in this institute in 25 patients with Dupuytrens contracture operated by limited fasciectomy, between January 2013 and December 2015. All 25 patients of Dupuytrens contracture who presented to us were admitted, evaluated for their severity and operated by limited fasciectomy. Patients were followed up for a period of 6 months to 2 years and evaluated for finger extension and range of movements. 20 of the 25 patients who were operated by limited fasciectomy had complete release of the contractures with normal wound healing and complete extension of fingers. No recurrence of disease was seen in all of these patients on regular follow up and active physiotherapy. Normal range of finger movements were present. 5 of the patients had minor surgical complications in the form of flap necrosis, partial skin graft loss and wound dehiscence, which resolved with conservative dressings and splinting and 2 of these patients developed flexion contractures at 6 months of followup.

***Conclusion*:** Limited fasciectomy is effective in all severity of Dupuytrens contractures with complete relief of symptoms and complete extension of fingers. No recurrence of contractures were seen in 92% of these patients. Limited fasciectomy being less morbid compared to radical fasciectomy or dermofasciectomy is a preferred surgical option in patients with Grade 1 and grade 2 Dupuytrens contractures.

Keywords: Dupuytrens contracture, Limited fasciectomy, Recurrence and outcome.

1. INTRODUCTION

Dupuytrens contracture is a fibro proliferative disorder of hand resulting in slowly progressive thickening and shortening of palmar fascia leading to finger flexion contractures [1]. This condition usually affects the fourth and fifth fingers [2] and common in elderly males with incidence of 3:1 as compared to females [3]. The disease has been associated with manual labourers [4] and was described as a deformity of palmar fascia by Guillaume Dupuytren [5] in 1832.

The etiology of the disease is not fully understood, but several systemic diseases and habits have been implemented as causative [1]. Diabetes mellitus, alcohol, smoking, long-term barbiturate use, epilepsy, hypercholesterolemia and liver disease are thought to be risk factors [5]. Manual labourers with exposure to vibrations and prior hand trauma are among factors held responsible [6]. There is a strong familial component with autosomal dominant inheritance with variable penetration and evident synergy with HLA-DR3 antigen [7].

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Speckled pitting and thickening of palmar skin are the earliest manifestations of Dupuytrens disease. However the key to early diagnosis is recognition of nodule, a firm painless mass fixed to skin and deeper fascia [1]. The nodule precedes the formation of cord by maybe months or several years, which gradually contracts, reeling in the metacarpophalangeal joint and proximal interphalangeal joint and leading to flexion deformity of the fingers. The disease progresses in 3 stages of 1) Proliferative phase where myofibroblasts proliferate and nodules develop. 2) Involution phase where disease spreads along the fascia into fingers and resulting in development of cords and 3) Residual phase where the cords tighten to create a contracture and nodular tissue replaced with thick bands of collagen. The ratio of type III collagen to type I increases, the reverse of normal pattern.

The patients are classified clinically into 3 grades of severity [8] as given below (Figure **1**) Grade 1: Thickened nodule and band in palmar aponeurosis: They may have skin abnormalities Grade 2: Development of pretendinous and digital cords with limitation of finger extension Grade 3: Presence of flexion contracture.

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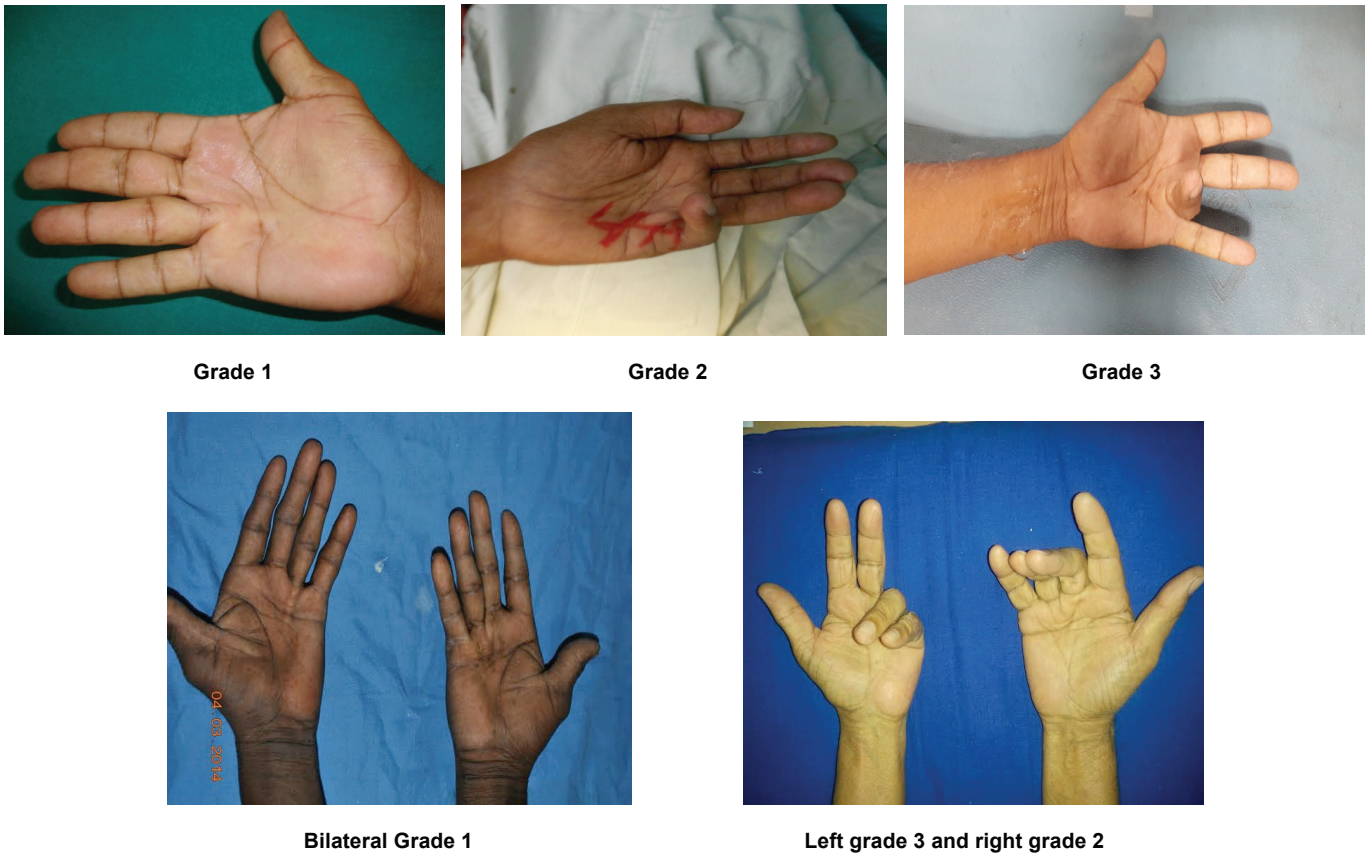


Figure 1: Clinical grading of Dupuytrens.

The contractures interfere with daily activities at workplace (manual labour, wearing gloves) and home (washing, dressing).

The aim of treatment is to remove the contracture of the fascia, correct the flexion deformity and regain the finger function. Treatments include nonsurgical and surgical methods.

The nonsurgical treatments includes radiotherapy, splinting, steroids [9], topical vitamin A and collagenase injections which have been tried in early stage of disease.

Surgical treatment is indicated in patients with a metacarpophalangeal joint contracture of more than 30^{o} or if any contracture is present over proximal interphalangeal joint. Surgical options include fasciotomy, fasciectomy, dermofasiectomy and digital amputation. Fasciotomy can be percutaneous needle fasciotomy or open fasciotomy [1] and is preferred in elderly patients who are not in good health and who cannot tolerate a more extensive approach.

Fasciectomy can be limited fasciectomy, where only macroscopically diseased fascia is excised and radical fasciectomy, where all the palmar fascia is excised including the normal fascia [1].

Dermofasiectomy was reported by Hueston in 1982 [10], which consists of removal of fascia together with skin and repair of the defect with grafting in advanced cases and in recurrent cases.

Digital amputation is sometimes indicated in cases of severe, irreversible joint contracture [1].

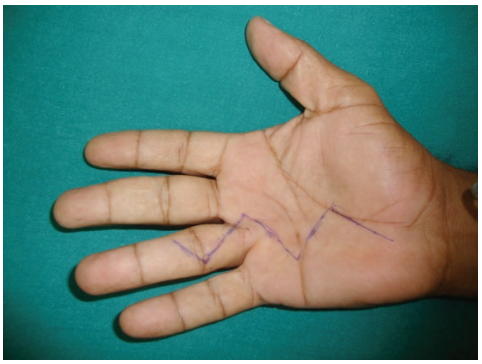
2. PATIENTS AND METHODS

It is a prospective study of 25 patients of Dupuytrens contracture who were operated by limited fasciectomy between January 2013 and December 2015. Patients were admitted, evaluated for severity (Figure **1**) and planned for surgery. Patients were investigated and posted for surgery. Preoperative photographs were taken with consent and nature of disease and prognosis and chances of recurrence were explained to the patients. The need for aggressive physiotherapy and splinting of hand postoperatively were also explained. Patients were operated under general anesthesia or regional block with application of a tourniquet and use of magnification loups. Patients with bilateral involve-

ment were operated on the side with severe disease. A zigzag incision or Z-plasty incision (Figure **2**) was made over the prominent contracture band and flaps elevated on either sides. The fibrosed palmar fascia along with the pretendinous cord, spiral cord, central cord and lateral cords were excised, taking care not to injure the neurovascular structures (Figure **3**). Tourniquet was removed, hemostasis ensured and flaps sutured after ensuring vascularity of fingers. Sterile dressing was applied with a splint in functional position with meta-carpophalangeal joints in 45-70^0 flexion and inter-phalangeal joints in complete extension. Splint was applied for 2 weeks till the sutures were removed and active physiotherapy was started. Patients were reviewed every week for evaluating the range of movements and compliance of physiotherapy. Patients were followed up for 6 months to 2 years.

3. RESULTS

Twenty-five patients with Dupuytrens disease were operated with limited fasciectomy surgery. 20 of the



Zigzag incision

Z plasty incision

Figure 2: Incisions for fasciectomy.

Flaps elevated and fascia seen

Fascia being excised

Fascia excised

Post op healed wounds

Figure 3: Intraoperative steps.

patients (80%) were male and other 5 patients (20%) were female. The age of the patients ranged from 45 to 66years with a mean age of 54 years. 13 of the patients had involvement of right hand, 7 of left hand and 5 had involvement of both hands. Patients in the study were labourers, farmers, clerks and housewives as shown in the data (Table **1**). Ten patients had history of long-term alcohol intake, 13 were smokers, 5 were diabetics and 5 had family history of Dupuytrens disease. 5 patients did not have any of the risk factors for Dupuytrens. Among the 25 patients 19 of them were grade 2 contractures (Figure **5**), 3 were grade 1 (Figure **4**), and 3 were grade 3 (Figure **6**).

All the patients were operated by limited fasciectomy. Full thickness skin grafting was required in 2 patients with grade 3 contractures in whom primary closure of flaps was not possible. All patients were splinted for 2 weeks and active physiotherapy started thereon. Patients were followed regularly for 6 months to two years and evaluated for range of movements and any signs of recurrence. 20 of the 25 patients had normal wound healing, complete extension of fingers and full range of movements. No recurrence was noted after a follow up of 6 months to 2 years.

Two patients with grade 3 contracture had partial flap necrosis and one had partial graft loss. Two patients with grade 2 contracture had wound dehiscence. All these patients were treated conservatively with regular dressings and splinting till the wounds healed. Aggressive physiotherapy was started there after which resulted in complete extension of fingers and full range of movements. 2 of the patients with grade 3 disease,

Table1: General Characteristics of Patients

S. No.	Age	Gender	Side	Finger	Severity of Grade	Occupation	Accompanying Diseases/Habits
1	54	M	Right	4,5	Grade 2	Farmer	DM, S, A
2	60	M	Right	4	Grade 3	Labourer	A, S
3	50	M	Bilateral	4,5	Grade 2	Clerk	DM
4	48	F	Left	4	Grade 2	Housewife	FH
5	52	M	Left	3,4,5,	Grade 2	Clerk	DM
6	55	M	Right	3	Grade 2	Farmer	-
7	48	M	Bilateral	4	Grade 2	Labourer	FH
8	66	M	Right	4,5	Grade 2	Retired clerk	A,S
9	54	F	Left	4	Grade 1	Clerk	-
10	45	M	Right	5	Grade 1	Farmer	S
11	50	M	Right	3	Grade 2	Clerk	DM,FH
12	55	M	Left	4	Grade 3	Labourer	A, S
13	65	M	Right	4,5	Grade 2	Farmer	-
14	57	M	Right	4,5	Grade 2	Farmer	S
15	64	M	Right	4	Grade 2	Labourer	A,S
16	50	M	Bilateral	4,5	Grade 2	Labourer	S
17	48	F	Left	4	Grade 2	Clerk	DM,FH
18	55	F	Right	4,5	Grade 2	Housewife	-
19	60	M	Right	4	Grade 3	Farmer	A,S
20	51	M	Right	4,5	Grade 2	Farmer	-
21	57	M	Right	4	Grade1	Labourer	S,A
22	64	M	Left	3	Grade2	Labourer	S,A
23	59	F	Bilateral	4	Grade 2	Labourer	S, A
24	61	M	Left	3,4,5	Grade 2	Retired clerk	-
25	55	M	Right	4,5	Grade 2	Labourer	S,A

(DM-Diabetes Mellitus, A-Alcoholism, S-Smoking, FH-Family history).

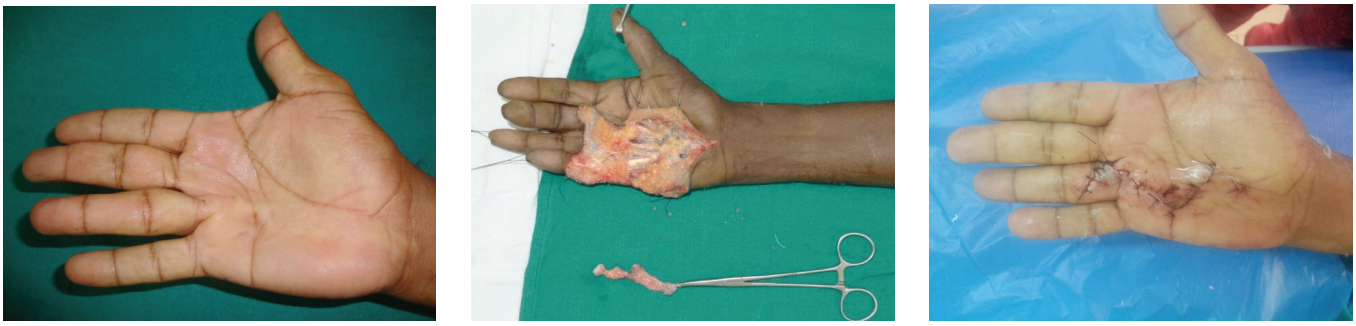


Figure 4: Grade 1 Dupuytrens.

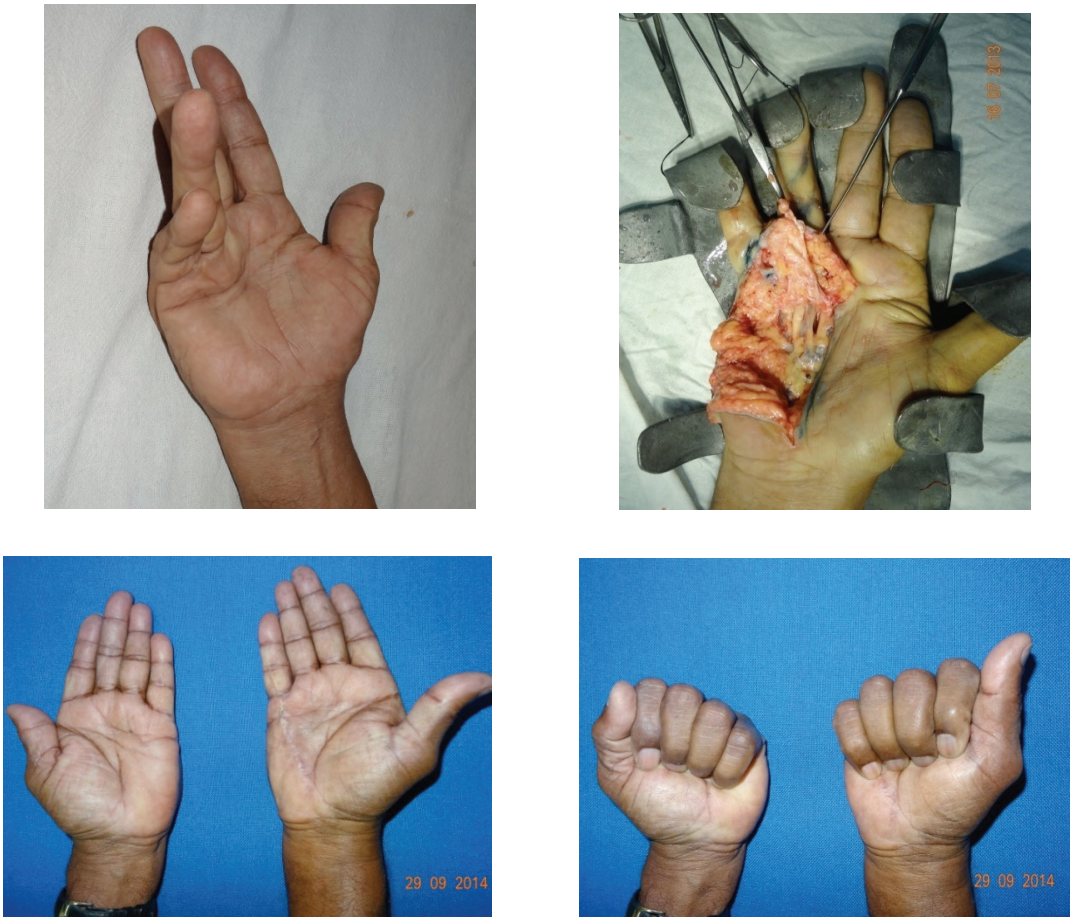


Figure 5: Grade 2 Dupuytrens.

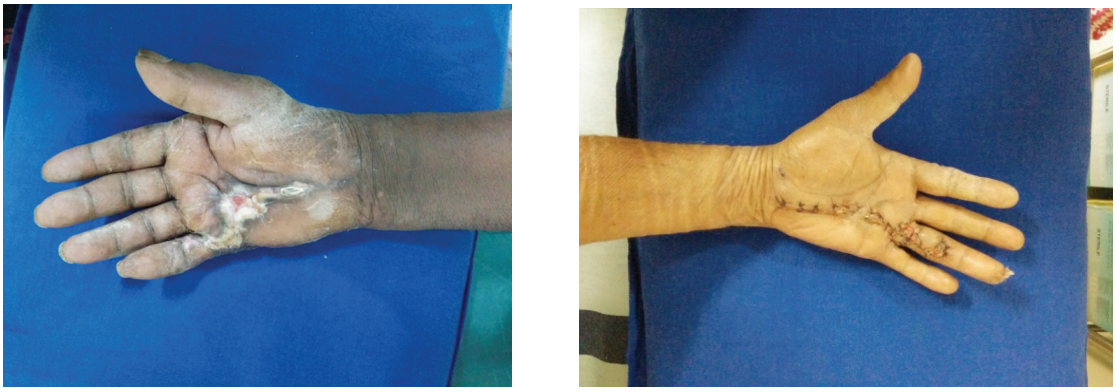
who had partial flap necrosis (Figure **7**) and partial graft loss developed flexion contractures after 6 months of surgery and are treated by night splints and active physiotherapy.

4. DISCUSSION

Dupuytrens disease is a fibro proliferative disorder resulting in pathological contracture of palmar fascia. Dupuytrens contracture is most often seen in 50 to 70 years. In the current study it was seen 4 times more in males than females and mean age was 54 years (range 45-66 years). Dupuytrens contracture has been reported on the ulnar side with the most common involvement of the 4th finger. In our study 4th finger was involved in 10 patients, 4thand 5th fingers in 9 patients, 3rd, 4th, and 5th fingers in 2 patients, 3rd finger in 3 patients and 5th finger alone in 1 patient.

Several systemic diseases and habits have been suspected to be causative risk factors for Dupuytrens disease. 13 of the patients were smokers, 10 had

Figure 6: Grade 3 Dupuytrens.



Partial Flap necrosis

Figure 7: Complications.

history of alcoholism and 5 were diabetic in our study. 4 had family history of Dupuytrens disease.

The aim of treatment is to release the contracture, correct flexion deformity and regain function of finger. Treatments include non-operative methods and surgical methods. The nonsurgical treatments include radiotherapy, splinting, steroid injections, topical vitamin A and collagenase injections, which have been tried in early stage of disease.

Surgical options include fasciotomy, fasciectomy, dermofasiectomy and digital amputation. Fasciotomy can be percutaneous needle fasciotomy or open fasciotomy and is preferred in elderly patients who are not in good health and who cannot tolerate surgery and in early stages of disease. Disadvantage of this procedures is inadequate release and higher rate of recurrence. Fasciectomy can be either limited fasciectomy or radical fasciectomy. In limited fasciectomy only macroscopically diseased fascia is excised whereas in radical fasciectomy all the palmar fascia is excised including the normal fascia. Radical fasciectomy is a more morbid procedure where even normal fascia, which is not diseased is excised in the expectation of reducing disease recurrence.

Dermofasciectomy involves excision of fascia along with the overlying skin. The raw areas need to be covered by skin grafts. The dermofasciectomy is reserved only for patients with recurrent and scarred contractures.

All 25 patients in our study had undergone limited fasciectomy for all severities of Dupuytrens contracture, which involved only excision of the diseased and fibrosed fascia only.

23 of the 25 (92%) patients who underwent limited fasciectomy had complete relief of symptoms, with complete finger extension and normal range of movements. No recurrence was noted in these patients after a follow up period of 6months to 2 years.

Five patients had complications like partial flap necrosis, partial graft loss and wound dehiscence, which were treated conservatively with dressings and splinting. Three patients recovered completely with normal finger movements and 2 patients had recurrent con-

tractures at 6 months of follow-up, the reason for which has not been assessed as patients were lost to follow-up.

5. CONCLUSION

Dupuytrens contracture is a progressive fibro proliferative disease resulting in contracture of palmar fascia and flexion deformity of fingers. Many causative risk factors have been suspected, but no clear association with a particular risk factor has been identified. It has shown to have a strong association with smoking, alcohol intake and diabetes. Most of the patients presenting are grade 2 contractures and with involvement of 4^{th} and 5^{th} fingers commonly. Fasciotomy, fasciectomy and dermofasciectomy are the surgical options for correction of deformity. Limited fasciectomy is effective in all severity of Dupuytrens contractures with complete relief of symptoms and complete finger extension. 2 patients with Grade 3 contractures who developed partial flap necrosis and graft loss developed contractures, the reason for which couldnot be concluded due to lost followup. 23 of the 25 patients had complete release of contractures and normal range of finger movements with limited fasciectomy. Limited fasciectomy being less morbid compared to radical fasciectomy or dermofasciectomy is a preferred surgical option in patients with Grade 1 and 2 Dupuytrens contractures.

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