Nepal Orthopedic Association Journal
https://doi.org/10.59173/noaj.20241002b

Original Article

Dupuytren's Contracture: Outcome of limited fasciectomy

Lok Raj Chaurasia[1], Prawesh Singh Bhandari[2], Pushkar Pudasaini[1], Kiran Kishor Nakarmi[1]
[1]Hand & Microsurgery Unit, Kirtipur Hospital, Kathmandu, Nepal
[2]Dept of Orthopaedics, Institute of Medicine, Maharajgunj, Kathmandu, Nepal

ABSTRACT

Introduction: Dupuytren's contracture of the palm and hand, is a benign fibroproliferative disorder of the fascial tissue. The small finger is the most affected finger followed by the ring finger and others. There is no treatment for the disease, but several treatments are available for contracture correction like observation, splinting, injecting pharmacological drugs, radial fasciectomy, segmental fasciectomy, and limited fasciectomy. In the study, we evaluate the effectiveness of limited fasciectomy for contracture correction.

Method: Limited fasciectomy was done under magnification under tourniquet control to attain no extension deficit. Splinting was done post-operatively for 3 months. Assessment of the cases was done at the beginning of treatment and at 2 years follow up using Brief Michigan Hand Score.

Results: The small finger is the most affected finger followed by the ring finger. Bilateral hand involvement was seen in 21.7% of cases. A good hand score was seen at the end of 2 years despite extension lag occurring in a few cases($p<0.00$). Delayed wound healing was the most common complication. No recurrence was seen at the end of 2 years.

Conclusion: Limited fasciectomy is a good treatment option for Dupuytren's contracture.

KEYWORDS: Dupuytren's contracture, Heuston test, limited fasciectomy, table-top test

INTRODUCTION

Dupuytren's disease is an inherited benign chronic progressive disorder, in which the fascial tissue undergoes fibrotic proliferation resulting in contracture of the digits and palm. It may also affect the foot (Ledderhose disease), and penis (Peyronies disease).[1] Exact etiology is not known but a few factors like hereditary, and autosomal dominance with variable penetrance have been implicated.[2] Other associated conditions are diabetes, heavy drinking, and working with vibratory tools for more than 15 years.[3] In a meta-analysis published in 2020, the worldwide prevalence of Dupuytren's contracture (DC) was reported to be 8.2%, with the highest association with type I Diabetes Mellitus (34.1%).[4] The prevalence of DC in Nepal has been found to be 3% among surgically treated patients.[5] The small finger is the most involved finger followed ring finger, there is bilateral involvement of the hand in 16% of cases.[6]

There is no absolute treatment for DC; however, several techniques have been developed to address its morbidity. Non-operative measures like observation, night-time splinting and therapy, and injecting pharmacological drugs, such as Collagenase.[7,8] Operative treatments like radical fasciectomy, segmental fasciectomy, and limited fasciectomy.[8,9] Of which, limited fasciectomy is the most accepted procedure, with a recurrence of around 21%.[8,9,10] Heuston in his publication in 1962 mentioned recurrence as a reappearance of contracture in an already operated finger.[11] Recurrence has been defined as the development of more than 20 degrees of contracture in any treated joint at one-year post-treatment compared to six weeks post-treatment.[12] It is found in the literature that recurrence is common in younger age groups with dorsal knuckle pads, usually within 2 years of surgery.[13] Although limited fasciectomy has been a widely accepted treatment method, its efficacy in terms of functional and patient-reported outcomes is not clearly understood. Hence, this study aimed to evaluate the outcomes of limited fasciectomy in patients with DC in terms of improvement in the contracture angle (physiological), functional outcomes, patient-reported outcome measure (PROM) using the Brief Michigan Hand Questionnaire, and complications.

METHODS

A single-center, prospective study was conducted at Kirtipur Hospital, Kirtipur, from April 2017- March 2020 involving patients with DC. Patients presenting with DC who were unable to place their palm on the table during the Table-top test were included and those who were not fit for the surgery, who had associated deformities, who had prior hand surgeries, and who did not provide consent were excluded.

Surgical Technique

After the brachial plexus block, the patient was prepared and draped. The limb was exsanguinated and under tourniquet,

Correspondance:

Lok Raj Chaurasia
Hand & Microsurgery Unit, Dept of Burns, Plastics & Reconstructive Surgery, Devdhoka, Kirtipur, Kathmandu, Bagmati Province, Nepal.
Phone No: +977-9862170048, Email: chaurasialokraj@gmail.com

control to have a clear field of vision.

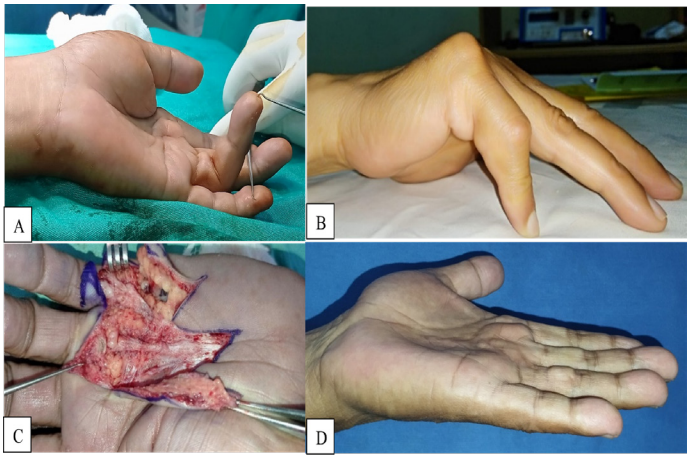

Fig. 1. A. Dupuytrens' contracture B. Table top test C. Surgical dissection showing thickened fascia of palm and their orientation D. Follow up at two years post-operative

The whole procedure was done under a magnification of Surgical loupe with 4X magnification. The principal cords and nodules were identified, and incisions were planned accordingly that would address the maximum of cords/nodules. Multiple Z plasty incision was marked for cases that would require either skin grafting or healing by secondary intention. Brunner incision or multiple Z plasty incisions were given for the skin. Flaps with the subcutaneous tissues were raised. The primarily thickened fascia was dissected and all extensions were freed from the overlying skin, few punctures that were made accidentally were left as such. The fascia was divided at the proximal most site and pulled anteriorly. This gives us a better visualization of the dorsal extensions to the metacarpals. With the sweeping movements of scissors, the dorsal extensions were divided close to the metacarpals keeping the neurovascular structures safe. In the proximal and middle phalanx, the fascia was carefully dissected and freed from the neurovascular bundles. The fascia was then excised. The tourniquet was released and hemostasis was done. The skin flaps are repositioned or refashioned and sutured. A compression dressing and a splint with metacarpophalangeal, proximal interphalangeal joint, and distal interphalangeal joint in extension were applied. The dressing was done at regular intervals of 3-4 days and the suture was removed on day 14. Scar care with scar massage was done and nighttime splinting was continued for 3 months.

The patients were followed up to 3 months (FU 1) for the surgical wound and complications, if any. Second, follow up at 2 years (FU 2) for functional outcome evaluation. The patients were evaluated pre-operatively (FU 0) and at FU 2 for the extension deficits by taking the average of extension deficit at MCP, PIP, and DIP of the severely affected digit after fully extending the digit passively.

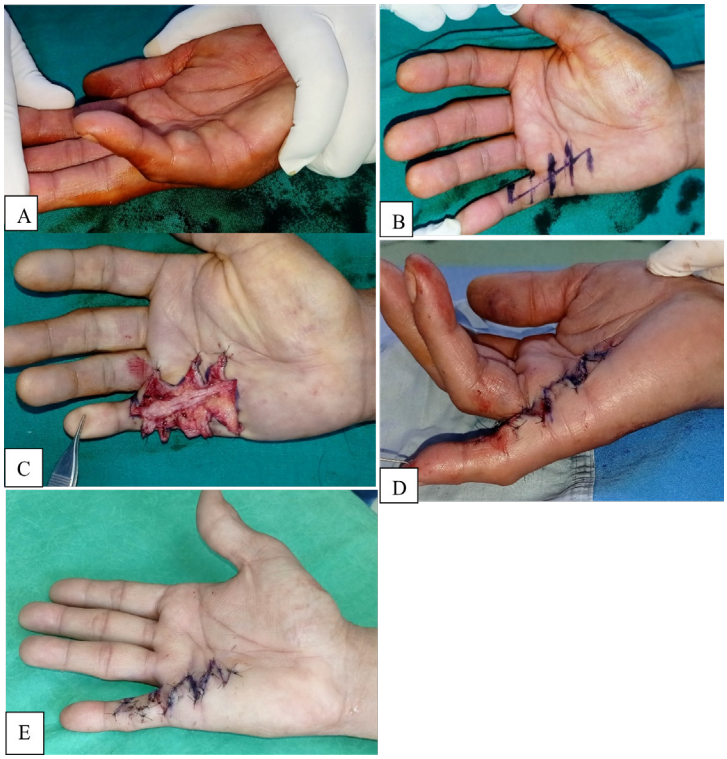

Fig 2. A. Dupuytren's Contracture B. Skin Markings C. Disssection showing thickened fascia D. Immediate correction after fasciectomy E. 2 weeks after surgery

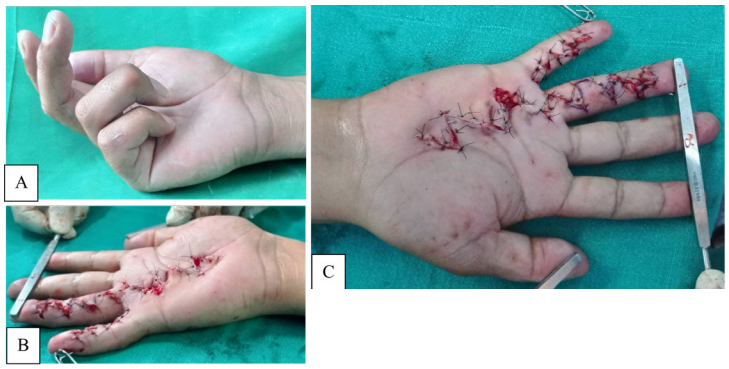

Fig 3. A. Contracture involving DIP joint B,C. Immediate post operative

The patients were initially evaluated by the therapist for examination and scoring of hand function. The patient-reported outcome was evaluated using Brief Michigan Hand Score (bMHS).

The data was recorded in MS Excel 2019 and analysis of data was done using Statistical Package for Social Sciences (SPSS) version 21. Descriptive statistics was carried out, and a paired sample t-test was used to show the association between dependent and independent variables. $p<0.05$ was considered statistically significant. The chi-square test was applied to find a correlation between different variables. The results were interpreted as percentages and numbers.

RESULTS

Our study included 23 cases who underwent limited fasciectomy. The mean age of involvement for DC is 53.39 ±

13.94 years. There was equal involvement of both sides of the hand. Bilateral involvement was seen in 23 (21.7%) patients. The small finger was the most involved finger followed by the ring, long, 1st web space. The metacarpophalangeal joint was the most involved.

There was no correlation between co-morbid conditions like Diabetes mellitus, hypertension, age, and Dupuytren's disease (p>0.05). A single case with involvement of the Small finger Distal interphalangeal joint along with PIP and MCP joint of the small finger and ring finger was seen which was not a usual finding (fig 3).

There has been a significant improvement in the hand functioning of patients as seen at two years follow-ups. bMHS increased from 46.74±17.12 pre-operatively to 92.70±9.53 post-operatively at two years follow up. The p-value for patient-reported outcome is 0.00, thus, signifying a good outcome of the surgical technique for the contracture.

The complications encountered were wound-related. Complications due to wounds were reported in 5 (21%) cases. Delayed wound healing was commonly seen in 4 (17%). Hypertrophic scar was seen in 1 (4%) case. There had been the reappearance of extension deficit in 6 (23%) cases. The maximum deficit seen was 20 º in 2 (9%) cases. All these cases however had a good hand function. No recurrence was seen in any cases.

DISCUSSION

The current study aims to know the pattern of the disease occurring in a tertiary center of Nepal. There is no treatment for Dupuytren's disease. Also, all the treatment methods are directed to treat the contracture caused by the disease. We have studied just the outcome of limited fasciectomy.

Our study shows significant improvement in the hand function of patients as seen at two years of follow-up. The bMHS increased from 46.74±17.12 SD pre-operatively to 92.70±9.53 SD post-operatively at two years follow up. This shows that limited fasciectomy is effective in providing long-term good functional outcomes.

A long-term outcome study of limited fasciectomy using the DASH score has shown that even though hand function worsened over time but was better than before surgery.[14] In the study by Selles R. W. comparing the outcome of limited fasciectomy and percutaneous aponeurotomy lipofilling (PALF), the mean degree of extension deficit was higher in the PALF group (53) than limited fasciotomy group (31) over a period of 5years.[15]

Variable rates of complications are reported with different techniques, fasciectomy (17%), needle fasciotomy (19%), and dermofasciectomy (12%).[16] Similar types of results are found in the study. Our study showed that the complications rate to 21% (n=5) of cases. These complications were wound-related and delayed wound healing was commonly seen (17%). Hypertrophic scar was seen in 1 case (4%). In a review by Dias and Aziz, most complications of limited fasciectomy were nerve injury 12.4 %, chronic regional pain syndrome (CRPS) 19.4% & skin necrosis 14.7 %.[17]

In 2006, Dias and Braybrooke reviewed the outcomes of surgery in 1177 patients. There was a clear correlation between the incidence of each reported complication and the severity of the initial deformity, with a greater deformity having higher complication rates. It also mentioned that if full correction is achieved, it is likely to be maintained, regardless of initial deformity.[6] Early complications like wound dehiscence and stiffness of fingers were seen. late complications like extension deficit were seen, however, the patients continued to have a useful function. The complication rate of 23% is less than that reported by Dias et al.

The recurrence rate in our study is 0% in a follow-up period of 2 years, while Kitridis reported a recurrence rate of 7% in the follow-up period of the mean of 4.9 years. They also mentioned that these patients did not adhere to the post-operative protocol.[18] In another study by Van Rijssen et al comparing needle fasciotomy and limited fasciectomy over a period of 5 years, the recurrence rate was significantly lower in the limited fasciectomy (20.9%) group vs needle fasciotomy group (84.9 %).[10]

We opine that meticulous preparation and surgical technique must have contributed to less intraoperative complication like nerve injury which was recorded in the review of Dias. In our study delayed wound healing and hypertrophic scars are unavoidable complications that should be discussed preoperatively with the patients and these risks should be assessed preoperatively.

In regards to the epidemiological aspect of the disease, the worldwide trend of male predominance and progressive increase in cases with increasing age. This may be affected by the average of the population of the geographical region.[19] Our study also shows male preponderance.

The lesser number of patients (n=23) could not significantly report the association of comorbid conditions like diabetes and hypertension to Dupuytren's disease. Also, the small finger is the most involved finger followed by the ring finger as also seen in our study.[6]

In a study comparing the outcome of Collagenase Clostridium Histolyticum (CCH) and fasciectomy though MHQ score was better in the CCH group at the end of six weeks of follow-up. There was no difference in clinical improvement in metacarpophalangeal joint contracture in both groups while proximal interphalangeal contracture worsened in the CCH group.[20]

These findings suggest that limited fasciectomy which is effective for limited disease is a dependable procedure that not only provides good functional outcomes but is successful in providing long-term maintenance of good functional outcomes. In our setting, the availability of newer methods like CCH is limited by factors like cost and the role of this treatment needs to be further established by more studies.

The major limitation was no involvement of female participants and a lesser number of cases in the study.

CONCLUSION

Limited fasciectomy is a good surgical treatment option for Dupuytren's contracture. A person retains a useful hand function despite the extension deficit occurring over time. Studies including the large number of patients of both sexes are required to validate the outcomes of limited fasciectomy.

CONFLICT OF INTEREST

None

ACKNOWLEDGEMENT

All the study participants and department of physiotherapy.

REFERENCES

1. Eaton C. Green's operative hand surgery. 7th ed. Scott WW, Robert NH, Scott HK, William CP, Mark SC, editors. Philadelphia: Elsevier; 2017.
2. Hu FZ, Nystrom A, Ahmed A, Palmquist M, Dopico R, Mossberg I, et al. Mapping of an autosomal dominant gene for Dupuytren's contracture to chromosome 16q in a Swedish family. Clin Genet. 2005 Nov; 68(5): 424-429. https://doi.org/10.1111/j.1399-0004.2005.00504.x
3. Descatha A, Carton M, Mediouni Z, Dumontier C, Roquelaure Y, Goldberg M, et al. Association among work exposure, alcohol intake, smoking, and Dupuytren's disease in a large cohort study (GAZEL). BMJ Open. 2014 jan; 4(1). https://doi.org/10.1136/bmjopen-2013-004214
4. Salari N, Heydari M, al MHe. The worldwide prevalence of the Dupuytren disease: a comprehensive systematic review and meta-analysis. Journal of Orthopaedic Surg Res. 2020; 15: 495. https://doi.org/10.1186/s13018-020-01999-7
5. Karki B. Profile of Hand surgery cases at Kirtipur Hospital. Journal of Nepalgunj Medical College. 2016 december; 14(2): 41-43. https://doi.org/10.3126/jngmc.v14i2.21537
6. Dias J J, Braybrooke J. Dupuytren's contracture: an audit of the outcomes of surgery. The journal of hand surgery. 2006 october; 31B(5): 514-521. https://doi.org/10.1016/J.JHSB.2006.05.005
7. Larocerie-salgado J, Davidson J. Non operative treatment of PIPJ flexion contractures associated with Dupuytren's disease. journal of hand surgery. 2012; 37: 722-727. https://doi.org/10.1177/1753193411422680
8. Carr L, Michelotti B, Brgoch M, Hauck R. Dupuytren Disease Management Trends: A Survey of Hand Surgeons. HAND 2020, Vol; 15(1): 97-102. https://doi.org/10.1177/1558944718787281
9. Denkler KA, Vaughn C, Dolan EL. Evidence-based medicine: options for Dupuytren's contracture: incise, excise, and dissolve. Plast Reconstr Surg. Plast Reconstr Surg. 2017; 139(240-255). https://doi.org/10.1097/PRS.0000000000002857
10. Rijssen ALV, Linden Hein T, Werker PMN. Five-Year Results of a Randomized Clinical Trial on Treatment in Dupuytren's Disease: Percutaneous Needle Fasciotomy versus Limited Fasciectomy. Plastic and Reconstructive Surgery. 2012 Feb; 129(2): 469-477. https://doi.org/10.1097/PRS.0b013e31823aea95
11. Hueston JT. The table top test. The Hand. 1982; 14(1): 100-103. https://doi.org/10.1016/S0072-968X(82)80053-3
12. Kan HJ, Verrijp FW, Hovius SER, Nieuwenhoven CAv, Group DD, Selles RW. Recurrence of Dupuytren's contracture: A Consensus-based definition. PLoS One. 2017 may; 12(5). https://doi.org/10.1371/journal.pone.0164849
13. HUESTON JT. Recurrent Dupuytren's contracture. Plastic Reconstructive Surgery. 1963 jan; 31: 66-69. https://doi.org/10.1097/00006534-196301000-00008
14. Bergovec M, Jelicic J, Oljaca A, Bilic R. Hand function and recurrence after limited fasciectomy for Dupuytren's contracture: Long term follow-up. Journal of orthopaedic surgery. 2018 march; 26(1). https://doi.org/10.1177/2309499018762195
15. Selles RW, Zhou C, Kan HJ, Wouters RM. Percutaneous Aponeurotomy and Lipofilling versus Limited Fasciectomy for Dupuytren's Contracture: 5-Year Results from a Randomized Clinical Trial. Plastic and Reconstructive Surgery. 2018 December; 142(6): 1523-31. https://doi.org/10.1097/PRS.0000000000004982
16. Krefter C, Marks M, Hensler S, Herren DB, Calcagni M. Complications after treating Dupuytren's disease. A systematic literature review. Hand surgery and rehabilitation. 2017; 36(5). https://doi.org/10.1016/j.hansur.2017.07.002
17. Dias J, Aziz S. Fasciectomy for Dupuytren contracture. Hand Clinics. 2018 Aug; 34(3): 351-66. https://doi.org/10.1016/j.hcl.2018.04.002
18. Kitridis D, Karamitsou P, Giannaros ·, Papadakis N, Sinopidis C. Dupuytren's disease: limited fasciectomy, night splinting, and hand exercises-long term results. European Journal of Orthopaedic Surgery & Traumatology. 2018 november. https://doi.org/10.1007/s00590-018-2340-6
19. Hindocha S, McGrouther D, Bayat A. Epidemiological evaluation of Dupuytren's disease incidence and prevalence rates in relation to etiology. Hand. 2009 september; 4(3): 256-69. https://doi.org/10.1007/s11552-008-9160-9
20. Zhou C, Hovius SE, Slijper HP. Comparative effectiveness of collagenase injection for dupuytren contracture. In: dupuytren disease and related diseases the cutting edge. Cham (Switzerland):Springer. 2017;: 259-70. https://doi.org/10.1007/978-3-319-32199-8_35