

Dupuytren's Disease: The Role of Hand Therapy

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Introduction

Dupuytren's disease may lead to flexion contractures in the fingers of the hand, resulting in limited hand function and reduced quality of life ¹.

Hand therapists primarily treat patients with Dupuytren's disease following corrective surgical procedures. A few studies have investigated non-surgical treatments (splinting, therapeutic ultrasound, or frictional massage) for early Dupuytren's disease. These are very small case series, showing limited, insufficient evidence of efficacy ². One study demonstrated that splinting could be a useful non-operative treatment in early proliferative untreated hands and aggressive post-surgery recurrence. The downside of this success was that patients had to wear a splint for up to 20 hours/day. Outcomes were collected at three months post-initiation of the intervention; therefore, the long-term effects regarding the recurrence of flexion contractures are unknown ³. A night time hand-based finger extension splint (for 6-8 hours) and instructions for gentle stretching exercises and tissue mobilization massage was given in a small sample of 11 patients with mild to moderate presentations of the disease. The authors reported «a quantifiable effect on the degree of deformity» ⁴. The Dutch Multidisciplinary Guideline on Dupuytren Disease states: noninvasive treatments as primary therapy in primary Dupuytren disease can not be recommended ⁵.

A survey among British hand therapists identified that preoperative therapy could enhance postoperative compliance and engagement in patients with Dupuytren's disease, as the postoperative demands are high, and improved engagement could have a notable impact on outcomes ⁶. A systematic review concluded that although preoperative therapeutic interventions for Dupuytren's disease have demonstrated largely positive outcomes, the current evidence is insufficient to fully establish their potential, underscoring the need for further high-quality studies ⁷.

This article focuses on therapeutic interventions provided by hand therapists after corrective surgical procedures,

which are a vital part of the treatment in patients with Dupuytren's disease ^{8, 9, 10, 11, 12, 13, 14}. Hand therapists help patients manage the first phase post-surgical intervention ^{15, 16}. Prior to surgical (percutaneous needle fasciotomy (PNF), open surgery fasciectomy, open surgery dermo-fasciectomy) or non-surgical procedures (injection of collagenase clostridium histolytic [CCH]) hand therapists evaluate the functional limitations of the patient and their restrictions in performing everyday tasks. This, in turn, provides the foundation for assessing the effectiveness of the interventions ¹⁷.

Hand therapy may provide the following interventions:

- pain and edema control ^{9, 18, 19, 20, 21}
- wound and scar management ^{9, 19, 20, 22}
- exercise therapy for regaining and maintaining newly won range of motion, namely finger extension, and prevention of joint stiffness ^{9, 19, 22, 23}
- night-time splinting ^{9, 24, 25, 26, 27}
- corrective or exercise (day-time) splinting ^{9, 20, 24, 28, 29, 30}
- patient education (instructions, coaching) ^{9, 31}

to limit/avoid complications, such as (prolonged) pain, delayed wound healing or infection, adherent scarring, intrinsic muscle tightness, joint stiffness, and poor functional use of the hand ³².

Hand therapy is a complex multi-modal intervention (*Figure 1*) to treat a wide range of possible post-operative problems and must be tailored to the patient's needs ²⁵. Research has focused on outcomes related to surgical interventions and has shown greater improvement of the extension deficits of the metacarpophalangeal joint (MCPJ) than of the proximal interphalangeal joint (PIPJ) ^{20, 33}.

Abstract

Hand therapy plays a central role in the management of Dupuytren's disease, particularly following surgical intervention. Postoperative hand therapy is considered standard practice rather than an exception and is essential for optimizing functional outcomes. In contrast, there is currently insufficient evidence to support hand therapy as a sole treatment for Dupuytren's disease, and available data do not allow a clear recommendation for its isolated use. Preoperative rehabilitation, including patient education and functional preparation, may be beneficial in selected cases and could support postoperative recovery.

Following surgical procedures, especially after fasciectomy or dermofasciectomy, structured hand therapy is a key factor in enabling patients to regain hand function and effectively reintegrate hand use into daily activities. Further high-quality research is needed to clarify the role of hand therapy across all stages and treatments of Dupuytren's disease management.

Keywords

Dupuytren's Disease, Morbus Dupuytren, Handtherapie, Hand Therapy, Splinting, Schienenversorgung

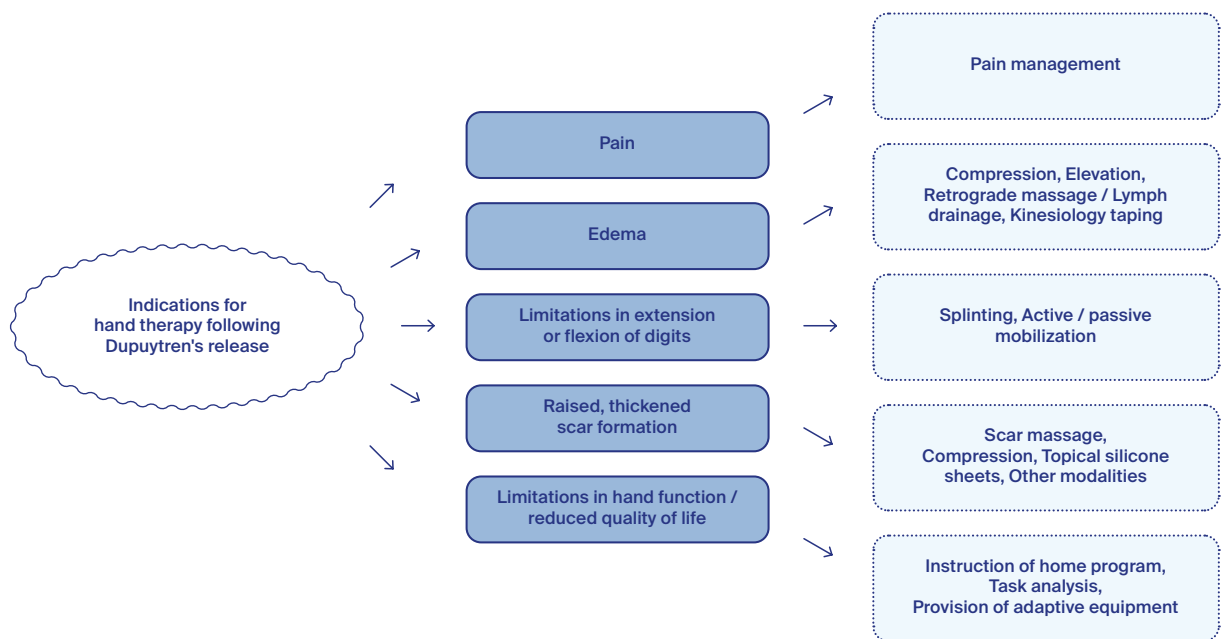


Figure 1 Indications for hand therapy following corrective interventions in patients with Dupuytren's disease

Sound evidence for the necessity of hand therapy after each of the above-mentioned corrective procedures is not (yet) established. To date, patients are referred for hand therapy on an empirical basis^{34, 35}. There are no universal referral criteria for hand therapy interventions after corrective procedures, although some clinics have reported on such³⁴. Therefore, rehabilitation should be minimal and targeted to maximize cost-effectiveness³⁶.

Outcome measurement after intervention must address the patients' personal needs, changes in hand function (including improved range of motion/finger extension, better gripping and fine motor skills) and/or aesthetics³¹. In addition to goniometric measurement of finger range of motion, assessing specific patients' goals is key, as it has been shown that there can be weak relationship between severity of limited finger extension and self-perceived



Figures 2a, b Edema persisting after suture removal



Figures 3a, b, c post-surgical bandage applying compression and application of kinesiopathy tape

functioning (measured with the Disabilities of the Arm, Shoulder, and Hand [DASH])³⁷. The evidence to date from a recent systematic review suggests that the MHQ (Michigan Hand Outcomes Questionnaire) and briefMHQ possess the most acceptable psychometric properties³⁸. The Patient Specific Functional Scale (PSFS) has shown to be a valuable tool to set therapy goals and evaluate the progress/change over time³⁹.

Treatment, guidelines, and timing

The main goal of hand therapy after a corrective procedure is to maintain or improve extension of the affected finger(s) and consequently improve hand function³³. To our knowledge, there are no treatment guidelines regarding hand therapy after corrective procedures in patients with Dupuytren's disease. Agreement on timing (a phase based approach) can be found in the literature, but the schedules are diverse^{9, 26, 27, 28, 40, 41}.

Influencing soft tissue: scar treatment and edema reduction post-surgical intervention

Surgery leads to inflammation, including edema formation⁴². Prolonged edema may have a negative impact on joint and soft tissue mobility, therefore adversely impacting hand function. Therapeutic interventions to reduce edema are widely used in hand therapy and frequently a multimodal approach is applied which may include a combination of compression, elevation, exercises, kinesiopathy tape, and retrograde massage^{43, 44, 45} (see Figures 2a,b // 3a,b,c). Proof of evidence of each of the mentioned interventions is limited and further high quality research is needed⁴³. But expert therapists agree on the effectiveness and therefore the necessity of such interventions⁴⁵.

«Every laceration leaves a scar»¹⁹ (p. 6). And therefore scar treatment is paramount after surgical interventions in patients with Dupuytren's disease. Hand therapists use a variety of methods and modalities to positively influence

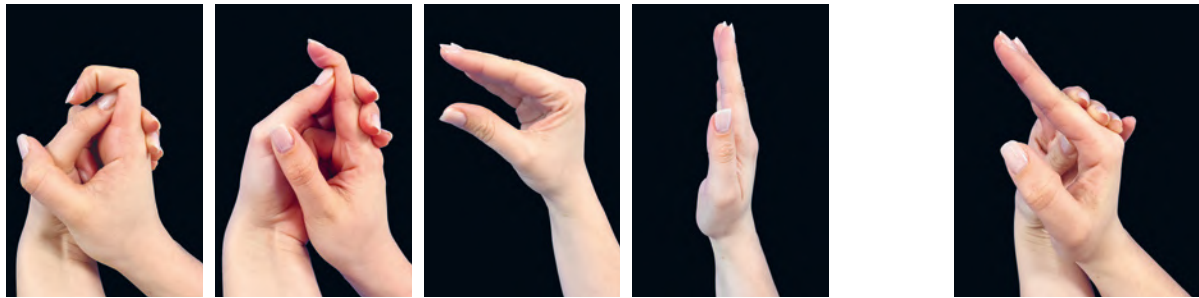
scar maturation, including massage, compression, topical application of silicone sheets or snail slime cream^{46, 47}. But the body of evidence remains scarce and interventions rely on expert opinion⁴⁷.

Exercises post-intervention

To our knowledge, no study has looked solely at the impact of targeted exercises on improving and maintaining joint mobility after corrective treatment. Hand therapists instruct their patients to do exercises regularly. Especially after open surgery, targeted exercises help reduce edema, increase range of motion, and prevent joint stiffness^{9, 19, 22, 23}. However, muscles that have not been used for a long time cannot be expected to immediately fully resume function after a corrective procedure. For example, after prolonged PIPJ flexion contracture, the intrinsic muscles must be strengthened (see various examples in Figures 4 a-i). In the literature, after PNF or CCH, different types of instructions for exercises were given: 1) no specific exercise instructions 2) encouragement to stretch the finger passively and to start increasing the motion of their hand or 3) written instructions including active flexion and extension range of motion (ROM) exercises for a minimum of 10 minutes twice a day^{48, 49, 50}.

Hand use and loading post-intervention

For the patient, it is important to know what to do and when. Only a few studies mentioned the timing when patients were allowed to resume use of their affected hand. It is advisable to encourage the patient to start using their hand as soon as possible. The exact timepoint differs between procedures and the needs of the patient (occupational situation, leisure activities, etc.). After surgical interventions, hand use is considered safe when the wound inflammation has subsided; this may be as early as a couple of days after the intervention or as late as two or three weeks postoperatively³². The hand use usually increases once stitches are removed and wounds are closed: when contact with water



Figures 4a, b, c, d Active blocking exercises for PIPJ/DIPJ flexion, «Intrinsic plus position» to activate active PIPJ/DIPJ extension, full combined extension of MCPJ/PIPJ/DIPJ

Figure 4e PIPJ extension enabled by gentle resistance over proximal phalanx

is permitted. Following less «invasive» procedures (PNF or CCH) patients were instructed to use their hand normally, but to avoid heavy grasping during the first two weeks^{48, 49, 52}.

Splinting post-intervention

Splinting after corrective interventions, especially open surgery, is quite common but highly expert opinion driven. In the literature there are both, those that advocate for it and those that recommend against it^{53, 54, 55}. Interestingly, Baron Guillaume Dupuytren himself already propo-

«A recent systematic review and meta-analysis concluded that splinting should be applied «judiciously», as it adds extra costs to the treatment and only in postsurgical patients if there is an extension deficit¹³.»

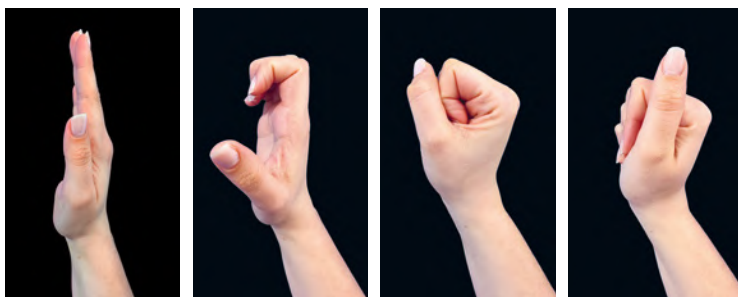
sed splinting³⁴. The rationale behind it is to improve or preserve joint mobility³⁴ and to positively influence scar remodeling⁵⁶. Indeed, stressing the tissue in the post-surgical inflammatory phase might not be advisable. Two studies examined this and concluded that tension-free splinting leads to fewer flare-ups post-intervention^{18, 40} (Figures 5a, b). When the wound situation settles, wearing the splint during the night gives approx. 6 to 8 hours of low load tension, the necessary prolonged time application for tissue growth⁵⁷. A study by Giesberts et al.²³ focused on tissue adaption rate by measuring the contraction forces of the finger on the splint over time in a small sample of patients after partial fasciectomy. They observed that the contraction force decreased each night to reach equilibrium after about three hours. There are many different splint models, made of thermoplastic material in use (dorsal^{23, 26, 27} or volar^{28, 58} application, including the

wrist²⁸, etc.) (Figures 6a-c). The night-time splint is fabricated typically within days after the corrective intervention^{28, 26}. A recent systematic review and meta-analysis concluded that splinting should be applied «judiciously», as it adds extra costs to the treatment and only in postsurgical patients if there is an extension deficit¹³. Therefore, night-time splinting may be useful for a select group of patients with early post-operative persistent contracture⁵⁶. Often, the PIPJ exhibits extension deficits, therefore, a thermoplastic PIPJ-extension splint may also be worn, intermittently during day for several weeks – until a satisfactory result is obtained⁴⁰ (Figures 7a, b). To improve comfort and convenience, splints for stiff PIP joints can be made out of neoprene⁵⁹ (Figure 8). The application of small «tissue-balancing» day-time splints may also be beneficial in encouraging active motion of some joints while redirecting muscular pull away from other joints. The relative motion flexion splint (RMF) may enhance PIPJ extension by limiting MCPJ hyper-extension^{30, 60} (Figures 9a,b).

Looking into the evidence regarding the use of night splints

Night-time splinting after open surgery fasciectomy/dermofasciectomy

«The current literature does not appear to support the use of static night orthosis (splinting) in addition to hand therapy after surgical correction of Dupuytren contracture»⁶¹ (p. 839). A 2015 Cochrane Review concluded: «Low-quality evidence suggests that post-operative splinting may not improve outcomes and may impair outcomes by reducing active flexion. Further trials on this topic are urgently required»⁶² (p. 2). Two years before, the HANDGUIDE study stated: that postsurgical splinting should be provided only upon indication; if provided, wearing recommendations for the splint were for 6 to 24 weeks during night-time, and if needed for a limited period during the day-time⁹ (see overview in Table 1).



Figures 4f, g, b, i «Classic» tendon gliding exercises (as motion is lotion) 51



Figure 6a Patient displaying several splint models he used over a 10-year period prior to a recent surgical intervention for the left hand.



Figures 5a, b Tension-free dorsal extension block splint allowing to move the fingers within it

Photos kindly provided by Cynthia Watkins, PT, DPT, CHT
Rothman Institute of Orthopaedics, Philadelphia, USA



Figures 7a, b two types of custom fabricated, finger-based PIPJ splints, for improving PIPJ extension, rebalancing extensor apparatus and foster DIPJ flexion

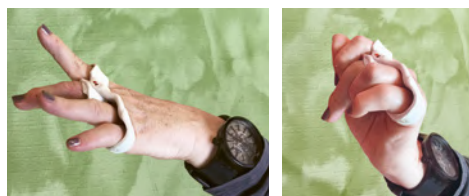
Photo 7b kindly provided by Cynthia Watkins, PT, DPT, CHT
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Figures 6b, c Volar hand-based static extension night splint with added padding emphasizing PIPJ extension



Figure 8 Elastic tension digital neoprene splint



Figures 9a, b Relative motion flexion splint (RMF)

Intervention	Study Design	Sample Size	Conclusions	Year	Country	Authors
Standard hand therapy (HT) with or without night splinting (NS) for 6 months	RCT (multi-centre)	HT only: n=75 HT & NS: n=71	«No differences were observed in self-reported upper limb disability or active range of motion between a group of patients who were all routinely splinted after surgery and a group of patients receiving hand therapy and only splinted if and when contractures occurred.» (p. 1) (one year post intervention)	2011	United Kingdom	Jerosch-Herold, C et al. 25
HT with or without NS for 3 months (worn day / night for 4 weeks)	RCT (pilot study, two centres)	HT only: n=26 HT & NS: n=28	«After operative release of a Dupuytren's contracture, a post-operative protocol using a splint and hand therapy was no better than hand therapy alone in minimizing post-operative flexion contractures.» (p. 733)	2012	The Netherlands	Kemler, MA et al. 27
HT with or without NS for 3 months	RCT (single centre)	HT only: n=28 HT & NS: n=25	«The use of a night extension orthosis in combination with standard hand therapy has no greater effect on maintaining finger extension than hand therapy alone in the 3 months following surgical release of Dupuytren contracture.» (p. 1285)	2013	New Zealand	Collis, J et al. 26
NS with and without tension (NTA) applied (worn at night and intermittently during day and exercises)	Case Series (Cohort Study) retrospective (single centre)	NTA: n=165 Tension applied: n=103	«The results indicate that post-operative management that prevents applied mechanical tension in the early phases of wound healing decreases complications after this surgery and that no digital motion is lost to extension with the NTA technique.» (p. 331)	2002	USA	Evans, E et al. 18
Tension-free splinting (continuously for 3 weeks, motion allowed within the splint; thereafter only at night-time for several weeks) and exercises // volar based finger splints worn during daytime for PIPJ-extension deficits	Case Series (Cohort Study) retrospective (single centre)	n=228	«The incidence of flare reaction using tension-free immobilization postoperatively was low in our study. According to our findings, wound healing problems are rare when tensionless splinting is utilized.» (p. 459)	2014	USA	Rivlin, M et al. 40
NS and home program (exercises)	Case Series (Cohort Study) retrospective (single centre)	n=30	«This study shows that limited fasciectomy followed by a 24-week night splint application, combined with home hand exercises for at least eight weeks, is a viable protocol which reduces the rates of recurrence of DC.» (p. 349) (Mean Follow-up 4.9 years)	2019	Greece	Kitridis, D et al. 41

RCT: randomized controlled study n: number NTA: No Tension Applied DC: Dupuytren's disease

Table 1 Overview of studies looking at the effect of night-time splinting after surgical intervention (limited 2002 – up to date)

Night-time splinting after (percutaneous) needle fasciotomy (PNF)

To date, no large, rigorous study has investigated the effect of night-time splinting after PNF. In most cases, hand therapy was not prescribed, or it was not reported on, nor was it a focus of the study ^{48, 49, 52, 63, 64, 65} (see overview in Table 2).

Night-time splinting after CCH

To date, no large, rigorous study has investigated the effect of night-time splinting after CCH. Mostly hand therapy was not prescribed, or it was not reported upon ^{64, 67} (see overview in Table 3).

Intervention	Study Design	Sample Size	Conclusions	Year	Country	Authors
Standard hand therapy (HT) with night splinting (NS) or NS and home exercise program	Case Series retrospective (single centre)	Night splint and HT n=8 No night splint and home exercise program n=14	«Night extension splinting following needle aponeurotomy may not improve AROM of the MCP or PIP joints.» (p. 23)	2016	Canada	Tam, L et al. ⁶⁶

n: number AROM: Active Range of Motion MCP: Metacarpo-Phalangeal joint PIP: Proximal inter-phalangeal joint

Table 2 One study looking at the effect of night-time splinting after PNF

Intervention	Study Design	Sample Size	Conclusions	Year	Country	Authors
Instructions by hand therapist (exercises, edema control) and night-time splinting for 3 months or instructions alone	RCT (single centre)	Night splint n=14 No splint n=15	«In patients with Dupuytren contracture with primarily MCP joint involvement, providing an orthosis after treatment with CCH may not offer a short-term benefit compared with CCH treatment alone in terms of TAE, TAF, or patient-reported outcome measures.» (p.272)	2021	USA	Bowers, NL et al. ⁵⁸
Patients received counseling from hand therapist (daily finger ROM exercises, active and passive stretching) and night-time splinting for 4 months or instructions alone	RCT (single centre)	Night splint n=39 No splint n=40	«Our study suggests greater benefit of night orthosis for PIP joint contractures. We recommend night orthosis after CCH treatment of PIP joint contractures and optional use for MCP contractures.» (p.547)	2025	USA	Dent, C et al. ⁶⁸
Splint (to wear at all times, except for exercises/ hygiene) for 4 weeks and specific exercise program	Case Series retrospective (single centre)	n=21	«In the short term, it appears that severe PIP joint contractures benefit from specific, post injection orthotic intervention and targeted exercises.» (p.684)	2013	USA	Skirven, TM et al. ²⁴

n: number MCP: Metacarpo-Phalangeal joint PIP: Proximal inter-phalangeal joint TAE: Total Active Extension TAF: Total Active Flexion ROM : Range of Motion

Table 3 Two studies looking at the effect of night-time splinting after CCH

Summary / Conclusion

A multi-modal approach in hand therapy is widely used and generally well accepted following corrective procedures for Dupuytren's disease, yet robust evidence supporting routine intervention for all patients remains limited, particularly regarding the standard prescription of night splints after surgery. In light of current data and the need for cost-conscious care, postoperative rehabilitation should be as minimal and targeted as possible, rather than applied indiscriminately. Early referral to hand therapy appears most appropriate when patients present with persistent pain or edema, or demonstrate loss of digital extension, in order to address these issues promptly and optimise functional outcome. ■

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