SCIENTIFIC ARTICLE

A Comparison of Percutaneous Needle Fasciotomy and Collagenase Injection for Dupuytren Disease

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Purpose To compare percutaneous needle fasciotomy (PNF) with collagenase injection in the treatment of Dupuytren contracture.

Methods A retrospective review was performed for patients with Dupuytren disease treated with PNF or collagenase. Range of motion, patient satisfaction, and complications were recorded.

Results There were 29 patients in the collagenase group with mean baseline contractures of 40° for 22 affected metacarpophalangeal joints and 50° for 12 affected proximal interphalangeal joints. The PNF group was composed of 30 patients with mean baseline contractures of 37° for 32 affected metacarpophalangeal joints and 41° for 18 affected proximal interphalangeal joints. All patients were observed for a minimum of 3 months. Clinical success (reduction of contracture within 0° to 5° of normal) was accomplished in 35 of 50 joints (67%) in the PNF group and in 19 of 34 joints (56%) in the collagenase group. Patient satisfaction was similar between groups. Only minor complications were observed, including skin tears, ecchymosis, edema, pruritus, and lymphadenopathy.

Conclusions In the short term, both PNF and collagenase have similar clinical outcomes and patient satisfaction. *(J Hand Surg 2013;■A:■−■. Copyright © 2013 by the American Society for Surgery of the Hand. All rights reserved.)*

Type of study/level of evidence Therapeutic III.

Key words Dupuytren, collagenase, percutaneous needle fasciotomy.

DUPUYTREN DISEASE IS a progressive genetic disorder with variable penetrance. Standard treatment indications include metacarpophalangeal (MCP) joint contracture of greater than 30° and/or any proximal interphalangeal (PIP) joint contracture.[1]

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Although no treatment is curative, various surgical and nonsurgical treatment options exist. Regional (subtotal) fasciectomy is the accepted standard in the surgical treatment of primary Dupuytren contracture.[2] The reported surgical complication rate ranges from 4% to 39%.[3] The incidence of digital artery and nerve injury in surgery for recurrent disease increased 10 and 5 times, respectively.[3] Given the potentially higher complication rate and longer postoperative recovery for Dupuytren surgery, efforts have been made to optimize nonoperative treatments. The main advantage of nonsurgical treatments is the brief recovery period.[4–6]

Percutaneous needle fasciotomy (PNF) is a nonsurgical treatment option for Dupuytren contracture.[4–6] Cooper[7] described closed percutaneous fasciotomy. The Cooper fasciotomy was reintroduced in 1979 with modifications as percutaneous needle fasciotomy (PNF) by a group of French

rheumatologists using a 25-gauge needle after local anesthesia.[4] Major risks of PNF include injury of digital nerve or vessels and flexor tendon ruptures.

The United States Food and Drug Administration approved collagenase *Clostridium histolyticum* (Auxillium Pharmaceuticals, Inc, Malvern, PA) injection for the treatment of Dupuytren disease in 2010. Collagenase has been studied for over 15 years, including the rigorous and well-designed Food and Drug Administration clinical trials.[8–10] Although there have been few reports of flexor tendon ruptures, clinical trials have shown a low risk profile with excellent clinical results.[8–10]

The purpose of this study was to compare the results of PNF with collagenase injection in the treatment of Dupuytren contracture.

TABLE 1. Clinical Success (Reduction of Contracture to 0° to 5° of Normal) of MCP and PIP Joints

	MCP	PIP
Percutaneous needle fasciotomy	26/32 (81%)	9/18 (50%)
Collagenase	14/22 (64%)	5/12 (42%)
P value	.37	.72

TABLE 2. Mean Reduction of Contracture (Degrees) After Percutaneous Needle Fasciotomy and Collagenase Treatment

	MCP	PIP
Percutaneous needle fasciotomy	32	21
Collagenase	30	24
P value	.67	.84

MATERIALS AND METHODS

A retrospective study of prospectively collected data was performed on patients with Dupuytren disease treated with PNF or collagenase. Selection of treatment was based on patient and physician preference. Three fellowship-trained hand surgeons administered treatment at 1 institution. Our institutional review board approved the study.

Description of treatment Groups

Collagenase treatment group. On average, patients returned between 2 and 4 weeks after initial office visit for collagenase injection. Collagenase was administered as instructed, without local anesthesia. Collagenase injection was limited to 0.25 mL for MCP joint contracture and 0.20 mL for PIP joint contracture.[8–10] A soft dressing was placed after injection. Patients returned the next day for manipulation of the contracted digit after local anesthetic block. Repeat collagenase injections were offered if the desired reduction of contracture was not met at 4 weeks. There was no requirement to continue treatment until a specific contracture correction was achieved as described in the Collagenase Option for the Reduction of Dupuytren (CORD) studies.[8,9]

Percutaneous needle fasciotomy. The PNF was performed in an office setting. An ink pen was used to mark the locations of palpable cords to be released. The hand was sterilely prepped and injected with subdermal lidocaine without epinephrine. Palpable and visible cords were released with 25- and 22-gauge needles. Patients were asked to report paresthesias to avoid digital nerve injury. Patients actively flexed and extended the fingers to ensure the flexor tendons were not penetrated. After needle release along multiple sites of the cord, the finger was manipulated with gentle, progressive extension force. A digital block was performed before manipulation.

For both groups, patients were given a custom hand-based extension orthosis to wear at night for 4 months. If present, skin tears were managed with local care until healed. Range of motion measurements were recorded before and after manipulation and at each subsequent office visit. Adverse effects were recorded if present. Patient-rated satisfaction (0–100) of treatment was recorded at most recent follow-up. No formal hand therapy was done for either group. Data were analyzed using paired *t*-test for continuous data or Fisher's exact test for categorical data.

RESULTS

There were 29 patients in the collagenase group (85% men; mean age, 67 ± 10 y) with mean baseline contractures of 40° ± 12° for 22 affected MCP joints and 50° ± 27° for 12 affected PIP joints. Mean follow-up was 6 months (range, 3–24 mo). The PNF group was composed of 30 patients (75% men; mean age, 66 ± 10 y) with mean baseline contractures of 37° ± 20° for 32 affected MCP joints and 41° ± 33° for 18 affected PIP joints. Mean follow-up was 6 months (range, 3–28 mo). There were no statistical differences when comparing demographics or baseline contracture between groups.

TABLE 3. Adverse Events After Percutaneous Needle Fasciotomy and Collagenase Injection

	Edema	Ecchymosis	Skin Tear	Lymphadenopathy	Pruritus
Percutaneous needle fasciotomy	5	3	15	0	0
Collagenase	29	28	10	6	7
P value	< .01	< .01	.29	< .01	< .01

During the study period, no patient requested a different type of treatment or underwent surgery. One patient received a second collagenase injection for continued ring finger PIP joint contracture, which improved from 60° to 10°. Clinical success (reduction of contracture to 0° to 5° of normal) was accomplished in 35 of 50 joints (67%) in the PNF group and in 19 of 34 joints (56%) in the collagenase group ($P = .25$) (Table 1). There was no statistically significant difference in the mean reduction of contracture of the PNF and collagenase groups (Table 2). Mean contractures at most recent follow-up for the collagenase group were: MCP joints 10° (range, 0° to 20°), PIP joints 26° (range, 0° to 60°); and for the PNF group: MCP joints 5° (range, 0° to 25°), PIP joints 20° (range, 0° to 60°). Patient satisfaction (collagenase 75 ± 34, and PNF 81 ± 25) was similar between groups ($P = .44$). Only minor complications, including skin tears, ecchymosis, edema, pruritus, and lymphadenopathy, were seen in the 2 groups (Table 3). No major complications (tendon rupture, nerve, or vessel injury) were observed. Unique to the collagenase group, nodules and prominent cords were notably softened in 18 of 29 patients.

DISCUSSION

In this study, short-term clinical results offered by PNF and collagenase injection were similar. Both clinical success (as defined by reduction of contracture to 0° o 5° of normal) and mean reduction in contracture were similar between groups. When comparing the 2 treatments, not only is collagenase more expensive, it may also require more treatments to achieve the same clinical results. The CORD I study obtained clinical success in 130 of 203 patients (64%), with a mean of 1.7 injections.[8] A mean of 1.5 injections were required to achieve clinical success in 20 of 45 patients (44%) in the CORD II study.[9] The number of required or recommended collagenase injections is not known and is currently being investigated. The optimum timing of manipulation after collagenase injection remains unanswered. Although PNF can be accomplished during 1 office visit, it routinely requires more treatment time compared with collagenase injection.

Patient satisfaction was similar in both treatment groups and was likely related to the early functional return. There were no recurrences of contracture requiring treatment observed during the time of this study. However, the definition of recurrence in the treatment of Dupuytren disease remains to be standardized. The reported softening of the Dupuytren nodules and cord observed is a potential short-term benefit of collagenase treatment. Watt et al[11] reported that 8 patients treated with collagenase were evaluated at an 8-year follow-up period, during which 6 of 8 had recurrence of contracture. However, none of these patients had further intervention on the injected finger. Given the low complication rate and rapid return to function, PNF or collagenase can be used if contractures recur.[12,13]

Percutaneous needle fasciotomy has been a viable nonoperative treatment option for many years. The procedure can be performed in the office at the patient's convenience, including during the initial visit. In addition, multiple digits can be treated at the same time. We believe that PNF has a higher learning curve than collagenase and requires more time.

There were no major complications (tendon rupture, nerve, or arterial injury) in this study. Common adverse events (ecchymosis and edema) after injection were observed in the collagenase group. Skin tears were observed in both groups. Unique to the collagenase group, several patients experienced pruritus and axillary lymphadenopathy, which resolved. There were no serious allergic reactions.

Our study has a number of limitations. The study was performed only at 1 institution in which treatment technique and experience could alter outcomes. The small sample size may have led to the possibility of type II error. There was no randomization of treatment, and with the short length of follow-up, we were unable to detect recurrence of contracture requiring treatment. We did not have a third-party evaluator blinded to study protocols measure outcomes after treatment. We reported only contracture data, patient satisfaction, and complications, because to date, there

is no validated outcome score for Dupuytren disease. We plan to have continued follow-up to observe recurrence rates between treatment groups at 5 years. We did not seek to determine recurrence rates with the current study. A randomized prospective study with longer follow-up is required to better delineate treatment outcomes.

With the understanding that there is currently no cure for Dupuytren disease, contractures of the hand are managed with surgical and nonsurgical treatments. Both PNF and collagenase provide good alternatives to surgery in select patients.

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