

Dupuytren Disease Management Trends: A Survey of Hand Surgeons

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Abstract

Background: Indication for intervention in Dupuytren disease is influenced by many factors, including location and extent of disease, surgeon preference, and comfort level with different treatment techniques. The aim of this study was to determine current Dupuytren disease management trends. **Methods:** A questionnaire was sent through the American Society for Surgery of the Hand to all members. In addition to demographic data, questions focused on indications for different procedural interventions based on location of disease, age, and activity level of the patient. **Results:** Approximately 24% of respondents completed the survey. Respondents were mostly orthopedic surgeons in private practice who do not work with residents or fellows. Respondents preferred collagenase over needle aponeurotomy and limited fasciectomy for primary Dupuytren disease involving only the metacarpophalangeal (MCP) joint. Limited fasciectomy was the preferred treatment for primary Dupuytren disease involving the MCP and proximal interphalangeal joints. For a patient amenable to any treatment option, the majority would use collagenase, although 87.1% felt that fasciectomy offered the longest disease-free interval. Furthermore, given the option of a young, working patient, 42.7% would use collagenase, while plastic and general surgeons were more likely to treat this patient with limited fasciectomy. More plastic surgeons (vs orthopedic) believe that limited fasciectomy yields the longest disease-free interval. For a patient amenable to any surgical option, orthopedic surgeons prefer collagenase, whereas plastic hand surgeons prefer a limited fasciectomy. **Conclusion:** There are several procedural options for the treatment of Dupuytren disease. This study details current practice patterns among hand surgeons and reveals the increasingly prevalent use of collagenase.

Keywords: Dupuytren disease, collagenase, fasciotomy, needle aponeurotomy, limited fasciectomy

Introduction

Dupuytren disease is a progressive fibroproliferative disorder of digital and palmar fascia.¹² The disease most commonly affects Caucasians in European or Western countries with a prevalence of 0.6 to 31.6%.^{5,12} A combination of both genetic and environmental factors have been attributed to Dupuytren disease.

Environmental risk factors include tobacco and alcohol consumption⁸ as well as microtrauma to the hand.⁴ Systemic diseases such as diabetes, especially if medications are required, and epilepsy have also been implicated.⁶ The molecular mechanisms associated with these risk factors have yet to be fully elucidated.

Although benign, the disease is progressive and debilitating. Most advocate treatment when the metacarpophalangeal (MCP) joint has contracted 30° or more and/or the proximal interphalangeal (PIP) joint has any flexion deformity. Risks and benefits of an intervention should be carefully weighed against a patient's functional limitations and expectations for recovery.²⁷

The most commonly practiced treatment options include needle aponeurotomy (percutaneous fasciotomy), collagenase injection, and limited fasciectomy or complete fasciectomy. The aim of this study was to determine current Dupuytren disease management trends among certified hand surgeons.

Materials and Methods

An online survey consisting of a 5-page document with 50 multiple-choice questions was created and distributed through the American Society for Surgery of the Hand

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Supplemental material is available in the online version of the article.

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Table 1. Survey Respondent Demographics.

Question	Responses					
	(%)					
Practice region	Northeast (26.1)	Southeast (21.8)	Midwest (20.6)	Southwest (7.6)	West (21.4)	Canada (2.5)
Practice type	Private (68.7)	Academic (19.0)	Mixed (10.5)	Military (1.8)		
Age (y)	<31 (0)	31-40 (21.5)	41-50 (24.6)	51-60 (28.6)		>61 (12.2)
Board certification	Ortho (81.8)	Plastics (14.1)	General (5.7)			
Fellowship	Ortho (65.7)	Plastics (3.2)	General (2.2)		Combined (ortho & plastics) (28.9)	
Years in practice	0-5 (17.8)	6-10 (13.4)	11-15 (11.4)	16-20 (11.1)		>20 (46.2)
Hand surgery (% of practice)	<51 (13.7)	51-75 (19.4)	76-95 (30.2)	>95 (36.6)		
Dupuytren disease frequency (% patients per month)	<6 (33.6)	6-10 (42.1)	11-20 (18.7)	21-50 (4.6)		>50 (0.9)

(ASSH) to all active members after institutional review board approval was obtained (Supplemental Appendix 1). All active members of the ASSH (2,676 members) were invited to complete the questionnaire after permission was granted by the society. A link to the questionnaire was sent via email that included a brief statement about the purpose of the study, data collection, and the expected time to complete the survey. Data entered were directly uploaded to Research Electronic Data Capture (REDCap, Vanderbilt University). Members were given 2 months to respond with a reminder email sent at 1 month. Demographic data included the location, age, practice type, and experience (Table 1). The second section queried respondents about indications and preferred treatment in specific clinical scenarios (Table 2).

Data were anonymized and evaluated with IBM SPSS Statistics (Version 24.0.0; IBM, Armonk, New York) software package including cross tabulations, Fisher exact test, 1-way analysis of variance, Levene test of equal variances, and *t* test where appropriate. Matched groups were evaluated with 2-sample *t* tests, Wilcoxon rank sum tests, and chi-square analyses when appropriate. To further assess possible practice biases, multiple post hoc comparisons between specialties and training background were completed with both Fisher's least significant difference test and Bonferroni methods with an alpha of less than or equal 0.05 considered statistically significant.

Results

Six hundred thirty-eight active ASSH members (23.8%) completed the survey. Incomplete questionnaires were not included in the analysis. All regions were well represented,

but the highest respondent rates were from the Southeast (21.8%) and mid-Atlantic (17.3%). Respondents were most commonly part of a group private practice (58.1%) followed by academic (18.5%) and solo practice (11.1%). The majority of respondents did not work with residents or hand surgery fellows (54.4%), although more plastic surgeons worked with residents or fellows ($P < .001$). Age ranges were recorded, from <30 to >65 in 5 year increments. Fifty-one to 55 was the most common age group (14.8%, Table 1).

Board-certified orthopedic surgeons comprised the majority of the cohort (80.6%) followed by plastic surgeons (14.1%) and general surgeons (5.3%). Many were experienced surgeons having been in practice over 20 years (46.2%). Seventy-six percent of respondents reported seeing 10 or fewer patients with Dupuytren disease per month, but almost 40% of respondents were practicing hand surgery exclusively.

Thirty-nine percent of respondents performed needle aponeurotomy for Dupuytren disease and 65.5% reported using collagenase (Table 2). Those that perform the needle aponeurotomy primarily use a 25 gauge needle (43.8%) or an 18 gauge needle (26.1%). Respondents preferred collagenase (48.5%) over needle aponeurotomy (24.4%) and limited fasciectomy (20.8%) for primary Dupuytren disease involving only the MCP joint (Table 3). Limited fasciectomy (39.3%) was the preferred treatment for primary Dupuytren disease involving the MCP and PIP joints (Table 3).

Eighty-one percent of the respondents felt that there is sufficient evidence for the use of collagenase, though 51.3% of the cohort felt that the cost of collagenase was not worth the benefit. For a patient amenable to any treatment option, the majority (42.9%) would use collagenase, though 87.4% believed that fasciectomy offered the

Table 2. General Treatment Options.

	Needle aponeurotomy (%)	Collagenase (%)	Limited fasciectomy (%)
Does respondent perform procedure?			
Yes	39	66	95
No	61	34	5
Location/type ^a	Palm (100) Finger (67) Webspace (55)	Palm (98) Finger (82) Webspace (40)	Limited (59) Radical (20) Open (18)
Immediate results ^b			
Normal motion	16	23	32
Markedly improved	80	74	67
Somewhat improved	4	2.7	1
Results after 2 years ^b			
Normal motion	0.4	1.5	8
Markedly improved	36	47	80
Somewhat improved	35	23	7
Minimally improved	10	2.5	0.2
Not improved	1.2	0	0.2
Results after 5 years ^b			
Normal motion	0.4	0.2	3.1
Markedly improved	8.5	12	58
Somewhat improved	27	13	23
Minimally improved	18	6	1.6
Not improved	5	1.2	0.2
Need further therapy ^b			
0-25%	56	74	88
25-50%	28	15	9
50-75%	13	6	2
>75%	3.2	2	1
Complications ^b (only top 4 displayed)	None (34) Wound healing (5) Nerve injury (6.4) Skin tears (59)	None (42) Wound healing (28) Nerve injury (1.2) Tendon rupture (3)	None (16) Wound healing (65) Nerve injury (35) Hematoma (24) CRPS (18)

Note. CRPS = complex regional pain syndrome.

^aRecorded as percentage of respondents who reported performing procedure on the specific location.

^bRespondents answered based on personal experience. If respondents could not quantify their patient outcomes, the option of N/A was selected, and this percentage was excluded from the table.

longest disease-free survival (Table 3). Hand surgeons report patients receiving limited fasciectomy had better range of motion (ROM) immediately and over time compared with collagenase and needle fasciotomy (Table 2).

When analyzed by board certification, 68.3% of plastic hand surgeons use collagenase compared with 65.7% of orthopedic hand surgeons (Table 4). Almost all hand surgeons regardless of board certification perform fasciectomies. Plastic surgeons were more likely than their orthopedic colleagues to treat a young, gainfully employed patient with aggressive Dupuytren disease with fasciectomy ($P = 0.044$). In addition, more plastic (vs orthopedic) surgeons believe that limited fasciectomy yields the longest disease-free interval ($P = .036$). When compared with responses from plastic and general surgeons, a higher percentage of

orthopedic surgeons believe collagenase offers the longest disease-free interval ($P = .034$). For a patient amenable to any surgical option, orthopedic hand surgeons prefer collagenase injection (38.8%), whereas plastic hand surgeons prefer a limited fasciectomy (33.7%).

Discussion

There is no cure for Dupuytren disease and as many as 1% of the US population is affected.¹³ Once clinical symptoms arise, the disease is progressive over months to years, with rapid and recalcitrant progression associated with Dupuytren diathesis.^{5,22}

The definition of successful treatment and recurrence varies widely across the literature. Commonly accepted,

Table 3. Specific Treatment Options (Analyzed as a Group).

	Needle aponeurotomy (%)	Collagenase (%)	Limited fasciectomy (%)	Open palm (%)	Radical fasciectomy (%)
Preferred for MCP joint	24.4	48.5	20.8	0.3	3.7
Preferred for MCP and PIP joint	14.2	35.9	39.3	6.3	1.9
Recurrent MCP joint	11.5	30.5	42.7	8.3	4.6
Recurrent MCP and PIP joint	4.9	19.5	51	9.2	12.2
Best treatment	21.9	42.9	30.3		
Longest disease-free survival	0.5	7.5	87.4		
Young employed patient	17.3	42.7	36.6		
Elderly retired patient	28.8	47.8	19.8		

Note. Rows may not add up to 100% as some respondents chose "other" as an option. MCP = metacarpophalangeal; PIP = proximal interphalangeal.

Table 4. Two-Sided Analysis of Variance Comparing Board Certification.

Clinical question	Board certification			P value
	Orthopedics n = 514	Plastics n = 90	General n = 34	
Do you work with residents and/or fellows in your practice?	30.1 ± 2.1	56.1 ± 5.5	16.0 ± 7.5	<.001
Do you perform needle aponeurotomy for Dupuytren contracture?	40.3 ± 2.2	41.5 ± 5.5	24.0 ± 8.7	.28
Do you treat patients with Dupuytren disease with collagenase injections?	65.7 ± 2.2	68.3 ± 5.2	64.0 ± 9.8	.878
Do you perform fasciectomy for Dupuytren contracture?	94.6 ± 1.0	97.6 ± 1.7	96.0 ± 4.0	.349
What is your preferred treatment for primary Dupuytren contracture involving only the MCP joint?				
Collagenase	49.5 ± 2.3	45.1 ± 5.5	44.0 ± 10.1	.4
Limited fasciectomy	19.7 ± 1.8	25.6 ± 4.8	24.0 ± 8.7	.263
Needle aponeurotomy	25.4 ± 2.0	21.9 ± 4.6	16.0 ± 7.5	.234
Do you think that the cost of collagenase injections is worth the benefit?	50.1 ± 2.3	42.7 ± 5.5	52.0 ± 10.2	.53
Would you perform more collagenase injections if the cost was lower?	55.7 ± 2.3	65.9 ± 5.3	64.0 ± 9.8	.098
In your opinion, which treatment most likely offers the longest disease-free survival?				
Fasciectomy	86.1 ± 1.6	92.7 ± 2.9	96.0 ± 4.0	.036
Collagenase	8.7 ± 1.3	1.2 ± 1.2	4.0 ± 4.0	.034
Needle aponeurotomy	0.4 ± 0.3	1.2 ± 1.2	0 ± 0	.711
Other	4.8 ± 1.0	4.9 ± 2.4	0 ± 0	.426
Which intervention would you typically recommend for a young, gainfully employed patient with a dominant ring finger MCP contracture of 50° and PIP contracture of 20°?				
Fasciectomy	34.5 ± 2.2	43.9 ± 5.5	48.0 ± 10.2	.044
Collagenase	44.3 ± 2.3	36.6 ± 5.4	36.0 ± 9.8	.141
Needle aponeurotomy	18.5 ± 1.8	12.2 ± 3.6	12.0 ± 6.6	.161
Which intervention would you typically recommend for an 85-year-old retired patient with a dominant ring finger MCP contracture of 50° and PIP contracture of 20°?				
Fasciectomy	18.9 ± 1.8	23.2 ± 4.7	20.0 ± 8.2	.517
Collagenase	47.8 ± 2.3	47.6 ± 5.5	52.0 ± 10.2	.784
Needle Aponeurotomy	29.9 ± 2.1	25.6 ± 4.9	20.0 ± 8.2	.202

Note. MCP = metacarpophalangeal; PIP = proximal interphalangeal.

quantifiable outcomes define success as correction to less than 5° of contracture and recurrence as greater than 30° of contracture.^{11,27} Of note, correction of a contracture to a

quantifiable degree does not necessarily change patient reported disability or improve function. When choosing a treatment modality, many factors must be taken into consid-

eration such as patient expectations, surgeon experience, recovery, and complications rates.

The majority of survey respondents do not perform needle aponeurotomy (Table 2). Of those who do, most reported immediate, markedly improved motion, but a high skin tear complication rate (Table 2). Compared with limited fasciectomy, needle aponeurotomy has a lower complications rate and faster recovery but is less durable with faster recurrence.^{16,26,27} Patient satisfaction is directly correlated to recurrence rate, but more patients would choose a second needle aponeurotomy vs a limited fasciectomy.²⁷ Compared with collagenase, treatment is completed in one session and has fewer minor complications and similar initial contracture correction rates.¹⁸ Although completed in one session, achieving appropriate anesthesia while being mindful of the neurovascular bundle and correcting the contracture can take time. Needle aponeurotomy can be a powerful technique due to its minimally invasive nature, rapid recovery, and low cost. It may be a good option for patients who cannot afford collagenase and want to avoid prolonged recovery and higher risks of surgery.

The cost of collagenase was reported as a limiting factor in the treatment of Dupuytren disease. The price of collagenase is high (up to \$5400), but the therapy is cost-effective.² Naam studied return to work: 2 days vs almost 40 for fasciectomy.¹⁷ Despite the cost and unclear long-term results, the use of collagenase has increased substantially since its introduction in 2010, while use of fasciectomy has declined.^{13,28}

Collagenase was prospectively and randomly compared with needle aponeurotomy for treatment of PIP joint contracture and showed similar results at 2 years; >95% had greater than 5° of contracture recurrence, and >70% had recurrence greater than 20°. ²⁴ This study also examined the Disabilities of the Arm, Shoulder and Hand scores, which were very low before and after treatment interventions. Likewise, a similar study examined collagenase and needle aponeurotomy for treatment of MCP joint contractures, and both outcomes were similar: a 50° increase in motion and a total ROM of approximately 83° at the MCP joint at 1 year.²⁵ Respondents in our survey believe that at 5 years the majority of patients treated with collagenase required no further treatment. Survey respondents also stated the evidence was sufficient to support the use of collagenase. Collagenase may be more favorable compared with needle aponeurotomy as an in-office treatment because it may be perceived as faster than puncturing the cord repeatedly with a needle.

According to the survey, orthopedic surgeons employ collagenase more often than other surgeons in both the young and the old as well as in the MCP and PIP joints (Table 4). The risk profile of collagenase is favorable. Minor complications include swelling, bruising, skin tears, and blood blisters.⁵ Major complications occur in approximately 2% of patients.⁷ Recently, Auxilium Pharmaceuticals, Inc, the makers of Xiaflex, released data on over 27,000 injections and found a 0.09% flexor tendon rupture, 0.01% ligamentous injury, and 1 report of both complex

regional pain syndrome (CRPS) and a neuropraxia that resolved.²³ As a group, respondents reported no adverse effects in 42% of patients, but uncharacteristically high tendon rupture (3%) and nerve injury (1.2%).

The majority of respondents agree that limited fasciectomy yields the longest disease-free survival, yet given the option for a young, employed patient with Dupuytren disease, the majority (42.7 vs 36.6%) would use collagenase. This may be because an earlier recurrence is weighed against the morbidity of fasciectomy and ability to repeat a collagenase injection or perform a different intervention for disease recurrence.

When contrasting specialties, plastic surgery-trained hand surgeons were more likely than their orthopedic colleagues to treat a young, gainfully employed patient with aggressive Dupuytren disease with fasciectomy ($P = .044$). More plastic and general surgeons believe that limited fasciectomy yields the longest disease-free interval ($P = .034$).

Based on the best available evidence, limited fasciectomy results in the lowest 5-year recurrence rate (21%), but carries an increased risk of complications.²⁷ Risks of fasciectomy include digital artery or nerve injury, infection, hematoma, wound healing issues, or a flare reaction. Major complications occur at a rate of 15% and 10 times this incidence with recurrent disease.^{3,20} CRPS was reported to occur at a rate of 18% by survey respondents but is likely closer to 5%.⁹ Although risk of complication and recovery are important, 1 study found recurrence rate and ability to correct the contracture are the most important factors for the patient when considering treatment.¹⁰

We recognize that this study has certain limitations. Most define recurrence in degrees or a change from baseline, some clinically by visualization of disease,³ where others do not clearly define recurrence.^{1,14} Our survey examined surgeon reports of recurrence at different intervals, which is subject to recall bias. This may account for the respondent's inflated complication rate for patients treated with collagenase. Our response rate was relatively low, albeit this questionnaire was more detailed than studies which had higher response rates.^{15,19,21} Though this is not a validated survey, we believe it achieved its intended purpose—to ascertain current practice patterns among hand surgeons caring for patients with Dupuytren disease. With the incorporation of collagenase into practice many have adopted this modality as a faster and less morbid procedure than a limited fasciectomy, even if the recurrence rate is much higher. Interestingly, surgeon age and experience, and practice type, breadth, and location showed no correlation to practice trends.

With this survey study, we have determined that most respondents would use collagenase as the primary treatment of Dupuytren disease of the MCP and PIP joint where an intervention is indicated, even though the evidence reports higher long-term recurrence rate and increased cost. It also highlights the differences between orthopedic and plastic surgery-trained hand surgeons with respect to treatment in different clinical scenarios.

Ethical Approval

This study was approved by our institutional review board.

Statement of Human Rights

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

Statement of Informed Consent

Informed consent was implied by completion of the survey.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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