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# Using tongue depressors to aid cord localization during collagenase injection for Dupuytren disease

## *Utilisation d'abaisseurs de langue pour faciliter la localisation de la corde pendant l'injection de collagénase dans la maladie de Dupuytren*

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ABSTRACT

The aim of this paper was to introduce a simple and effective method to aid in isolation and stabilization of Dupuytren cords for collagenase injection. Tongue depressors were used to isolate and stabilize the cord during the injection procedure. The area to be injected was sterilely prepared. An assistant was then directed to place a tongue depressor on both sides of the cord. A total of 35 patients with Dupuytren disease were treated. Follow-up lasted two years. Post-operative Disabilities of the Arm, Shoulder and Hand (DASH) scores was $4 \pm 2$. Health-related quality of life measured with the EQ-5D index was $0.89 \pm 0.4$. Recurrence rates of metacarpophalangeal joint and proximal interphalangeal joint were 11% and 14% respectively, using a flexion contracture of 20° to define recurrence. Collagenase treatment using a modified injection method with the aid of tongue depressors are a safe, effective way to treat Dupuytren contractures of the fingers. The technique can isolate the cord, which improves visualization of the cord. It may allow improved accuracy with needle placement and helps to decrease the complications and recurrence.



RÉSUMÉ

Le but de cet article était de présenter une méthode simple et efficace pour aider à l'isolement et à la stabilisation des cordes de Dupuytren lors d'injection de collagénase. Des abaisseurs de langue ont été utilisés pour isoler et stabiliser la corde pendant l'injection. La zone à injecter était préparée stérilement. Un assistant était ensuite chargé de placer un abaisseur de langue de chaque côté de la corde. Un total de 35 patients présentant une maladie de Dupuytren a été traité. Le suivi a duré deux ans. Les scores Disabilities of the Arm, Shoulder and Hand (DASH) étaient de $4 \pm 2$. La qualité de vie liée à la santé mesurée avec l'indice EQ-5D était de $0,89 \pm 0,4$. Les taux de récidive de l'articulation métacarpo-phalangienne et de l'articulation interphalangienne proximale étaient respectivement de 11% et 14%, en utilisant une limitation de l'extension de 20 degrés pour définir la récidive. Le traitement par collagénase utilisant une méthode d'injection modifiée avec l'aide d'abaisseurs de langue est un moyen sûr et efficace de traiter les griffes de Dupuytren des doigts. La technique permet d'isoler la corde, ce qui en améliore la visualisation. Elle peut améliorer la précision dans le placement de l'aiguille et aide à diminuer les complications et la récidive.



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## 1. Introduction

Collagenase injection is a frequently used method for the minimally invasive treatment of Dupuytren disease. However, poor localization of contracted fascial cords increases the risks of complications, including flexor tendon rupture, neurovascular compromise, and the need for a second injection for complete correction [1]. Collagenase injections can be used for metacarpophalangeal (MCP) and proximal interphalangeal (PIP) contractures [2]. Common cord locations include:

- pretendinous cord proximal to the MCP joint causing MCP joint contracture;
- spiral cord causing MCP and PIP contractures as well as displacement of the neurovascular bundle;
- central cord causing PIP joint contracture;
- lateral cord causing PIP or distal interphalangeal contractures [3].

Conventionally, the doctor palpates the contracted fascial cords and marks the site for the injections so that the enzyme is injected into the cords. Efficacy of treatment depends on the correct locations for injection.

The aim of this technical note is to introduce the modified injection technique using tongue depressors to isolate the cords. The procedure improves visualization of the cords and improves accuracy with needle placement.

## 2. Patients and methods

Our method was used in 35 patients with Dupuytren disease from January 2015 to May 2016. There were 31 male and 4 female patients with an average age of 52 years (range, 38 to 72 years). In this series, 34 ring fingers and 16 little fingers were affected.

In order to locate of injection sites, we use tongue depressors to isolate the cord during the injection procedure. Prior to performing the procedure, the patient is examined. A Dupuytren contracture with a palpable cord is verified. The area to be injected is sterilely prepared with a betadine solution. An assistant is then directed to place a tongue depressor on both sides of the cord (Fig. 1). Thus, we isolate the cord from the surrounding tissue and brings it into greater visual relief. We inject 0.58 mg of collagenase into the cord according to manufacturer recommendations. Because the tongue depressors continually isolate the cord during the injection, the physician can keep his second hand on the barrel of the needle to prevent migration of the needle tip out of the appropriate position while administering the injection. At the conclusion of the injection, a soft dressing is applied. In the senior author's practice, patients return to clinic in 48 hours for manipulation. They then are placed in a night splint for 4 months as well as prescribed therapy for range of motion.

Follow-up lasted two years. We measured the postoperative Disabilities of the Arm, Shoulder and Hand (DASH) score, health-related quality of life was assessed with the EQ-5D index. Recurrence rates of MCP and PIP joint was defined as a flexion contracture of 20°.

## 3. Results

No tendon rupture was noted. We found occurrence rates of edema, contusion, injection-site hemorrhage, injection-site pain, and ecchymosis were 52%, 35%, 24%, 20%, and 17%, respectively. For patients with two affected fingers, an average of range of motion outcomes was calculated. Follow-up lasted two years. In comparison of the opposite hand, preoperative total active extension deficit and total active flexion of the fingers were $101^\circ \pm 28^\circ$and $203^\circ \pm 19^\circ$, respectively. The mean active range of motion of MCP, PIP, and DIP joints were $42^\circ \pm 24^\circ$, $37^\circ \pm 26^\circ$, $62^\circ \pm 14^\circ$, respectively. Data after 2 years (range, 23 to 25 years) were $18^\circ \pm 9^\circ$ and $225^\circ \pm 23^\circ$, respectively. The mean active range of motion of MCP, PIP, and DIP joints were $73^\circ \pm 28^\circ$, $89^\circ \pm 24^\circ$, $63^\circ \pm 16^\circ$, respectively. The normal range reported in the literature were about 90°, 110°, 70°, respectively [4]. The pre- and post-operative Disabilities of the Arm, Shoulder and Hand (DASH) scores [5] were $16 \pm 9$ and $4 \pm 2$, respectively. Health-related quality of life measured with the EQ-5D index. The data was improved from $0.79 \pm 0.26$ pre-operatively to $0.89 \pm 0.4$ post-operatively. There were significant differences regarding total active flexion, DASH score, and EQ-5D index [6] ($P = 0.000$; 0.001; 0.000), respectively. Statistical significance was set to 0.05. Recurrence rates of MCP joint and PIP joint were 21% and 28% respectively, using a flexion contracture of 20° to define recurrence.

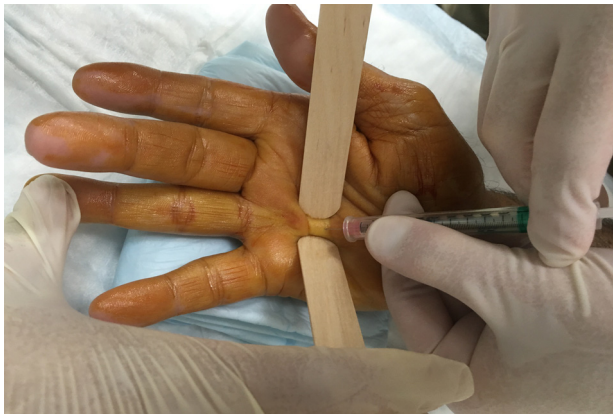

**Fig. 1.** Using tongue depressors to aid localization and visualization of the Dupuytren cord during collagenase injection. The injection technique isolates the cord allowing easy injection placement and the free use of both hands for delivering the injection.

## 4. Discussion

Dupuytren contracture is characterized by excessive collagen deposition which appears as cords causing an extension deficit [7]. These cords cause MCP and/or PIP joint contracture. Many studies have revealed enzyme injection as a safe and effective method of treating as an alternative to surgical fasciectomy [8]. The less invasive injection treatment was far superior to their surgical experience [9].

The tendons and ligaments are composed of the same type 1 collagen in Dupuytren cords. Therefore, one of the serious complications are tendon ruptures. Dupuytren contractures of the PIP joints are less likely to be fully corrected and have a higher recurrence rate. During the 4-year follow-up of 361 patients, Hurst et al. found that MCP joint recurrence was 35% and PIP joint recurrence was 61% when recurrence was defined as flexion contracture of 20°; using a flexion contracture of 30° to define recurrence showed rates of 22% and 13%, respectively [10]. The recurrence rates from surgery range from 20% to 80%. In a trial conducted by van Rijssen et al., treatment with needle aponeurotomy showed an 85% recurrence rate and limited fasciectomy had a recurrence rate of 21% [11].

In our series, all four types of cords, i.e., pretendinous, central, lateral, and spiral were localized with the help of tongue depressors. It is true that many cord combinations can be present in Dupuytren's disease. The most commonly found among our cases were the pretendinous cord and ulnar cord combination in

small fingers. Although one can palpate and localize the more easily pretendinous and central cords, tongue depressors additionally provided localization and stabilization while performing injection. The same technique was very helpful to localize and stabilize more challenging lateral and spiral cords and facilitate the successful injection.

Our study showed a lower recurrence rate was achieved comparing with Hurst et al. [12] data. Our technique is indicated for any collagenase injection for Dupuytren contracture. However, use of this technique may be difficult for injections of natatory cords in which severe adduction contracture is present. Contra-indications to this technique would be any patient for which a collagenase injection is contra-indicated.

Complications may not be completely avoided in any collagenase injection. The reported complications using the conventional technique are edema (72%), contusion to the surrounding tissues (51%), injection-site hemorrhage (37%), injection-site pain (32%), and ecchymosis (25%) [13,14]. We found those complications are lower, which may be the results of accuracy of injection. Those complications are treated with observation. Neurovascular injury is not common. Tendon rupture may occur when injecting PIP cords over the small finger. This can be decreased by inserting the needle only 2-3 mm into the skin and injecting no more than 4 mm distal to the palmar digital crease.

The limitations of this series study were that the sample size is small, and comparing the clinical results (deficit, recurrence, and complications) of this series to the literature may not be reliable because of different follow-ups.

## 5. Conclusion

Collagenase treatment using a modified injection method with the aid of tongue depressors are a safe, effective way to treat Dupuytren contractures of the fingers. The technique can isolate the cord, which improves visualization of the cord. It may allow improved accuracy with needle placement and helps decrease the complications and recurrence in the 2-year follow up period. In the future, a comparison study and a longer period of follow-up may ensure the accuracy of the results with the use of the technique.

## Ethical approval

The study received approval of the ethical committee and all patients gave informed consent for processing their clinical information and taking part in the study.

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## Disclosure of interests

The authors declare that they have no competing interest.

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