

## Review Article

# Evidence in treatment of trigger finger: a review

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## ABSTRACT

Scerosing flexor tenosynovitis (commonly known as “trigger finger”) is one of the main causes of pain and disability in the hand for which patients attend reconstructive and orthopedic surgery. The pathophysiology of this affectionation is based on the presence of repetitive trauma that generates an inflammatory process in the sheath of the flexor tendon of the fingers, which eventually generates an alteration in the hand pulley system and produces all the manifestations characteristics of this disease. First and second author independently searched databases using the following databases: Medline, Cinhal, Pubmed, Cochrane Library, and Clinicaltrials.gov, using the keywords: trigger finger conservative and surgical management. Publications that evaluated the effectiveness and provided comparative and conclusive information on the results of surgical and conservative management for carrying out this work were reviewed and considered. The usefulness of 3 therapeutic methods for managing trigger finger was reviewed, identifying a success rate of 56% with isolated steroid injection and up to 79.6% when used serially; in the use of orthoses, a reduction in the symptom score was identified in all cases, although there is no conclusive evidence on long-term results and complete resolution of the condition; Regarding surgical treatment, it was determined that it represents the best alternative for long-term symptom resolution, with a higher rate of sequelae such as pain within the first week or nerve injury. Intrafascial steroid-based injection represents the initial technique of choice in the management of trigger finger. The use of orthoses may represent an alternative in patients who have no impediment for their use for a fairly long time. Open surgical treatment continues being the therapeutic measure to be overcome, with a high symptom resolution rate 1 year after the procedure.

**Keywords:** Finger, Occupational hand injuries, Hand surgery, Tendon sheath

## INTRODUCTION

Scerosing tenosynovitis (also known as ‘trigger finger’) is one of the main causes of pain and disability in the hands, and also one of the main reasons for consultation with the reconstructive surgeon. TF is a common hand condition that occurs in 2-3% of the population, with a higher incidence in middle-aged women, with comorbidities such

as diabetes, and occurs mainly in the dominant hand.<sup>1,2</sup> The main symptoms present are the functional limitation to grasp and hold objects with handles, manipulate coins and perform fine movements with the fingers. TF frequently coexists with other muscle-tendon disorders of the upper extremity, such as de Quervain's tenosynovitis, lateral epicondylitis, Dupuytren's contracture, or carpal tunnel syndrome.<sup>3</sup> This pathology occurs as a consequence of

repetitive trauma that generates a chronic inflammatory process in the flexor tendon sheath of the fingers. This structure is responsible for keeping the deep and superficial tendons in place during the movement of the fingers, which is why its chronic inflammation generates a long-term nodule, which will cause abnormal movement through the tendon pulley system as it passes through it.<sup>4</sup>

The name of the pathology as ‘trigger finger’ was acquired from the classic ‘trigger’ toward flexion at the moment the nodule passes under the pulley system, and it occurs more frequently in the thumb, middle, and ring fingers.<sup>5</sup>

### Anatomy

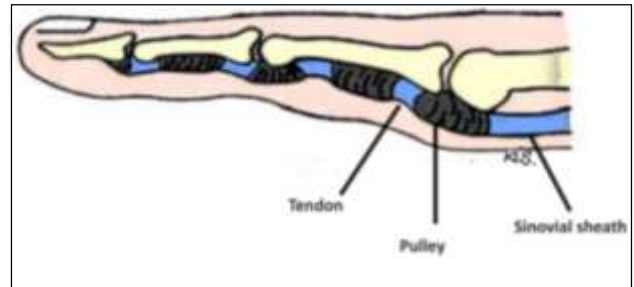
Before describing the anatomy necessary to understand the pathophysiology and surgical approach of trigger finger, it is important to mention that what is described in this section corresponds only to the second to fifth fingers, since the thumb (or first finger) has their own anatomical features. The flexor muscles of the fingers and their corresponding sheaths are considered as a system of pulleys. The flexor longus tendon sheaths extend from the metacarpal heads (the distal palmar crease, which lies superficial; the palmar lamina, which lies deep) and to the distal phalanges. These sheaths are attached to the underlying bones and to the volar plates, preventing the tendons from tightening. Due to these anatomical features, it is expected that thickenings will develop in the fibrous flexor sheath, which act as pulleys and help direct movements during finger gliding.<sup>6,7</sup>

Two main types of pulleys have been determined in this system, which have been called: annular (A) and crossed (C). The former are made up of simple fibrous bands or rings, which gives them their name. Crossed pulleys have two fibrous bands that cross each other. All pulleys are organized according to their location from proximal to distal. The A1 pulley is the most proximal and is the main one involved in the pathophysiology of TF. The A1 pulley overlaps the MCP joints. Later we find the A2 pulley, which overlaps the proximal end of the proximal phalanx. The C1 pulley is next and overlaps the middle of the proximal phalanx. Subsequently, the A3 pulley, which lies over the proximal interphalangeal (PIP) joint, is listed. The C2 pulley lies over the proximal end of the middle phalanx, while the A4 pulley lies over the center of the middle phalanx. The C3 pulley is located on the distal end of the middle phalanx and finally the A5 pulley is located on the proximal end of the distal phalanx (Figure 1).<sup>7,8</sup>

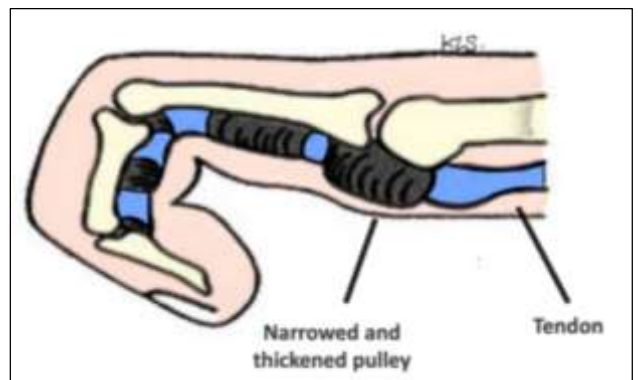
### Pathophysiology

The pathophysiology of this affectation is based on the presence of repetitive traumas that generate an inflammatory process in the sheath of the flexor tendon of the fingers. This anatomical structure forms a tunnel deep into the hand, which holds both the deep and superficial tendons in place during the execution of movements. This repeated trauma conditions the formation of a nodule in the

flexor tendon, altering the function of the pulley system, triggering difficulty for the tendon to pass through the tunnel.<sup>5</sup>



**Figure 1: Normal anatomy of the flexor sheath, showing the pulley, tendon, and tenosynovium.**



**Figure 2: Abnormal anatomical configuration showing the tendon stuck in a thickened and narrowed pulley.**

### METHODS

First and second author independently searched databases using the following databases: MEDLINE, CINHAI, PubMed, Cochrane Library, and Clinicaltrials.gov, using the keywords: trigger finger conservative and surgical management. Publications that evaluated the effectiveness and provided comparative and conclusive information on the results of surgical and conservative management for carrying out this work were reviewed and considered.

### RESULTS

Through the years, both plastic surgeons, orthopedists specializing in hand surgery, and rheumatologists have experimented with various alternatives for the management of trigger finger. There are surgeons who consider surgical treatment as the treatment of choice for this pathology; however, it is undeniable that conservative management represents an alternative with good results for a group of patients. Typically, the initial management of TF consists of the injection of steroids, while when we talk about surgical management, open surgery represents the gold standard for the treatment of this disease, however there are still no conclusive studies to determine the usefulness of endoscopic surgery or percutaneous surgery

compared to traditional surgery. Seeking to eliminate these discrepancies and seek to standardize treatment alternatives for trigger finger, in 2014 the Handguide group published a guide for the treatment of trigger finger, in which it determined that the most appropriate therapeutic options for TF, are: orthosis (splinting), corticosteroid injections, corticosteroid injections plus brace use surgery.<sup>9</sup>

**Conservative treatment**

The first publications on the conservative treatment of TF considered it a prolonged, unreliable, and expensive alternative, however subsequent series documented relevant adverse effects in surgical management, which diverted the spotlight towards conservative treatment, which generated lower long-term morbidity. Among the alternatives for conservative management, two treatments stand out: steroid injection into the tendon sheath and orthotic treatment.

**Steroid injection**

Steroid injection is considered to be the conservative therapy with the highest and fastest success rate of non-surgical treatments, as well as the one that generates the lowest cost for the patient.

This therapy has been used in isolation, demonstrating an effectiveness in resolving symptoms of 60-70%, although it has also been used in combination with the use of orthoses or preoperatively, as in the study published by Kerrigan and Stanwix in 2009, in which it was concluded that the most successful and cost-effective management strategy for TF is the algorithm of two steroid injections before surgical intervention.<sup>10,11</sup>

A systematic review published by Fleisch, et al in 2007, documented a 56% success rate with single steroid injection, while Lewis et al sought to document serial steroid injection, finding much more encouraging results, with symptom remission rates of 66.3%, 79.4% and 79.6% in the first, second and third injection, respectively.<sup>12</sup>

Injection of steroids into the tendon sheath is a procedure that can be performed in an office, as long as the necessary aseptic conditions are available. Several drugs have been used to do this, among them the most frequently used are prednisolone, dexamethasone and triamcinolone, all with a good success rate and without clear superiority of one over the other for the relief of symptoms. Prior localization of the nodule is recommended, as well as marking with indelible ink for better orientation prior to puncture. Likewise, the use of bupivacaine or some other anesthetic with a long half-life is recommended before infiltrating the steroid.

Well-identified risk factors in various clinical studies for obtaining satisfactory results with steroid injection therapy without other adjunctive treatment (Table 1) are: female

patients, patients with involvement of only one finger, duration of symptoms <4 months), without comorbidities (e. g., RA, diabetes mellitus).<sup>13-17</sup>

**Table 1: Poor prognostic factors in steroid injection into the tendon sheath.<sup>13-17</sup>**

<b>Factors</b>
<b>Male patients</b>
<b>Patients with involvement of two or more fingers</b>
<b>Duration of symptoms &gt;4 months</b>
<b>Comorbidities (e. g., RA, diabetes mellitus)</b>

**Orthosis**

Lundsford et al published in 2017 a systematic review 11, which included a total of 7 studies with 297 patients, in which the utility of the orthosis for the management of TF was evaluated. In it, the success in the management of the TF was evaluated in patients in whom orthoses were used, demonstrating a positive effect in reducing pain after using a device, as well as a change in the stages of the TF scale scores (Table 2).<sup>18,19</sup>

**Table 2: Green classification of trigger finger.<sup>17</sup>**

<b>Classification</b>
<b>Grade I</b> Palm pain and tenderness at A1 pulley
<b>Grade II</b> Catching of digit
<b>Grade III</b> Locking of digit, passively correctable
<b>Grade IV</b> Fixed, locked digit

**Surgical treatment**

Surgical treatment represents the technique of choice in patient’s refractory to steroid therapy and orthosis. A Cochrane review published in 2019 by Fiorini et al made a comparison between isolated steroid injection verses surgical treatment, considering two techniques: open surgery and steroid injection into the tendon sheath.<sup>19</sup> Based on two trials including 270 participants, symptom resolution without recurrence was achieved in 92% of cases with open surgery, while a 61% success rate was observed with steroid injection. Regarding pain, which was evaluated as its presence or absence after 7 days after the procedure, it was found that more people had pain with open surgery verses steroid injection (33% verses 66%). When analyzing trigger finger recurrence (6 to 12 months), it was found that fewer people had recurrence of symptoms with open surgery verses steroid injection (60% verses 3%). New devices have been designed to try to perform a minimally invasive surgical approach, one of them includes the ‘A-knife’ device, presented at the 10th Congress of the Asia-Pacific Federation of Societies of Surgery for the Hand, it is a scalpel designed in the shape of a scythe.<sup>20</sup> As the same as the original technique the nodule is located and marking it, to later make a 2 mm incision through which the scalpel is inserted and it is possible to cut, with subsequent release of A1-pulley.

Although it appears to be a promising tool due to the smaller healing surface, the fact of performing the procedure blindly could generate greater morbidity in the short term than that presented in open surgery. It is still a tool in the evaluation period, larger cohorts are needed to be able to compare it versus standard therapy.

## DISCUSSION

Faced with the various alternatives that exist for the management of trigger finger, treatment must be individualized. The characteristics of each patient can offer a range of complications and variable benefits with respect to each procedure. For example, in patients with diabetes, according to the evidence presented above, the injection of steroids into the tendon sheath would be inconvenient, in which case the patients could directly benefit from surgical release of the flexor tendon. However, patients with a low symptom rate and no risk factors may be candidates for steroid injection alone or a combination steroid injection and orthosis.

On the other hand, regarding surgical management, the indications after the administration of the steroid injection are not clearly established regarding the time or the number of sessions, which leaves the exact time of the surgery to be judged by the surgeon.

## CONCLUSION

Despite the fact that trigger finger is a disease that has been identified and studied for many years, three well-established lines of treatment remain, which consist of steroid injection, orthosis alone or combined with steroid injection, or surgical management. All of them can offer good results if we individualize the management in each patient, with strengths and weaknesses according to the parameter that we evaluate. The treatment that could be summarized as the one that offers the best definitive result is surgery, while the cheapest, fastest, least morbid and with a good cost-benefit ratio is injection with steroids into the tendon sheath. There are novel therapies and devices that can reduce the sequelae of surgical management, however there is still a lack of sufficient evidence to assess their superiority over conventional surgical treatment.

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