Trigger Finger after Carpal Tunnel Syndrome Release

(Review Article)

Abstract

Carpal Tunnel Syndrome (CTS) is the most common idiopathic neuropathic compression syndrome in the upper extremity, with a reported prevalence of 2.7% in the general population. Trigger Finger (TF) is a common upper limb disorder characterized by the painful locking of one or more fingers. A review of the literature, and personal experiences of the authors indicates that the occurrence of Trigger Finger after Carpal Tunnel Syndrome surgery is significantly higher in patients with CTS compared to those without CTS, though this increase in incidence has not definitively been linked to the surgery. In most studies, thumb has been the most commonly involved finger in association with CTS; however, in some cases, the third finger was more common. In contrast, when TF occurs alone, the fourth finger is typically the most frequently affected finger with triggering in the fourth one.

Keywords: Trigger finger disorder, Carpal tunnel syndrome, Tenosynovitis.

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Introduction

Carpal Tunnel Syndrome (CTS) is the most common idiopathic neuropathic compression disorder of the upper extremity, with an incidence of 2.7% in the general population[(1)]. In this condition, the median nerve is compressed as it passes beneath the flexor retinaculum of the wrist, leading to symptoms associated with this compression. The most common symptom of CTS, as observed in multiple studies, is numbness and tingling along the path of the median nerve, primarily occurring at night and progressively worsening. In more advanced stages, patients may present with atrophy of the thenar muscles and hand weakness[(2)]. Trigger Finger (TF) is a common disorder of the upper limb, characterized by the painful locking of one or more fingers. It occurs when the deep flexor tendon becomes trapped between the A1 and A2 pulleys, leading to an inability to extend the finger. The most common presentation of TF is tenderness along the A1 pulley, although more severe forms can occur. The condition starts with localized pain and tenderness at the A1 pulley near the proximal metacarpophalangeal joint, eventually leading to a finger locking in a flexed position, unable to be straightened[(2)]. Both CTS and TF are among the most common reasons for seeking hand surgery, with CTS surgeries representing some of the most frequently performed procedures. However, the etiology of both conditions remains largely unknown and is considered multifactorial. The concurrence of CTS and TF is well-documented, with studies reporting this rate to be ranging from 11% to 40%. The relationship between CTS and TF, however, is not fully understood. It remains unclear whether the concurrent occurrence is due to a common underlying cause or whether one condition predisposes the individual to the development of the other. Recent studies have shown a significant association between the development of TF following CTS surgery, but it is still uncertain whether this association is coincidental, arises from a shared etiology, or whether the surgical intervention itself contributes to the onset of TF. This paper aims to review the existing literature concerning the occurrence of TF after CTS treatment and to provide an overview of the various perspectives on the relationship between CTS surgery and TF.

Methods

All available articles published between 2000 and 2023 were reviewed from databases including Google Scholar, PubMed, and ResearchGate using the keywords "CTS and TF," "TF After CTS," and "Concomitant CTS & TF." In total, 19,700 articles were reviewed. Exclusion criteria included studies that explored underlying conditions such as diabetes, thyroid disorders, and rheumatologic diseases, as well as case reports that focused on the concurrent occurrence of these conditions. After applying these exclusion criteria, approximately 190 articles remained for review. Among these, 18 articles specifically analyzing the incidence of TF after CTS surgery were selected for further analysis.

Results and Discussion

In 1957, Jacobs et al. first introduced the topic by presenting a patient who, after undergoing CTS surgery, developed symptoms of TF. They raised the question of whether the surgery led to the onset of TF.

Later, in 1970, Hombol and Owen conducted a study on 124 CTS patients undergoing surgery and found that 21.9% of them (equivalent to 29 patients) developed TF symptoms post-surgery. In this study, they concluded that most of these patients were female (with a ratio of 27:2), and TF symptoms typically appeared 4 to 6 weeks after CTS surgery. In these individuals, the dominant hand was more frequently affected than the non-dominant hand, with the thumb being the most commonly affected digit, followed by fingers 4 and 3. The authors believed that the release of the transverse retinaculum and the subsequent exposure of the flexor tendons increased friction between the tendons, leading to a higher incidence of TF[3,4].

This theory later gained considerable attention, and some surgeons believe that increased swelling after CTS surgery may trigger an inflammatory process and lead to TF[5,6,7,8].

In 2017, Lir demonstrated that the risk of developing TF after CTS peaked in the first six months post-surgery[5]. This supported the theory that when edema and inflammation are at their highest after surgery, TF incidence increases. In 2000, AssnquS and colleagues, while examining TF patients, found that many of them had a history of CTS and its surgery[6].

In 2010, Dr. Gashtasbi et al. at the New York Hand Surgery Center conducted a large-scale study on 1,097 patients who had undergone CTS surgery. They found, in this retrospective study, that 50 patients (6.3%) developed TF after CTS surgery. Although this percentage was lower compared to other concurrent studies, it was justifiable since the study excluded individuals who had pre-existing symptoms suggestive of TF before surgery[7].

Dr. Gashtasbi's study also explored the risk factors (RFs) for developing TF after CTS surgery and identified four main risk factors: osteoarthritis, thyroid diseases, endoscopic surgery, and the use of soft bandages (without casts or splints) after CTS surgery.

They also found that other factors, including diabetes, CTS severity (based on nerve conduction studies), age, gender, occupation, tobacco use, and cardiovascular diseases, did not show a significant role in the development of TF post-CTS surgery. Among the related RFs, osteoarthritis had the most established impact. They proposed that the presence of osteoarthritis, due to its inflammatory nature, predisposes individuals to both CTS and TF. In cases where CTS symptoms develop first and the person undergoes surgery, the inflammation and edema caused by the surgery can interfere with tendon glide and lead to TF symptoms.

Moreover, subsequent studies suggested that endoscopic surgery for CTS increases the risk of TF development after surgery. The proposed theory is that using the endoscopic portal traumatizes the tendon path, causing friction and ultimately leading to TF[9,10]. This study also indicated that using light bandages, as opposed to casts or splints, could increase the risk of TF after surgery, although later studies have refuted this claim.

In Hayashi's 2001 study, their confirmed theory showed that 113 CTS hands were surgically treated, and 80 hands were treated conservatively. They found that TF occurrence was significantly higher in the surgically treated group compared to the other group[11].

In 2005, Harada and colleagues, during a study to evaluate RFs for TF, found that 101 patients who developed TF within a year of CTS surgery had been operated on for CTS. In this study, the thumb was the most commonly affected digit. The authors believed

that individuals might have had early signs of flexor tendon narrowing before CTS surgery, and the inflammation and edema following surgery could have triggered the symptoms, indicating that CTS surgery and the release of the retinaculum did not necessarily cause TF[12].

In 2019, Dezhang et al. conducted a retrospective study on 1,386 CTS patients. They found that 147 patients developed TF in the year before surgery, and 81 patients developed TF a year after surgery. They identified several factors that positively influenced the likelihood of developing TF after CTS surgery, including older age, high BMI, diabetes, and higher education levels. The most commonly affected digit was the middle finger, followed by the thumb. This study contradicted Dr. Gashtasbi's findings, where the thumb was the most commonly affected digit, and questioned the theory that flexor tendon glide in the thumb was most affected post-surgery[13].

LEE et al., in 2014, showed that by performing ultrasound on patients who had undergone CTS surgery, they could confirm changes in the prominence and glide of the flexor tendons post-surgery. They concluded that these factors could predispose individuals to TF[14].

In 2017, Jansen et al. conducted a case-control study comparing TF incidence in individuals who underwent CTS surgery and those without CTS. They found that individuals with CTS surgery were 3.6 times more likely to develop TF than the control group[15]. Similar to most studies, the thumb was the most commonly affected digit[15].

In 2020, Le Doigt et al. conducted a study on 467 CTS patients who had undergone surgery and found that 13.5% of them developed TF, with the earliest onset being 2 weeks post-surgery. The most commonly affected digit was the thumb, and none of the RFs examined, including age, occupation, BMI, and diabetes, showed a positive effect on TF incidence[16].

In 2022, the most recent article by Zouren E et al. reported on a large-scale retrospective study of 22 million CTS patients. They found no significant difference in TF incidence between those who underwent surgery and those who did not, with a higher incidence of TF in individuals who had not undergone surgery. Similar findings were confirmed by Wessel LE et al.[17,18]. The middle finger was the most commonly affected digit in this study, followed by the thumb[19,20]. Most articles have reported diabetes as an independent factor in TF development after CTS.

Conclusion

Our findings in this review revealed that the incidence of TF after CTS surgery is significantly higher than in individuals without CTS; however, it does not conclusively prove that this increase in incidence is directly related to the surgery itself. In most of the studies, the thumb was the most commonly affected digit in conjunction with carpal tunnel syndrome. However, in some cases, the third finger was more frequently involved. In all cases, unlike isolated occurrences, TF usually manifests with the fourth finger being the most commonly affected digit in conjunction with carpal tunnel syndrome.

Although some experts emphasize the superiority of endoscopic surgery for CTS over open surgery, there are studies highlighting significant disadvantages in using the endoscope, which must always be taken into consideration. Our review also revealed that there is still no definitive opinion on the optimal type of dressing following CTS surgery. While the authors of this paper have found, based on their experience, that splinting or immobilization post-surgery has no positive effects, they consistently use non-immobilizing dressings.

Overall, a key takeaway from our review is that in all patients presenting with CTS or TF, secondary disorders and systemic diseases must be carefully considered.

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