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Surgical treatment of trigger finger in adults

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Abstract

Background: Trigger finger (TF) is a common stenosing tenosynovitis characterized by painful catching or locking of the flexor tendon of the finger. In this study, we evaluated the results of patients diagnosed with TF who underwent A1 pulley release through open incision. **Methods:** Between January 2024 and April 2025, 211 patients (161 females, 50 males; mean age 59.4 ± 11.05 years; range, 18-86 years) with a diagnosis of TF who underwent open A1 pulley release were included in the study. **Results:** Involvement was on the right in 124 (58.7%) hands and on the left in 87 (41.2%) hands. The thumb was affected in 62 (50%), second finger in 9 (7.2%), third finger in 22 (17.7%), fourth finger in 28 (22.6%), and fifth finger in 3 (2.4%) of those with right hand involvement. In the left hand, 56 (64.4%) involved the thumb, 2 (2.3%) the second finger, 15 (17.2%) the third finger, 11 (12.6%) the fourth finger, and 3 (3.4%) the fifth finger. The mean follow-up period was 7.8 ± 4.9 (range, 1-16) months. Postoperative recurrence rates were as no recurrence in 206 (97.6%) patients and recurrence in 5 (2.4%) patients. **Conclusions:** The open release method we applied in the surgical treatment of TF is an effective and reliable method in that all anatomical structures, especially the A1 pulley, are visible, reducing the development of neurovascular complications and allowing the A1 pulley to be completely loosened.

Key words: Trigger finger, tenosynovitis, hand surgery, open surgery, A1 pulley

Introduction

Trigger finger (TF) is a common stenosing tenosynovitis characterized by painful catching or locking of the flexor tendon of the finger [1]. TF develops as a result of hypertrophy and inflammation at the tendon sheath interface, together with narrowing of the flexor tendon sheaths [1-3]. It is a common lesion in the hand, causing pain and dysfunction [1-3]. While painful catching occurs in the flexor tendons with finger movements, it may also result in flexion contracture of the proximal interphalangeal joint in the later period [1-3]. TF classically occurs in the A1 tendon sheath located in the metacarpophalangeal joint, which is the proximal part of the tendon sheath. However, it can also be seen rarely in A2 or A3 [1-5]. The lifetime prevalence of TP is 2.6%. More than one finger can be affected simultaneously [1-5]. The thumb, third and fourth fingers, and dominant hand are most commonly affected [1-3]. TF can usually be seen as trigger thumb in children [1-3]. The etiology of TF is diverse [1-8]. Carpal tunnel syndrome can be associated with certain comorbid diseases such as diabetes, amyloidosis, gout, thyroid disease, and rheumatoid arthritis [1-8]. Etiologic factors such as repetitive trauma forces, grasping movements, and increased palm pressure lead to hypertrophy and inflammation of the tendon and its sheath, causing a catching and locking sensation due to the inability to slide smoothly within the sheath [1,2,6]. Although there is no definitive imaging method, ultrasound is the preferred imaging method to evaluate this condition [1-3]. Diagnosis is usually made by physical examination [1,3].

Diagnosis of TF is based on Green's classification; Grade I: pain and tenderness of the A1 pulley; Grade II: compression during flexion and extension of a finger or thumb; Grade III: locking requiring use of the contralateral hand to open the finger after flexion. Rarely, Grade IV patients present with a locked finger that cannot be extended even passively [1,4]. There are many methods for the treatment of TF [4]. Conservative treatment methods include physical therapy, splint application, and injection of steroids or local anesthetics into the lesion [1-6]. In cases where conservative treatment fails, surgical release of the first annular (A1) pulley at the level of the metacarpal head is the main method used [1-5].

In this study, the results of adult TF patients who underwent A1 pulley release with the open incision method were evaluated.

Materials and methods

Between January 2024 and April 2025, 211 patients (211 fingers; 161 females, 50 males; mean age 59.4 ± 11.05 years; range 18 to 86 years) with a diagnosis of TF who underwent open A1 pulley release were included in the study (Table 1). The inclusion criteria were pain and tenderness on palpation at the A1 pulley level, pain on flexion or extension of the finger, palpable nodules, locking or triggering of the finger. All patients had palpable painful nodules and triggering during flexion and extension movements on the A1 pulley on the fingers. When the patients were graded according to the Green classification, all patients were found to be stage III [4]. This retrospective study involving human participants was conducted in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Table 1. Demographic characteristics of the patients.

Number of patients	211
Age, mean ± SD (range)	53.59 ± 11.05 (18-86)
Gender, n (%)	
Woman	161 (76.3)
Man	50 (23.7)
Follow-up duration, months, mean ± SD (range)	7.8 ± 4.9 (1-16)
Localization, n (%)	
Right hand	124 (58.7)
Thumb	62 (50)
Index finger	9 (7.2)
Middle finger	22 (17.7)
Ring finger	28 (22.6)
Pinky finger	3 (2.4)
Left hand	87 (41.2)
Thumb	56 (64.4)
Index finger	2 (2.3)
Middle finger	15 (17.2)
Ring finger	11 (12.6)
Pinky finger	3 (3.4)

SD: standard deviation

Surgical technique

All patients underwent surgical procedures under local anesthesia and without a tourniquet. A transverse incision of approximately 1 cm in length was made over the A1 pulley of the affected finger. The deep plane was reached by dissection, protecting the vascular and nerve bundles with finger retractors. After the A1 pulley was exposed by dissection, it was carefully loosened longitudinally. At the end of the loosening process, the finger was made to perform active flexion and extension movements to check whether the obstruction continued (Figure 1). The flexor tendon was retracted and the tendon area and bed were checked. The skin was sutured. Active and passive flexion-extension movements of the finger were started immediately after the surgery. The skin sutures were removed at the end of the 15th day on average. The patients were evaluated in terms of infection, painful scar formation at the incision site, reflex sympathetic dystrophy (RSD), and recurrence at the final controls after the surgery. The patients were asked about their satisfaction with the surgical results and categorized as successful and recurrence.

Results

Involvement was on the right hand in 124 (58.7%) and on the left hand in 87 (41.2%). The thumb was affected in 62 (50%), the second finger in 9 (7.2%), the third finger in 22 (17.7%), the fourth finger in 28 (22.6%), and the fifth finger in 3 (2.4%) of those with right hand involvement. In those with left hand involvement, the thumb was affected in 56 (64.4%), the second finger in 2 (2.3%), the third finger in 15 (17.2%), the fourth finger in 11 (12.6%), and the fifth finger in 3 (3.4%).

No complications were encountered during surgery. Postoperative pain and snapping sensations in the finger disappeared in all patients. The mean follow-up period was 7.8 ± 4.9 (range, 1-16) months. No postoperative limitation of motion, bowstring phenomenon, or painful scar formation at the incision site were found in any patient. Again, no nerve injury, infection or RSD was observed in any of our patients. All patients returned to their normal daily activities without any problems. Postoperative recurrence rates were as no recurrence in 206 (97.6%) patients and recurrence in 5 (2.4%) patients.

Discussion

TF treatment usually begins with nonsurgical interventions for at least three months [6]. Splinting is an effective treatment for TF and provides a healing rate of approximately 60%; however, its disadvantage is that it is applied for 6 to 9 weeks [1,2,6]. Steroid injection is also a very effective treatment method. Preferably, methylprednisolone acetate or betamethasone dipropionate is used in the osteofibrous tunnel for a maximum of 2 infiltrations at least 1 month apart [6,7]. Side effects of steroid injection include pain, bleeding, steroid flare reaction, infection, and transient increase in blood sugar levels in diabetic patients [3,7]. Tendon rupture may also occur rarely [2,3,7].

Percutaneous or open A1 pulley release is usually indicated when nonsurgical treatment methods fail [1-3,6,7]. Surgical methods include open surgery, endoscopic or percutaneous pulley release techniques, which have become widespread in recent years [5-7]. Each method has advantages and disadvantages over the other.

Open surgical release has a high success rate with minimal morbidity and recurrence. Therefore, open surgical release is considered the gold standard [5,9,10]. However, it is more costly than other methods [6]. Although rare in open surgical interventions, complications such as painful scar tissue formation, bowstring phenomenon, neurovascular injury, and infection can be seen [5,7-9,10]. Complications occur especially in the applications of inexperienced surgeons [1-4,9,10].

Percutaneous release can be performed with or without USG guidance [6-8,9]. Percutaneous release is preferred by more and more surgeons over traditional open surgical interventions due to its simplicity and ease of application and low cost (Video 1) [2,6-9]. Potential disadvantages of the percutaneous technique are limited visibility, inability to provide complete release, and the possibility of nerve or tendon damage during application [5,6-10]. In some

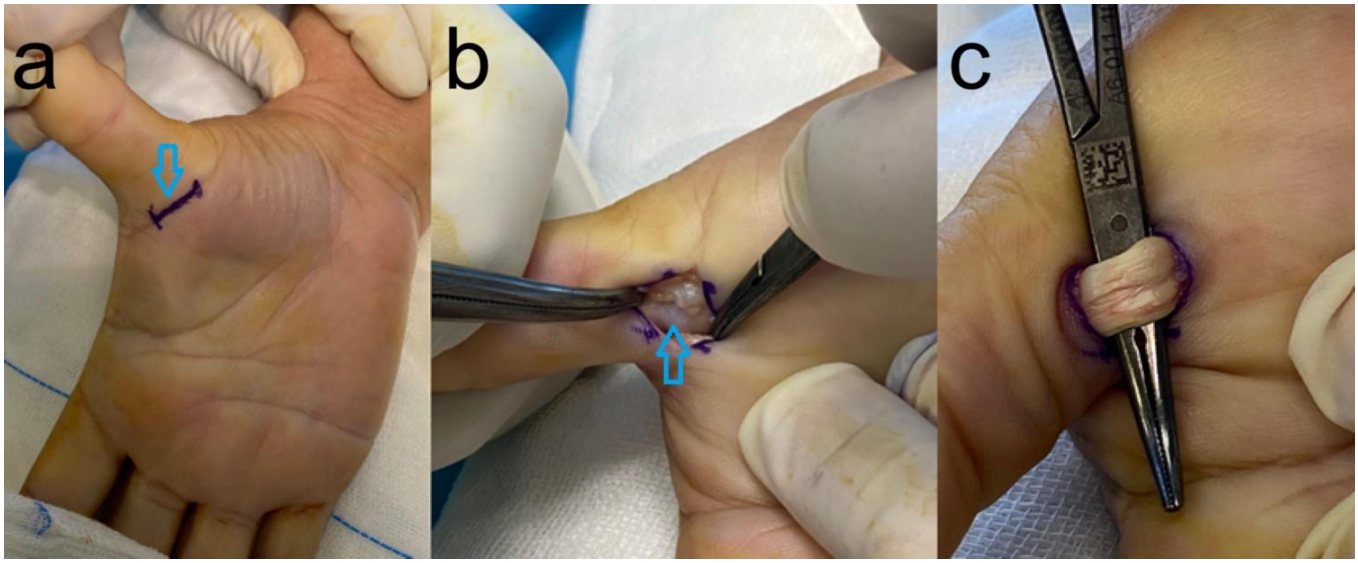

Fig. 1: a) Appearance of the transverse incision to be applied to the thumb of a patient with trigger finger, b) Appearance of the A1 pulley exposed after dissection, c) Appearance of the released thumb flexor tendon after dissection of the A1 pulley.

cadaver studies, it has been suggested that percutaneous release does not provide complete release in the pulley and damages the flexor tendon [2,5-10].

While there are authors who have revealed differences between the results of open release and percutaneous release methods, there are also authors who have reported high success rates for both techniques in terms of grip strength, active range of motion of the proximal interphalangeal joint and residual pain [2,6-10].

Providing early finger movements after surgery minimizes the development of joint contracture and scarring and allows the patient to return to daily activities earlier [4,5]. Our patients were given active and passive flexion-extension joint movement exercises as tolerated on the same day after surgery. At the end of the follow-up, our patient did not develop extension limitation, and PAM measurements were found to be normal at the last follow-up. There were some limitations to our study. The first was the lack of a comparison group. The second was the short follow-up period.

Conclusion

The open release method we applied in the surgical treatment of TF is an effective and reliable method in that all anatomical structures, especially the A1 pulley, are visible, reducing the development of neurovascular complications and allowing the A1 pulley to be completely loosened.

Author contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by TÖ, OD, ZK, HY. The first draft of the manuscript was written by T Ö and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Statements and declarations

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Conflict of Interest

The authors declare that they have no conflict of interest.

Ethical statement

The authors confirm that this retrospective study was conducted in accordance with the ethical standards set forth in the Declaration of Helsinki and its later amendments.

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