

The Effects of Different Treatment Procedures Applied to Trigger Finger on Recurrence

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ABSTRACT

Introduction: To investigate the effects of two different treatment methods on the recurrence rates within one year and on clinical and functional outcomes in patients with trigger finger (TF) complaints.

Methods: The files of 137 patients diagnosed with TF at our clinic between 2018 and 2022, who received two different treatments administered by two different physicians, were retrospectively reviewed. After applying the exclusion criteria, the study included 111 patients, of whom 66 underwent surgical release and were designated as group I, and 55 received steroid injections and were designated as group II. The Wolfe grading system was used to evaluate the severity of TF, and the Visual Analog Scale was employed to measure pain levels. Clinical and functional outcomes were assessed at the third and sixth months, and one year after treatment to evaluate the effect of each procedure on the development of recurrence.

Results: In group II, the distribution of grade II and grade IIIa recurrence in the first three and six months was found to be statistically significantly higher than in group I ($p=0.005$ and $p=0.045$, respectively). In the first year, the distribution of grade II, grade IIIa, and grade IIIb recurrences in group II was also significantly higher statistically compared to group I ($p=0.007$). No statistically significant difference was observed between group I and group II in terms of the distribution of improvement from baseline to the third and sixth months after treatment ($p=0.295$ and $p=0.118$, respectively). All patients in both group I and group II who experienced recurrence were treated surgically.

Conclusion: Although the ease of application and rapid effectiveness of steroid injection may appear advantageous compared to surgical methods in the treatment of TF, the high recurrence rates after the first six months negatively affect the potential for sustained success with steroid injection treatment.

Keywords: Trigger finger, surgical treatment, tendons, methylprednisolone acetate, rehabilitation, conservative treatment

Introduction

Trigger finger (TF), also known as stenosing tenosynovitis, is one of the most common hand disorders, affecting approximately 2-3% of the global population. Its annual incidence in the general population is 30 cases per 100,000, and its lifetime prevalence is 2.8%, with a particular frequency among women in their 50s and 60s (1,2). It is more commonly observed in the dominant hand, predominantly affecting the thumb, third, and fourth digits. Fibrous bands called pulleys, located along

the flexor tendon sheath in the hand, anchor the flexor tendons tightly to the phalanges during finger flexion and extension movements (2). Each finger has five distinct pulley regions extending distally from the metacarpophalangeal (MP) joint level on the palmar surface. TF develops as a result of stenosis caused by inflammation of the A1 pulley located at the MP joint level. This condition arises due to the disparity between the thickened and narrowed sheath and the flexor tendon. There is non-specific causative agent in the etiology of TF. Multiple etiological factors are considered to play a role.



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Risk factors for TF include diabetes, rheumatoid arthritis, strenuous hand activities, and female sex. It is observed with up to six times the frequency in women, and is most common during the fifth and sixth decades of life (3,4). In the pathophysiology of TF, the tendon experiences friction due to the significant degeneration of the fibrocartilaginous surface within the stenotic A1 pulley, which impedes tendon gliding. This friction leads to nodular changes in the tendon and inflammation manifested as hypervascularity in the flexor tendon (3-5). Over time, smooth motion of the flexor tendon within the A1 pulley becomes increasingly difficult. When the finger is flexed and the thickened nodule passes through the tight pulley, a catching or snapping sensation occurs, which is often painful. In severe cases of TF, the finger may become locked in a flexed position. Patients may occasionally need to use their other hand to manually extend the affected finger or thumb (5,6). Treatment options range from conservative methods such as splinting to corticosteroid injections: percutaneous release, or open surgical release. There is no definitive guideline for the treatment algorithm. The classic presentation of TF with clicking and locking is usually sufficient for diagnosis, however, patients may present with pain and swelling over the affected flexor sheath due to the acute symptom onset and avoidance of finger movement. Imaging plays no role in diagnosis (6-8).

In this study, we aimed to investigate the effect of two different treatment methods on recurrence development within one year in patients with TF complaints, based on clinical and functional outcome evaluations.

Methods

A retrospective review was conducted on the medical records of 137 patients diagnosed with TF who presented to our clinic between 2018 and 2022. The study was approved by the Sakarya University Non-Interventional Ethics Committee (approval number: E-71522473-050.01.04-216230-23, date: 31.01.2023). Patients who did not attend regular follow-ups, those with renal failure undergoing dialysis, those receiving oncological treatment, and those with coexisting Dupuytren's contracture in the hand were excluded from the study. Following the application of exclusion criteria, 111 patients were included in the analysis. Two treatment methods were applied by two physicians. A total of 66 patients who underwent surgical release under local anesthesia were designated as group I, and 55 patients who received a steroid injection (methylprednisolone acetate) into the A1 pulley were designated as group II. The severity of TF in patients was categorized using the Wolfe grading system.

Surgical procedures were performed under operating room conditions without the use of a tourniquet. After the subcutaneous administration of a local anesthetic (prilocaine hydrochloride) to the incision site, a 2-cm transverse incision was made, using the midpoint of the pulley as a reference. Care was taken to preserve vascular structures as the incision was deepened subcutaneously to reach the pulley. The pulley was released with a longitudinal incision extending proximally, and distally. Following the release, the tendons were assessed for any residual catching by performing flexion and extension movements of the finger (Figure 1). Upon confirmation of adequate release, and absence of locking, the anatomical layers were closed, and an elastic bandage was applied. Postoperatively, patients received a one-week course of oral

antibiotics and non-steroidal anti-inflammatory drug therapy. Passive exercises were initiated during the first postoperative week, followed by active exercises over the next two weeks. Sutures were removed on postoperative day 15.

In the steroid injection procedure, a mixture of 1 cc of long-acting steroid (methylprednisolone acetate) and 1 cc of local anesthetic, was administered over the pulley and tendon sheath. The steroid injection was administered only once by two physicians using a similar technique. No ultrasound or similar devices were used during the procedure; instead, an insulin injection was administered manually, using the midline of the pulley. These procedures were carried out under outpatient clinic conditions. Following both treatment modalities, the Wolfe grading system was used to assess the severity of TF based on flexion-extension movements of the fingers, while the Visual Analog Scale (VAS) was employed to evaluate pain levels. Clinical and functional outcomes were assessed at the third and sixth months, and one year after treatment in order to investigate the effect of the intervention on recurrence.

Statistical Analysis

In this study, statistical analyses were performed using the Number Cruncher Statistical System (NCSS) 2007 Statistical Software (Utah, USA) package. In the evaluation of data, descriptive statistical methods (mean $\pm$ standard deviation) were used, and the distribution of variables was assessed using the Shapiro-Wilk normality test. For variables with a normal distribution, comparisons between two groups were made using the Independent Samples t-test. For the comparison of categorical data, the chi-square test and Fisher's exact test were used. Results were considered statistically significant at a p-value of <0.05 .

Results

The mean age was 55.32 ± 8.96 years for group I and 57.64 ± 9.34 years for group II. The mean follow-up durations were 17.42 ± 4.14 months for group I and 16.80 ± 4.35 months for group II. Group I consisted of 66 patients (12 males and 54 females). In this group, 35 procedures were performed on the right extremity and 31 on the left. Group II included 55 patients, of whom 7 were male and 48 were female. In this group, 35 interventions were performed on the right side and 20 on the left (Table 1). In group I, 51 patients (77.27%) presented with TF in the first digit, while in group II, 43 patients (78.18%) had TF in the first digit. No statistically significant differences were observed between group I and group II in terms of mean age and sex distribution ($p=0.167$ and

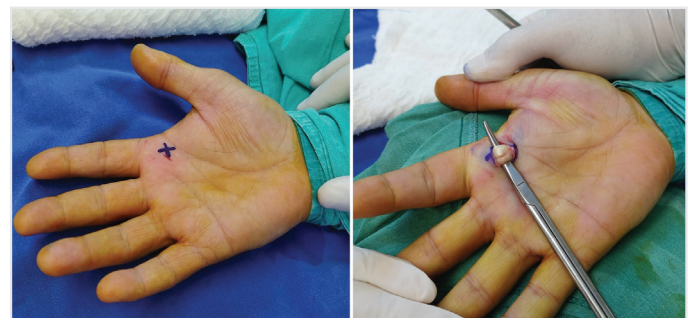


Figure 1. Trigger finger surgery (patient consent obtained)

$p=0.412$, respectively). Similarly, no statistically significant differences were identified in laterality or affected finger distribution between the groups ($p=0.239$ and $p=0.920$, respectively). The presence of comorbidities such as hypertension, vascular disease, chronic obstructive pulmonary disease, renal failure, heart disease, or rheumatoid arthritis showed no statistically significant differences between groups ($p>0.05$).

No statistically significant difference was observed between the groups in terms of the distribution of TF severity according to the Wolfe classification ($p=0.965$). However, in group II, the presence of grade II and grade IIIa recurrences at three and six months was significantly higher than in group I ($p=0.005$ and $p=0.045$, respectively). Similarly, during the first year, the distributions of grade II, grade IIIa, and grade IIIb recurrence in group II were significantly higher than in group I ($p=0.007$) (Table 2).

In group II, 8 patients (14.55%) showed no change and 4 patients (7.27%) had clinical worsening from pre-treatment to the one-year follow-up. These distributions were significantly higher than those in group I ($p=0.001$). No statistically significant difference was found between the groups regarding the distribution of clinical improvement from

pre-treatment to the third and sixth months ($p=0.295$ and $p=0.118$, respectively). However, the number of patients with no change ($n=8$, 14.55%) or worsening ($n=4$, 7.27%) at the one-year mark was again significantly higher in group II than in group I ($p=0.001$) (Figure 2). All patients in both groups who experienced recurrence underwent surgical release (Table 3).

No statistically significant difference was found between the pre-treatment mean VAS scores of the groups ($p=0.273$). At the third month after treatment, the mean VAS score in group I was significantly higher than in group II ($p=0.001$). However, at six months, group I had significantly lower VAS scores than group II ($p=0.001$), and at one year, group I showed significantly lower VAS scores ($p=0.0001$) (Table 4).

A statistically significant change was observed between pre-treatment and post-treatment three-month, six-month, and one-year mean VAS scores in group I ($p=0.0001$). Pre-treatment VAS scores were significantly higher than scores at all post-treatment timepoints ($p=0.0001$). Three-month VAS scores were significantly lower than both six-month and one-year scores ($p=0.0001$). Six-month scores were significantly higher than one-year scores ($p=0.0001$). Similarly, a statistically significant

Table 1. Comparison of demographic characteristics

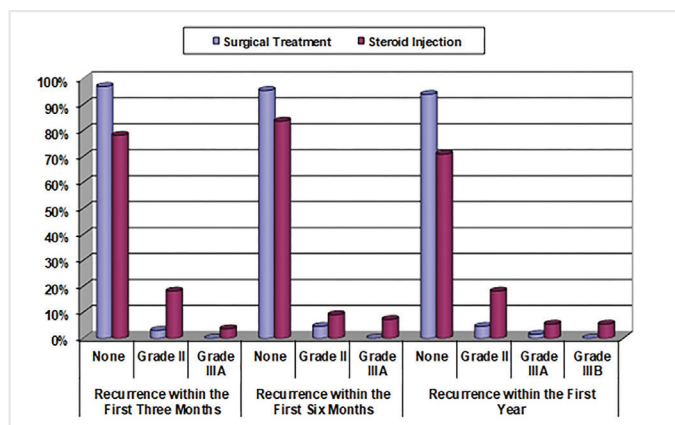
		Surgical release n=66		Steroid injection n=55		p
Age (years)		55.32±8.96		57.64±9.34		0.167*
Sex	Male	12	18.18%	7	12.73%	0.412 ⁺
	Female	54	81.82%	48	87.27%	
Affected side	Right	35	53.03%	35	63.64%	0.239 ⁺
	Left	31	46.97%	20	36.36%	
Affected finger	First digit	51	77.27%	43	78.18%	0.920 ⁺
	Second digit	7	10.61%	6	10.91%	
	Third digit	2	3.03%	1	1.82%	
	Fourth digit	5	7.58%	3	5.45%	
	Fifth digit	1	1.52%	2	3.64%	
Comorbidities	Absent	28	42.42%	33	60.00%	0.054 ⁺
	Present	38	57.58%	22	40.00%	
Hypertension	Absent	48	72.73%	41	74.55%	0.821 ⁺
	Present	18	27.27%	14	25.45%	
Diabetes	Absent	46	69.70%	49	89.09%	0.01 ⁺
	Present	20	30.30%	6	10.91%	
Vascular disease	Absent	64	96.97%	53	96.36%	0.998 [†]
	Present	2	3.03%	2	3.64%	
COPD	Absent	64	96.97%	55	100.00%	0.501 [†]
	Present	2	3.03%	0	0.00%	
Renal failure	Absent	61	92.42%	52	94.55%	0.640 ⁺
	Present	5	7.58%	3	5.45%	
Heart disease	Absent	63	95.45%	55	100.00%	0.250 [†]
	Present	3	4.55%	0	0.00%	
Rheumatoid arthritis	Absent	64	96.97%	50	90.91%	0.155 ⁺
	Present	2	3.03%	5	9.09%	

*Independent Samples t-test, ⁺Chi-square test, [†]Fisher's exact test
COPD: Chronic obstructive pulmonary disease

Table 2. Comparison of recurrence rates between groups

		Surgical release n=66		Steroid injection n=55		p
Trigger finger severity (Wolfe classification)	Grade II	29	43.94%	24	43.64%	0.965 ⁺
	Grade IIIa	22	33.33%	18	32.73%	
	Grade IIIb	9	13.64%	9	16.36%	
	Grade IV	6	9.09%	4	7.27%	
Recurrence within three months	None	64	96.97%	43	78.18%	0.005 ⁺
	Grade II	2	3.03%	10	18.18%	
	Grade IIIa	0	0.00%	2	3.64%	
Recurrence within six months	None	63	95.45%	46	83.64%	0.045 ⁺
	Grade II	3	4.55%	5	9.09%	
	Grade IIIa	0	0.00%	4	7.27%	
Recurrence within one year	None	62	93.94%	39	70.91%	0.007 ⁺
	Grade II	3	4.55%	10	18.18%	
	Grade IIIa	1	1.52%	3	5.45%	
	Grade IIIb	0	0.00%	3	5.45%	

*Chi-square test

**Figure 2.** Comparison of recurrence rates within the first year

change was observed among all follow-up timepoints in group II ($p=0.0001$). Pre-treatment VAS scores were significantly higher than those at all post-treatment times ($p=0.0001$). While three-month scores were significantly lower than one-year scores ($p=0.0001$), there was no statistically significant difference between three-month and six-month scores ($p=0.619$). However, six-month scores were significantly lower than one-year scores ($p=0.0001$, Table 5).

The difference in VAS scores between pre-treatment and the three-month follow-up in group I was significantly lower than in group II ($p=0.012$). No statistically significant difference was found between the groups regarding the change in VAS scores from pre-treatment to the six-month follow-up ($p=0.414$) (Figure 3). However, the change from pre-treatment to the one-year follow-up was significantly greater in group I than in group II ($p=0.0001$) (Table 6).

Discussion

TF is a condition characterized by painful locking or catching of the fingers due to inflammation of the flexor tendon sheath, caused by

various factors (9). During flexion and extension movements, the gliding motion of the flexor tendon becomes obstructed. TF has a prevalence of approximately 2.8% in the general population and up to 12% among patients with diabetes (9,10). Although it may be perceived as a simple condition, it can significantly impact daily life and functional capacity. Histological evaluation of the affected tissues suggests fibrocartilaginous metaplasia of the tendon sheath and the A1 pulley as a secondary response to inflammation. There are multiple treatment options for TF; however, determining the method that offers the highest clinical success and lowest recurrence rate remains a subject of debate (10,11). In our study, which examined the effect of two different treatment modalities on recurrence rates within one year, we observed that both methods yielded comparable clinical and functional outcomes at three and six months, with no significant difference in recurrence rates during this period. Nevertheless, after the six-month mark and within the first year, patients treated with steroid injections demonstrated a significant decline in clinical and functional outcomes, along with a notable increase in recurrence rates compared to the surgical group. We therefore conclude that surgical intervention should be the preferred method to achieve a durable and effective outcome in the treatment of TF.

Guillén Astete et al. (12) reported that steroid injections in grade II and III TF cases, achieved clinical and functional success rates of up to 70% in the early months, but recurrence rates increased significantly after 12 months. Emphasizing the importance of appropriate patient selection, the authors advocated for prompt surgical release in advanced-stage cases. In another study, Patrinely et al. (13) highlighted that the mixture of local anesthetic with steroid provided a painless and comfortable treatment option for TF, with high success rates. Gil et al. (14) stated that releasing the A1 pulley effectively reduced both the subjective and objective findings of TF and remains the reference procedure in its treatment. In addition, they reported that prophylactic antibiotic use in elective hand surgery cases was unnecessary. In our study, however,

Table 3. Comparison of improvement rates between groups

Improvement		Surgical release n=66		Steroid injection n=55		p
Pre-treatment to post-treatment month 3	No change	0	0.00%	1	1.82%	0.295 ⁺
	Improvement	66	100.00%	53	96.36%	
	Worsening	0	0.00%	1	1.82%	
Pre-treatment to post-treatment month 6	No change	0	0.00%	2	3.64%	0.118 ⁺
	Improvement	66	100.00%	53	96.36%	
Pre-treatment to post-treatment year 1	No change	1	1.52%	8	14.55%	0.001 ⁺
	Improvement	65	98.48%	43	78.18%	
	Worsening	0	0.00%	4	7.27%	

⁺Chi-square test, [†]Fisher's exact test

Table 4. Comparison of VAS scores of groups by follow-up timepoints

VAS score		Surgical release n=66	Steroid injection n=55	p
Pre-treatment	Mean $\pm$ SD	7.76 $\pm$ 0.77	7.93 $\pm$ 0.74	0.273
	Median (IQR)	8 (7-8)	8 (7-8)	
Post-treatment month 3	Mean $\pm$ SD	1.89 $\pm$ 0.81	1.64 $\pm$ 1.25	0.001
	Median (IQR)	2 (1-2)	1 (1-2)	
Post-treatment month 6	Mean $\pm$ SD	1.38 $\pm$ 0.92	1.78 $\pm$ 1.27	0.001
	Median (IQR)	1 (1-2)	2 (1-2)	
Post-treatment year 1	Mean $\pm$ SD	0.73 $\pm$ 1.44	3.33 $\pm$ 2.49	0.0001
	Median (IQR)	0 (0-1)	2 (1-6)	
p [‡]		0.0001	0.0001	

[†]Mann-Whitney U test, [‡]Friedman test

VAS: Visual Analog Scale, SD: Standard deviation, IQR: Interquartile range

Table 5. Multiple comparisons by follow-up timepoints in treatment groups using Dunn's multiple comparison test

Dunn's multiple comparison test	Surgical release n=66	Steroid injection n=55
Pre-treatment vs. post-treatment month 3	0.0001	0.0001
Pre-treatment vs. post-treatment month 6	0.0001	0.0001
Pre-treatment vs. post-treatment year 1	0.0001	0.0001
Post-treatment month 3 vs. month 6	0.0001	0.619
Post-treatment month 3 vs. year 1	0.0001	0.0001
Post-treatment month 6 vs. year 1	0.0001	0.0001

patients who underwent surgery were prescribed a one-week course of oral antibiotics.

Mirza et al. (15) compared postoperative complications of open and endoscopic release techniques in TF surgery and found that both methods were effective, with comparable rates of minor postoperative complications. Pompeu et al. (16) concluded that in advanced cases of TF, steroid injections did not yield satisfactory clinical or functional outcomes and were ineffective against flexion contractures. They recommended prompt release of the A1 pulley in such cases and drew attention to the risk of permanent extension deficits after release. Effendi et al. (17) reported that while major complications after release

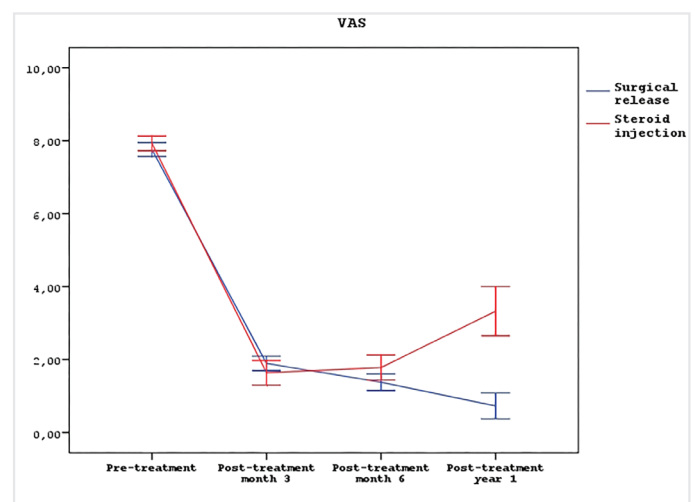


Figure 3. Graphical representation of changes in VAS scores over time by treatment group
VAS: Visual Analog Scale

surgery were rare, patients with poorly controlled diabetes might experience higher postoperative infection rates, which could potentially lead to severe wound complications and necrosis. In our study, no serious complications such as wound issues, infections, necrosis, or flexor tendon rupture were observed in diabetic patients. Notably, we

Table 6. Comparison of pre-treatment to follow-up differences in VAS scores between treatment groups				
VAS score		Surgical release n=66	Steroid injection n=55	p [†]
Pre-treatment- post-treatment month 3 difference	Mean ±SD	5.86±1.14	6.29±1.4	0.012
	Median (IQR)	6 (5-7)	7 (6-7)	
Pre-treatment - post-treatment month 6 difference	Mean ± SD	6.38±1.11	6.15±1.48	0.414
	Median (IQR)	6.5 (6-7)	6 (6-7)	
Pre-treatment - post-treatment year 1 difference	Mean ± SD	7.03±1.38	4.6±2.72	0.0001
	Median (IQR)	7 (7-8)	5 (2-7)	
†Mann-Whitney U test VAS: Visual Analog Scale, SD: Standard deviation, IQR: Interquartile range				

observed that patients receiving steroid injections experienced less relief after six months, and their symptoms approached their pre-treatment levels. In a study involving 192 patients with and without diabetes, Stirling et al. (18) reported a high rate of patient satisfaction (96%) with surgical treatment for TF, and found comparable improvements in both groups. In another study, Koopman et al. (19) found a complication rate as high as 17% following surgical release for TF, but noted that it was clinically insignificant. Despite the complication rate, the authors emphasized that surgery should be the primary treatment choice due to its effectiveness in reducing recurrence. Çimen and Nami (20) stated that percutaneous release was a safe and successful method in TF surgery and that neither diabetes nor prior steroid injections affected clinical outcomes. In a study on the management of TF by orthopedic surgeons in Brazil, Silva et al. (21) found that steroid injections and non-steroidal anti-inflammatory drug therapy were typically used within the first month to three months. However, for persistent or recurrent cases after the third month, surgical release was preferred. Roberts et al. (22) investigated the efficacy of different steroid preparations in TF cases and found that patients treated with methylprednisolone required surgical release more frequently and earlier than those treated with triamcinolone or dexamethasone.

Study Limitations

This study has several limitations. First, the retrospective design and lack of randomization prior to treatment may limit the generalizability of the findings. Second, the subjective assessment of TF severity through physical examination introduces the possibility of measurement error. Third, the sample size may be insufficient to draw definitive conclusions. Therefore, future prospective studies involving a larger number of patients and a broader spectrum of comorbidities are warranted to address these limitations.

Conclusion

Although the simplicity and rapid effectiveness of steroid injection may provide clinical and functional results comparable to surgery in the first six months, the markedly higher recurrence rates beyond six months negatively affect the long-term and permanent success of this treatment method. Our study demonstrates that surgical treatment of TF results in significantly lower recurrence rates within the first year compared to treatment with steroid injection. We emphasize that surgical intervention should be considered a primary treatment option

to achieve lasting and effective outcomes in TF management. We hope that this study will contribute to future research in the treatment of this condition, and believe that further studies including a greater number of patients and more variables are needed.

Ethics

Ethical Approval: The study was approved by the Sakarya University Non-Interventional Ethics Committee (approval number: E-71522473-050.01.04-216230-23, date: 31.01.2023).

Informed Consent: Retrospective study.

Footnotes

Authorship Contributions: Surgical and Medical Practices - B.A., Y.Ö., F.U.; Concept - B.A., A.D., M.A., E.Ş.; Design - B.A., A.D., M.B.B., Y.Ö., F.U.; Data Collection or Processing - B.A., M.B.B., M.A., E.Ş.; Analysis or Interpretation - B.A., F.U.; Literature Search - B.A., A.D., M.B.B., M.A., F.U.; Writing - B.A., A.D., Y.Ö.

Conflict of Interest: No conflict of interest was declared by the authors.

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References

1. Bridges TN, Kasper AA, Sherman MB, Matzon JL, Ilyas AM. Trigger finger release: are sutures requiring removal necessary? J Hand Surg Glob Online. 2023; 5: 740-3.
2. Belloti JC, Sato ES, Faloppa F. Trigger finger treatment. Rev Bras Ortop (Sao Paulo). 2020; 57: 911-6.
3. Bedrettin A, Mucahid Osman Y. Incidence of adductor tubercle tendinitis and its effect on clinical results in patients with genu varum undergoing high tibial osteotomy. Eur Rev Med Pharmacol Sci. 2023; 27: 144-50.
4. Kirby D, Donnelly M, Catalano W, Buchalter D, Glickel S, Hacquebord J. The effect of corticosteroid injections on postoperative infections in trigger finger release. Hand (N Y). 2023; 18: 430-5.
5. Wen J, Syed B, Khalil R, Shehabat M, Alam M, Sedighi R, et al. Percutaneous A1 pulley with corticosteroid injection for trigger finger release: a systematic review. J Orthop Surg Res. 2025; 20: 431.
6. Orhan SS. Percutaneous surgical treatment of trigger finger. Rev Bras Ortop (Sao Paulo). 2024; 59: e580-e3.
7. Panghate A, Panchal S, Prabhakar A, Jogani A. Outcome of percutaneous trigger finger release technique using a 20-gauge hypodermic needle. J Clin Orthop Trauma. 2020; 15: 55-9.

8. Levine N, Young C, Allen I, Immerman I. Percutaneous release of trigger finger with and without steroid injection a systematic review and meta-analysis. *Bull Hosp Jt Dis* (2013). 2022; 80: 137-44.
9. Lunsford D, Valdes K, Hengy S. Conservative management of trigger finger: a systematic review. *J Hand Ther*. 2019; 32: 212-21.
10. Hollins AW, Hein R, Atia A, Taskindoust M, Darner G, Shammass R, et al. Symptom duration and diabetic control influence success of steroid injection in trigger finger. *Plast Reconstr Surg*. 2022; 150: 357e-63e.
11. Akar B. The effects of different anesthetic approaches on recurrence in the surgical treatment of ganglion cysts. *J Med Palliat Care*. 2023; 4: 102-5.
12. Guillén Astete CA, Rodríguez López R, García Montes N. Determinants of therapeutic success of corticoids injections in trigger finger syndrome. *Reumatol Clin (Engl Ed)*. 2022; 18: 518-22.
13. Patrinely JR Jr, Johnson SP, Drolet BC. Trigger finger corticosteroid injection with and without local anesthetic: a randomized, double-blind controlled trial. *Hand (N Y)*. 2021; 16: 619-23.
14. Gil JA, Hresko AM, Weiss AC. Current concepts in the management of trigger finger in adults. *J Am Acad Orthop Surg*. 2020; 28: e642-e50.
15. Mirza A, Mirza J, Thomas TL, Zappia L, Abulencia J. Complications following endoscopic and open trigger finger release: a retrospective comparative study. *Hand (N Y)*. 2023; 18: 1089-94.
16. Pompeu Y, Aristega Almeida B, Kunze K, Altman E, Fufa DT. Current concepts in the management of advanced trigger finger: a critical analysis review. *JBJS Rev*. 2021; 9.
17. Effendi M, Yuan F, Stern PJ. Not just another trigger finger. *Hand (N Y)*. 2025; 20: 43-8.
18. Stirling PHC, Jenkins PJ, Duckworth AD, Clement ND, McEachan JE. Functional outcomes of trigger finger release in non-diabetic and diabetic patients. *J Hand Surg Eur Vol*. 2020; 45: 1078-82.
19. Koopman JE, Hundepool CA, Duraku LS, Smit JM, Zuidam JM, Selles RW, et al. Complications and functional outcomes following trigger finger release: a cohort study of 1879 patients. *Plast Reconstr Surg*. 2022; 150: 1015-24.
20. Çimen O, Nami Ş. Does surgical experience affect the outcomes during percutaneous release of the trigger finger? *Cureus*. 2023; 15: e46049
21. Silva PHJD, Moraes VY, Segre NG, Sato ES, Faloppa F, Belloti JC. Diagnosis and treatment of trigger finger in brazil - a cross-sectional study. *Rev Bras Ortop (Sao Paulo)*. 2021; 56: 181-91.
22. Roberts JM, Behar BJ, Siddique LM, Brgoch MS, Taylor KF. Choice of corticosteroid solution and outcome after injection for trigger finger. *Hand (N Y)*. 2021; 16: 321-5.