ORIGINAL ARTICLE

Short-term Functional Outcome of Corticosteroid Injection for Treatment of Trigger Finger in a Tertiary Care Center: A Prospective Observational Study

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Abstract

Introduction: Trigger finger is a common cause of painful digital dysfunction resulting from impaired gliding of the flexor tendon beneath a thickened A1 pulley. Corticosteroid injection is widely used as a first-line intervention for Quinnell Grades II and III trigger finger, but short-term outcomes in Nepalese clinical settings remain limited. This study aimed to evaluate short-term pain reduction and clinical improvement following intralesional injection in these grades.

Methods: This prospective observational study was conducted in the Orthopedics Department of a tertiary care center from April 3, 2023, to April 2, 2024. Ethical approval was obtained from the Institutional Review Committee (Ref. No. 245). A convenience sampling technique was used. Each participant presenting with Quinnell Grade II or III trigger finger received a single intralesional injection containing 40 mg of methylprednisolone acetate mixed with 1 ml of 2% lignocaine. Pain was assessed using the Visual Analogue Scale (0–100 mm) at baseline, 1 month, and 3 months. Clinical resolution of triggering and any injection-related complications was systematically recorded. Data were analyzed using Statistical Package for the Social Sciences version 20.0. Visual Analogue Scale scores were analyzed using the paired t-test,

Results: The mean baseline Visual Analogue Scale score was 74.50±13.10 mm, which showed a significant reduction to 18.70±16.80 mm at 1 month and further to 13.50±10.50 mm at 3 months ($p<0.001$). Complete resolution of triggering was achieved in 39 (98%) of the cases. One (2%) patient experienced recurrence and subsequently underwent percutaneous release. A single (2%) case of superficial injection-site infection was recorded, with no major complications reported.

Conclusions: Intralesional corticosteroid injection produced marked short-term pain reduction and near-complete symptom resolution in Grade II and III trigger finger, with minimal complications. These findings support its role as an effective and practical first-line treatment in outpatient settings.

Keywords: *corticosteroid injections; pain measurement; treatment outcome; trigger finger.*

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Introduction

Trigger finger, or stenosing flexor tenosynovitis, is a common condition characterized by painful, irregular finger motion caused by impaired gliding of the flexor tendon beneath a thickened A1 pulley.[1] Degenerative changes of the fibrocartilaginous surface increase friction, producing catching or locking.[2] Loss of smooth tendon sheath interaction due to pulley hypertrophy, tendon swelling, or nodularity contributes to progressive triggering.[3,4] Histopathology reveals scarring, inflammation, and fibrocartilage metaplasia within the A1 pulley tendon complex, correlating with severity.[5] The Quinnell system is frequently used for grading.[2]

Corticosteroid injection is a simple, minimally invasive treatment that restores gliding by reducing inflammation and pulley thickness.[3,5,6] Reported success ranges from 57% to more than 70-80%.[4–6] A hospitalized prospective study reported a 79.60% overall success rate following corticosteroid injection, with patients followed longitudinally for up to six months.[7] Despite effectiveness, evidence for short-term outcomes in Quinnell Grade II-III disease remains limited.

This study aimed to evaluate short-term pain reduction and clinical improvement following intralesional injection in these grades.

Methods

This hospital-based observational study was conducted in the Orthopedics Outpatient Department of Shree Birendra Hospital from April 3, 2023, to April 2, 2024. All eligible adult patients presenting with trigger finger within this 12-month period were enrolled. Ethical approval was obtained from the Nepal Army Institute of Health Sciences Institutional Review Committee (Ref. No. 245). Diagnosis and Quinnell grading were performed by the attending orthopedic surgeon based on the clinical history of painful catching or locking and physical examination. The Quinnell system classifies trigger finger as: Grade I (pain, no catching), Grade II (triggering with active extension possible), Grade III (triggering preventing active extension, passively correctable), and Grade IV (fixed flexion). Only patients with Grade II or III were included. Grade I was excluded due to potential spontaneous resolution, and Grade IV was excluded due to poor response to injection and frequent need for surgery. Inclusion criteria comprised adults aged >20 years with Grade II or III disease who provided consent. Exclusion criteria were: age ≤20 years (to exclude pediatric/congenital forms with distinct etiology), Grade I or IV, pregnancy, local infection, congenital trigger finger, uncontrolled diabetes (random blood sugar >140 mg/dL), and prior injection or surgery for recurrence. All patients meeting the inclusion criteria during the study period were enrolled, resulting in a total of 40 participants.[7]

Demographic variables (age, sex), hand dominance, affected digit, relevant medical history, and Quinnell grade were documented at baseline. Pain intensity was measured using the VAS, treated as a continuous variable ranging from 0 to 10 cm, recorded in millimeters. All patients received a single intralesional injection of methylprednisolone acetate (40 mg) with 1ml of 2% lignocaine as part of routine care, administered by the attending surgeon. Patients were evaluated at 1 month and 3 months after the procedure. At each visit, VAS pain score, persistence or recurrence of triggering, and procedure-related complications such as infection, neurovascular injury, tendon bowstringing, stiffness, or limitation of motion were recorded. Early return visits were permitted for unresolved symptoms or adverse events.

Data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences version 20.0. Continuous variables were summarized as mean ± standard deviation, while categorical variables were reported as frequencies and percentages. Changes in pre- and post-injection VAS scores were analyzed using the paired t-test, treating VAS as a continuous parametric variable. A p-value < 0.05 was considered statistically significant.

Results

The study included 40 patients, all of whom completed the follow-up period without dropout. The demographic and clinical characteristics of the cohort are summarized in Table 1. In brief, the mean age of the participants was 50.90 ± 8.65 years, with the majority being female 21 (52.50%) and right-hand dominant 33 (82.50%). Trigger finger most frequently affected the thumb 21 (52.50%), and participants were classified as Quinnell Grade II 23 (57.50%) or Grade III 17 (42.50%).

Table 1. Baseline Demographic and Clinical Characteristics (n= 40).

Variable	Category	n(%)
Age Group (years)	30-39	3(7.50)
	40-49	12(30)
	50-59	15(37.50)
	60-69	10(25)
Gender	Male	19(47.50)
	Female	21(52.50)
Hand Dominance	Right	33(82.50)
	Left	7(17.50)
Side Involved	Right	25(62.50)
	Left	15(37.50)
Digit Involved	Thumb	21(52.50)
	Middle	6(15)
	Ring	9(22.50)
	Index	4(10)
Quinnell Grade	Grade II	23(57.50)
	Grade III	17(42.50)

Pain intensity showed significant improvement across follow-up intervals. The mean VAS score decreased from 7.45±1.31 at baseline to 1.87 ± 1.68 at 1 month and 1.35 ± 1.05 at 3 months. Pairwise comparisons (baseline vs 1 month, baseline vs 3 months, and 1 month vs 3 months) demonstrated statistically significant reductions (all $p < 0.001$) (Figure 1).

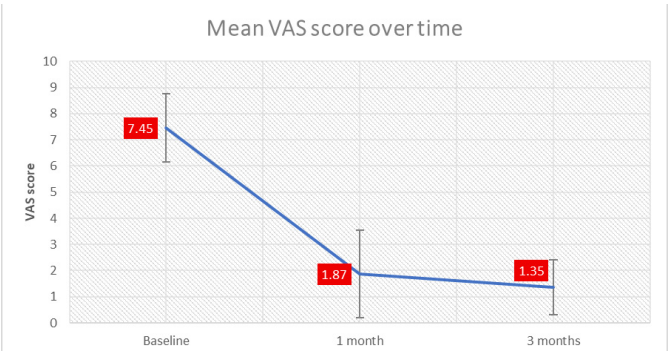

Figure 1: Change in mean visual analogue scale (VAS) scores over time. Values are expressed as mean ± standard deviation.

At 1 month, triggering had resolved in 39 (98%) patients. By 3 months, outcomes remained stable, with only one (2.50%) patient still experiencing unresolved triggering. A superficial injection-site infection was identified in one patient and resolved with oral antibiotics. No neurovascular injury, tendon bowstringing, stiffness, or motion limitation was reported (Table 2).

Table 2: Clinical outcomes and complications (n= 40).

Outcome / Complication	n(%)
Resolution of triggering at 3 months	39(97.50)
Recurrence	1(2.50)

Discussion

The present study demonstrates that a single intralesional corticosteroid injection provides significant short-term pain reduction and high rates of clinical resolution in patients with Quinnell Grade II and III trigger finger. Mean VAS scores decreased substantially at both 1-month and 3-month follow-ups. Triggering had resolved in 39 (97.50%) patients by 1-month, and outcomes remained stable at 3 months, with only one (2.50%) patient still experiencing unresolved triggering. These findings emphasized the effectiveness of corticosteroid injection in achieving rapid symptomatic relief during the early phase of treatment. The high short-term success rate observed in the present study likely reflects careful patient selection and study design. Only patients with Quinnell Grade II and III disease were included, while advanced Grade IV triggering, known to respond less favorably to injection, was excluded. In addition, patients with diabetes mellitus and recurrent trigger finger were excluded, both of which are well-recognized risk factors for reduced response and higher recurrence rates following corticosteroid injection.[9] These design features may partly explain the higher early resolution rates observed compared with studies that included more heterogeneous populations.

Similar short-term outcomes following corticosteroid injection have been reported in Nepalese and regional studies. In their study of 54 digits, Sharma and Sah observed significant pain reduction and early symptomatic improvement within 2 weeks of injection, with 45 (83.33%) digits remaining asymptomatic, and 6 (11.11%) digits showing some improvement. Sustained improvement was documented at serial follow-ups at 1, 3, and 6 months, with an overall success rate of 43 (79.63%) digits.[7] Gupta et al. demonstrated that although percutaneous release remains the definitive treatment, corticosteroid injections represent an effective conservative alternative. In their study, steroid injections achieved peak pain reductions of 68% in Grade II and 62% in Grade III at 6-week follow-up, with greater durability of effect observed in patients with lower initial grade severity.[10] Indian clinical series report that patients treated with a percutaneous A1 pulley release showed complete pain-free motion and significant

improvement in Quinnell grades by six months. These studies also show better functional outcomes for patients treated with percutaneous release than with corticosteroid injection, and that open release provides better long-term functional scores than corticosteroid injection alone.[11,12]

Consistent short-term positive results for corticosteroid injections to treat mild-to-moderate trigger finger are reported in international studies. Dala-Ali et al. observed a significant decrease in both pain and triggering frequency across 90 digits within 6-12 weeks following injection.[4] Results from a meta-analysis of 368 participants (190 corticosteroid-treated; 178 controls) demonstrated the benefit of corticosteroid treatment on pain and function relative to the controls, and those benefits were mostly noted between 4 and 12 weeks after treatment.[13] More recently, a systematic review reviewing 14 randomized trials of injection therapies for trigger finger demonstrated that infiltrative corticosteroid treatment resulted in a consistent improvement in both pain and hand function within the first 3 months post-treatment.[14]

With respect to recurrence, the 2% rate observed at 3 months in this study lies at the lower end of reported short-term recurrence rates following corticosteroid injection. Previous studies assessing outcomes at similar early follow-up intervals have likewise reported low recurrence rates within the first three months after treatment.[7,10] However, studies with longer follow-up durations consistently demonstrate increasing recurrence rates after corticosteroid injection, highlighting that early symptomatic improvement does not necessarily predict long-term durability.[15,16] While long-term outcomes were not assessed in the present study, these findings emphasize the importance of continued follow-up beyond the early post-injection period.

Complications in the present study were minimal, limited to a single superficial injection-site infection, with no tendon ruptures, neurovascular injuries, stiffness, or functional limitations. This safety profile is consistent with Nepalese, Indian, and international reports describing a low incidence of serious complications following intralesional corticosteroid injection when performed using an appropriate technique.[7,10,17]

The study was conducted at a single center with a modest sample size and relatively short follow-up duration, limiting assessment of long-term recurrence and durability of response. Exclusion of patients with diabetes mellitus and advanced (Grade IV) trigger finger may have contributed to favorable outcomes and limits generalizability to these higher-risk groups. Additionally, potential confounders such as occupational hand use and symptom duration were not formally adjusted for in the analysis.

Future studies with larger sample sizes and longer follow-up durations are warranted to evaluate the durability of response and long-term recurrence patterns.

Conclusions

Intralesional corticosteroid injection demonstrated excellent short-term effectiveness in relieving pain and resolving triggering in patients with Quinnell Grade II and III trigger finger. The procedure was safe, minimally invasive, and associated with very low recurrence and complication rates.

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