

Long-Term Effectiveness of Repeat Corticosteroid Injections for Trigger Finger

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Purpose To quantify the long-term success of repeat injections for trigger fingers and to identify predictors of treatment outcomes.

Methods This retrospective case series analyzed 292 repeat corticosteroid injections for trigger fingers administered by hand surgeons at a single tertiary center between January 2010 and January 2013. One hundred eighty-seven patients (64%) were female, 139 patients (48%) had multiple trigger fingers, and 63 patients (22%) were diabetic. The primary outcome, treatment failure, was defined as receiving a subsequent injection or surgical treatment. Patients without either documented failure or a return office visit in 2015 or 2016 were surveyed by telephone to determine if they had required subsequent treatment. Kaplan-Meier analyses with log-rank testing assessed the median time to treatment failure and the effect of demographic and disease-specific characteristics on injection success rate and predictors of injection outcome (success vs failure) were assessed with multivariable logistic regression.

Results Second injections provided long-term treatment success in 39% (111 of 285) of trigger fingers with 86 receiving an additional injection and 108 ultimately undergoing surgical release. Thirty-nine percent (24 of 62) of third injections resulted in long-term success, with 22 receiving an additional injection, and 23 ultimately undergoing surgery. Median times-to-failure for second and third injections were 371 and 407 days, respectively. Success curves did not differ significantly according to any patient or disease factor. Logistic regression identified that advancing patient age and injection for trigger thumb were associated with success of second injections.

Conclusions Thirty-nine percent of second and third corticosteroid injections for trigger finger yield long-term relief. Although most patients ultimately require surgical release, 50% of patients receiving repeat trigger injections realize 1 year or more of symptomatic relief. Repeat injections of trigger fingers should be considered in patients who prefer nonsurgical treatment. (*J Hand Surg Am.* 2017;42(4):227–235. Copyright © 2017 by the American Society for Surgery of the Hand. All rights reserved.)

Type of study/level of evidence Therapeutic IV.

Key words Corticosteroid, injection, repeat, stenosing tenosynovitis, trigger finger.



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CORTICOSTEROID INJECTIONS ARE the definitive treatment for the majority of newly diagnosed trigger fingers.^{1–12} The response to initial corticosteroid injections is well-studied, with the percentage of symptom-free patients gradually declining over the first year after injection before plateauing at 45% treatment success by 5 years.^{13,14} Factors affecting the outcome after initial trigger finger injection include symptom duration,^{2,3} nodule type,⁸ finger involved,^{7,9} presence of multiple trigger fingers,^{2,9,13,14} sex,^{7,14} age,¹³ comorbid upper extremity tendonopathies,¹³ and diabetes.^{15,16}

The chance of long-term success after second and third injections for trigger finger is less precisely understood. Estimates for the chance of symptomatic relief ranges from 23% to 79% for second injections and from 6% to 74% for third injections.^{2,4,5,9,10,13,17} These wide ranges reflect prior studies reporting these outcomes with secondary descriptive statistics as opposed to being evaluated as a primary research focus.

Based on the available literature, surgeons are unable to counsel patients precisely regarding the risk of symptom recurrence after a repeat corticosteroid injection. Furthermore, the pattern of symptom recurrence over time and the factors affecting treatment success remain unclear. This study was designed to quantify the likelihood of long-term success after second and third corticosteroid injections for trigger fingers. The secondary aim was to identify factors predictive of treatment success. Our working hypothesis was that the success of repeat injections would be less than initial injections and that factors associated with the success of initial injections (ie, multiple trigger fingers, diabetes) would have an impact on the chance of success with repeat injection.

MATERIALS AND METHODS

Participant selection

Our institutional review board approved this single-center retrospective case series, which analyzed 289 second and third corticosteroid injections in flexor tendon sheaths to quantify the chance of long-term success of repeat corticosteroid injections for trigger finger. Injections were placed into the flexor tendon sheath through the A1 pulley angled 45° from proximal to distal with 1 mL of 40 mg/mL methylprednisolone acetate (Depo-Medrol) and 0.5 to 1.0 mL of 1% lidocaine. The primary outcome, treatment failure, was defined as a subsequent

TABLE 1. Green Classification of Trigger Finger Grade

Grade I	Pain or tenderness at the A1 pulley
Grade II	Catching, can actively extend digit
Grade III	Locking, requiring passive extension
Grade IV	Locked, unable to passively extend, fixed flexion contracture

injection or surgical release of the A1 pulley of the affected digit.

Potential subjects treated for trigger finger by 1 of 7 fellowship-trained hand orthopedic surgeons at a single tertiary center between January 2010 and December 2013 were identified by a search of departmental billing data. The search was conducted using Current Procedural Terminology codes 20550 (injection; tendon sheath, ligament), 20551 (injection; tendon origin/insertion), or 20600 (arthrocentesis, aspiration, or injection) and *International Classification of Diseases*, Ninth Revision, codes 727.03 (trigger finger) or 727.05 (tenosynovitis; hand, wrist). Inclusion criteria required delivery of a repeat injection for trigger finger during the study period to a patient at least 18 years old. Our database search identified 2,176 injections in 1,483 patients over the study period.

Medical records were manually reviewed for the patient's age at first injection, sex, injection date, digit injected, symptoms graded according to the Green classification at each injection (Table 1), presence of multiple trigger fingers, and associated comorbidities with potential relevance to the trigger finger (ie, rheumatoid arthritis, hypothyroidism, carpal tunnel syndrome, other upper extremity tendonitis, and diabetes mellitus [non—insulin-dependent {NIDDM} vs insulin-dependent {IDDM}]) at time of injection. The presence of multiple trigger fingers was defined as more than 1 symptomatic trigger finger either at or before the time of repeat injection. For patients with return visits for treatment failure, the time to failure and subsequent treatment were recorded. For patients with repeat injections for multiple digits within the 3-year period, only the first repeat injection contributed data to the study to ensure independent observations for statistical analyses. In the case of concurrent bilateral injections, a random number generator was used to pick the studied side. This decision minimized bias introduced by the selection of a digit according to duration, severity, side, or subsequent treatment needed. Subjects were

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