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# Clinical results of a percutaneous technique for trigger digit release using a 25-gauge hypodermic needle with corticosteroid infiltration

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## KEYWORDS

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**Summary** Clinical results of a percutaneous needle trigger digit release (PNTDR) technique using a 25-gauge needle with corticosteroid infiltration are reported. This prospective study assessed 52 digits that underwent PNTDR. Experimental results were compared with those of a control group with only steroid injection. Patients who underwent PNTDR were divided into diabetic and nondiabetic groups, and assessed after 1 week, and 1, 2, 3, and 6 months post surgery. The quick disability of the arm, shoulder, and hand (QuickDASH) questionnaire and visual analog scale (VAS) score for pain were completed both before and after surgery. PNTDR showed better statistical results than the control group. At final follow-up, 94% of patients were rated as excellent or good, recurrence was observed in 3 digits, and QuickDASH and VAS score significantly decreased. This technique was equally effective in patients with moderate or well-controlled diabetes with favorable results.

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## Introduction

It is generally accepted that the initial treatment for trigger finger is corticosteroid injection into the flexor tendon sheath. However, corticosteroid injection was found to be

significantly less effective in the digits of diabetic patients and did not decrease the rate of surgery.<sup>1</sup> A comprehensive review of the literature retrieved guidelines for trigger digit management from the British Society for Surgery of the Hand (BSSH),<sup>2</sup> which states four indications for trigger digit release in adults: (1) after failed conservative treatment, (2) for recurrent triggering after one to two steroid injections, (3) if there are severe symptoms at presentation, and (4) in populations who are unlikely to benefit from

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steroid injections (e.g., a diabetic patient with many digits affected and severe symptoms).

Trigger digit release surgery is generally considered as a safe and effective treatment that can provide permanent cure. Although major complications are rare, minor complications are relatively common, with rates of 3% and 28% for open surgery.<sup>3</sup> Percutaneous trigger digit release is reported to provide faster recovery from discomfort and faster return to routine activities than open release.<sup>4–6</sup> However, results of a meta-analysis revealed that their frequencies of treatment failure and complications were similar.<sup>3</sup>

In order to provide permanent cure by reducing treatment failure and complications associated with trigger digit release, a minimally invasive percutaneous needle trigger digit release (PNTDR) technique using a 25-gauge hypodermic needle with corticosteroid infiltration was introduced. The purpose of this study is to investigate the preference of this technique over only steroid injection, and to verify its efficacy for both diabetic and nondiabetic patients.

## Patients and methods

This nonblinded prospective, unrandomized study was conducted according to and approved by the local Medical Ethics Committee in March 2013. Patients who visited our outpatient clinic with trigger digits from April 2013 to April 2014 and desired to be treated by this method were assessed for enrollment in this study.

A total of 68 patients were enrolled in this study, and 97 digits were considered to be treated. Patients with failed conservative treatment or recurrent triggering after steroid injection(s) were also included in this study. Triggering of the digits was graded according to the severity of symptoms as classified by the modified Quinnell grading system<sup>7</sup> (Table 1). Medical evaluations included laboratory examinations and assessments of radiographs of the digit under study to identify patients with diabetes mellitus, rheumatoid arthritis, previous trauma, Heberden tubercles, Bouchard tubercles, and trapeziometacarpal osteoarthritis. Diabetes mellitus was diagnosed when Glycated hemoglobin ( $HbA_{1c}$ )  $\geq 6.5\%$ .

A total of 33 patients (45 digits) were excluded from this study as they had either arthritis in their phalangeal or trapeziometacarpal joints (15 digits of 14 patients), uncontrolled diabetes defined as  $HbA_{1c} > 8.0\%$  (seven digits of

four patients), type 1 diabetes (one digit of one patient), modified Quinnell grade II (13 digits of 10 patients), or bilateral involvement (nine digits of four patients). Therefore, 35 patients (52 digits: 16 thumbs, five index fingers, 15 middle fingers, and 16 ring fingers) underwent PNTDR via a technique using a 25-gauge needle with corticosteroid infiltration. A total of 8, 19, and 25 digits were classified as grade III, IV, and V, respectively, by the modified Quinnell grading system. Written consent was obtained from all patients who underwent PNTDR.

A control group, which consisted of 35 patients (41 digits) with only steroid injection (1 ml of lidocaine 1% and 2 mg of triamcinolone acetate), was included in this study to compare the efficacy of PNTDR. The patients of this group were those with trigger digits after PNTDR has been completed. Similar inclusion and exclusion criteria were found in the patients who underwent PNTDR. A total of 41 digits were classified by the modified Quinnell grading system as follows: grade III = seven digits, grade IV = 19 digits, and grade V = 15 digits.

## Assessment

Patients with PNTDR were assessed after 1 week, and 1, 2, 3, and 6 months post surgery. Clinical results were classified into three categories: excellent, good, and poor (Table 1).<sup>7</sup> At follow-up, all patients completed the quick disability of the arm, shoulder, and hand (QuickDASH) questionnaire and visual analog scale (VAS) score for pain. VAS scores of 0 and 10 indicate no pain and the maximum possible pain, respectively. Complications, including recurrence, were also documented at each visit. Recurrence was classified into type I (the presence of triggering, crepitus, or clicking without locking) and type II (painful tenosynovitis without triggering). Technical complications following PNTDR were also assessed.

In the control group, same parameters were also examined before and 3 months after corticosteroid injection, whose results were compared with those of PNTDR patients at 3 months after procedure. Patients with PNTDR were divided into diabetic and nondiabetic groups. Clinical results were also compared between diabetic and nondiabetic groups after 6 months of follow-up.

## Statistics

Statistical evaluation was performed using statistical software (StatMate 5, Atoms, Tokyo, Japan), and the categorical data were analyzed using chi-squared test. All other data were analyzed using Student's *t*-test. Statistical significance was set at  $p < 0.05$ .

## Technique

The procedure can be performed in an outpatient setting, with the patient either lying on a bed or sitting in a chair. Multiple affected digits of a patient were treated during the same session. Portal sites were carefully chosen by palpating the thickened A1 pulleys and drawing digit centerlines on the skin with a marker. Anatomical references

**Table 1** Modified Quinnell grading system for trigger digits (Ragoowansi et al., 2005).

Grade	Clinical findings
I	Normal movement, no pain
II	Normal movement, occasional pain
III	Uneven movement (involving crepitus or clicking without locking)
IV	Intermittent locking, actively correctable
V	Locking, only passively correctable

Grade I, excellent; grade II, good; grade III–V, poor.

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