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PERCUTANEOUS HYPODERMIC NEEDLE RELEASE IN TRIGGER FINGER TREATMENT

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ABSTRACT

Background: Stenosing tenosynovitis, also known as trigger finger, is a common condition that results in hand pain and dysfunction, including triggering sensation, restricted finger motion, swelling, and pain. Percutaneous release of the A1 pulley can be performed with good clinical results, low complication rates, and high patient satisfaction when conservative therapy fail.

Aim: to evaluate the effectiveness of percutaneous hypodermic needle release of trigger finger for pain and functional outcomes.

Methods: Fifty participants of both sexes who did not improve after conservative trigger finger treatment were included in the current study. In the current investigation, participants who did not react to conservative treatment were evaluated, and subjects with grades III, IV, and V modified Quinnell's grading were included. Participants with congenital triggers were also not allowed to participate in the study.

Results: The trigger finger was clinically evaluated in this study using a modified Quinnell grading system during pre-surgery follow-ups at 1, 3, and 6 months as well as one year following surgery. Eighty-four percent (n=42) of the patients shown great outcomes, twelve percent (n=6) demonstrated good results, and four percent (n=2) demonstrated bad results. Digital nerve damage further developed in 4% (n=2) of the individuals. Using Quinnell's criteria, the hand (Q-DASH) score, quick disabilities of the arm and shoulder, and the visual analog scale (VAS) at regular follow-ups of 1, 3, 6, and 12 months,

Conclusion: For the treatment of trigger finger, percutaneous hypodermic needle release is a low-cost, practical, safe, and effective daycare approach that has no serious side effects. In addition, it provides a secure substitute for open surgery. Percutaneous release improves overall functional outcomes and produces excellent to good results. Therefore, it may be regarded as a better course of action for individuals with trigger fingers.

Keywords: visual analog score, trigger finger, quick arm limitations, and modified Quinnell's grading

INTRODUCTION

Tenosynovitis, also referred to as trigger finger, is a common cause of hand dysfunction and pain, manifesting as limited finger motion, soreness, swelling, and triggering sensation. The trapping of the flexor tendon due to A1-pulley thickening is the primary pathophysiology of tenosynovitis. The flexor tendon's range of motion is gradually restricted by enlargement and inflammation of the retinacular sheath.[1]

Though it can affect any digit, the thumb, ring finger, index finger, and digit are the most commonly affected. A secondary trigger finger may be felt by subjects with diabetes, gout, renal problems, rheumatoid arthritis, or other inflammatory condition. If proper therapy is not received, this may result in flexion contracture of the proximal interphalangeal joint.[2]

The thickening of the tendon sheath and the flexor tendons in the second to fifth fingers are represented by annular pulleys. While the thumb only has two annular pulleys, A1 and A2, they are designated A1–A5. The tendon sheath is made up of the synovial part section and the retinal pulley. While the outer layer serves as the synovial pouch's protective layer, the visceral layer of the synovial portion adheres to the tendon. The A1 pulley is typically associated with the triggering finger. It derives two-thirds of its origin from the palmar plate of the metacarpophalangeal joint and has two to three times the normal size of hypertrophy.[3]

The idiopathic etiology is usually seen in trigger fingers. Nonetheless, it has been connected to a number of illnesses, cancers, and neoplasms. It is most frequently observed in middle-aged women. In patients with single-digit involvement and early cases, several conservative therapy techniques, such as steroid injections, NSAIDs (nonsteroid anti-inflammatory medicines), and splint immobilization, have been shown to have positive results. Surgery to release the A1 pulley is advised for patients whose non-surgical therapy is unsuccessful. When conservative treatment is ineffective, the A1 pulley can be released percutaneously.[4]

High clinical success rates, low complication rates, and high patient satisfaction rates are all linked to percutaneous release of the A1 pulley. There have also been reports in the literature about the trigger finger's safe and affordable percutaneous release.5 This study sought to evaluate the effectiveness of percutaneous hypodermic needle release for trigger finger pain and functional outcomes using Quinnell's criteria, hand (Q-DASH) score, arm and shoulder quick disabilities, and visual analog scale (VAS) at 1, 3, 6, and 12 months of follow-up.

MATERIALS AND METHODS

Quinnell's criteria, hand (Q-DASH) score, quick disabilities of the arm and shoulder, and VAS (visual analog scale) were used in this prospective clinical study to evaluate the effectiveness of percutaneous hypodermic needle release of trigger finger for pain and functional outcomes at regular follow-ups of 1, 3, 6, and 12 months.

After receiving approval from the relevant institutional ethical committee, the study was conducted at... from... to. The study participants came from the Institute's General Surgery Department. Prior to their involvement in the study, all subjects gave their written and verbal informed consent.

Fifty participants of both sexes who had been diagnosed with trigger finger and those who did not improve with conservative treatment were included in the study. The modified Quinnell grading of trigger finger is used to assign a severity rating. Subjects with Grade III, IV, and V trigger fingers (Table 1) who did not improve with conservative treatment were included in the study. Subjects with congenital triggering were excluded from the study.

The skin was wrapped and sterilized in the procedure under very rigorous aseptic conditions. The skin of the A1 pulley was treated with over 2cc of 2% lignocaine. The afflicted finger was stretched beyond its typical range in order to feel the A1 pulley. An 18 gauge needle was used to puncture the flexion tendon through the metacarpophalangeal crease. The distal phalanx was flexed and stretched, and the needle was carefully withdrawn to evaluate its movements. By shifting the needle's sharp edge up and down, the A1 pulley's longitudinal axis was adjusted, resulting in the release.

A sudden drop in resistance at the needle's tip guaranteed the substantial discharge. The finger was observed to move freely and to lose its triggering ability. A gentle dressing was applied to the wound following care. Following the surgery, subjects were instructed to move their fingers right away, and daily mobilization was carried out in accordance with their tolerance. Following treatment, all patients were tracked and evaluated using their VAS ratings at 1, 3, 6, and 12 months. Quinnell's trigger finger grading was modified for clinical evaluation. Finger functionality was evaluated using a Q-DASH score. A 10-point VAS scale was used to measure the impairment brought on by the pain.

The statistical analysis of the collected data was conducted using the chi-square test, Fisher exact test, one-way ANOVA (analysis of variance), and SPSS (Statistical Package for the Social Sciences) software version 24.0 (IBM Corp., Armonk, NY, USA) for evaluating descriptive measures. The findings were presented as frequency, percentages, mean, and standard deviation. Statistical significance was defined as a p-value of less than 0.05.

RESULTS

Quinnell's criteria, hand (Q-DASH) score, quick disabilities of the arm and shoulder, and VAS (visual analog scale) were used

in this prospective clinical study to evaluate the effectiveness of percutaneous hypodermic needle release of trigger finger for pain and functional outcomes at regular follow-ups of 1, 3, 6, and 12 months.

Fifty participants of both sexes who had been diagnosed with trigger finger and those who did not improve with conservative treatment were included in the study. Modified Quinnell grading in triggering finger was used to conduct a clinical evaluation of the research participants. With a mean age of 47.7 years, the bulk of study participants were between the ages of 40 and 50. Thirty percent of the patients were female, and twenty percent were male.

Out of the 50 participants evaluated, 44% (n=22) had an impacted ring finger, 32% (n=16) had an affected thumb, and 24% (n=12) had an affected index finger (Table 2).

According to the modified Quinnell grading system, 12% (n=6), 44% (n=22), and 36% (n=18) of the study participants received grades of III, IV, and V, respectively (Table 3).

Of the 50 participants, 64% (n=32) had a problem with their right hand, and 36% (n=18) had a problem with their left hand (Table 4). At one, three, six, and twelve months, all individuals underwent routine evaluations. At baseline, the mean VAS scores were 7.74±0.4, but they substantially dropped to 1.7±0.2 ($p<0.05$) and then non-significantly dropped to 1.4±0.5, 1.2±0.6, and 0.34±0.5 at 3, 6, and 12 months, respectively. All of the individuals had statistically significant improvement ($p<0.05$) at the follow-up.

According to the study's findings, the mean Q-DASH was measured both before and after surgery for 50 individuals with trigger finger. According to the findings, the mean Q-DASH ranged from 31.4±1.65 to 1.98±2.38 and was statistically significant ($p=0.004$). Modified Quinnell's grades also showed a significant improvement from baseline to the 1-year follow-up ($p<0.05$).

The trigger finger's modified Quinnell grading was evaluated in this study prior to surgery, one, three, six, and twelve months following the procedure. According to the study's findings, 12% of the participants (n = 6) had good results, 84% (n = 42) had fantastic outcomes, and 4% (n = 2) had terrible results. In 4% (n=2) of the study participants, digital nerve damage was seen. However, none of the research participants had any significant complications other intrinsic muscle loss.

DISCUSSION

50 participants of both sexes who had been diagnosed with trigger finger and those who had not responded to conservative treatment were evaluated in this study. Modified Quinnell grading in triggering finger was used to conduct a clinical evaluation of the research participants. With a mean age of 47.7 years, the bulk of study participants were between the ages of 40 and 50. Thirty percent of the patients were female, and twenty percent were male. These demographics were comparable to those found in studies by Toprak D et al. (2020) and Tawfik MT et al. (2022), in which the authors evaluated participants with trigger finger demographic data comparable to the current investigation.

The findings of the study indicated that, out of the 50 participants evaluated, 44% (n=22) had an impacted ring finger, 32% (n=16) had an affected thumb, and 24% (n=12) had an affected index finger. According to the modified Quinnell grading system, 12% (n=6), 44% (n=22), and 36% (n=18) of the study participants received grades of III, IV, and V, respectively.

These findings were in line with research by Singh VK et al. (2006) and Pandey BK et al. (2010), where the authors' reports of disease data were similar to those of the current study.

Sixty-four percent (n=32) of the 50 study participants experienced problems with their right hand, while 36 percent (n=18) had problems with their left hand. At one, three, six, and twelve months, all individuals underwent routine evaluations. At baseline, the mean VAS scores were 7.74±0.4, but they substantially dropped to 1.7±0.2 ($p<0.05$) and then non-significantly dropped to 1.4±0.5, 1.2±0.6, and 0.34±0.5 at 3, 6, and 12 months, respectively.

All of the individuals had statistically significant improvement ($p<0.05$) at the follow-up. These results were consistent with those of Abe Y et al. (2016) and Uçar BY et al. (2012), who also observed a significant decrease in VAS ratings after percutaneous hypodermic needle release according to their investigations.

Additionally, mean Q-DASH was measured at 1-year follow-up and prior to surgery in 50 participants evaluated for trigger finger. According to the findings, the mean Q-DASH ranged from 31.4±1.65 to 1.98±2.38 and was statistically significant ($p=0.004$).

Modified Quinnell's grades also showed a significant improvement from baseline to the 1-year follow-up ($p<0.05$). These findings were consistent with those of Maneerit J et al. (2003) and Cebesoy O et al. (2007), whose authors reported mean Q-DASH scores comparable to the current study in their separate investigations.

The results of this study also evaluated the trigger finger's modified Quinnell grading prior to surgery, one, three, six, and twelve months following surgery. According to the study's findings, 12% of the participants (n = 6) had good results, 84% (n = 42) had fantastic outcomes, and 4% (n = 2) had terrible results.

In 4% (n=2) of the study participants, digital nerve damage was seen. However, none of the research participants had any significant complications other intrinsic muscle loss. These results were consistent with those of Wilhelmi BJ et al. (2003) and Philip J et al. (2009), who reported similar outcomes to the current investigation following the treatment of trigger finger.

CONCLUSION

Considering its limitations, the present study concludes that percutaneous hypodermic needle release for the trigger finger is an inexpensive, convenient, effective, and safe day-care procedure with no significant complications for the management of the trigger finger. It is also a safe alternative to the open surgery. Percutaneous release shows excellent to good results with improvement in overall functional outcomes. Hence, it can be considered as a preferable management option in subjects with trigger fingers.

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S. No	Grades	Clinical findings
1.	**I**	No pain and normal movement
2.	**II**	Occasional pain and normal movement
3.	**III**	Uneven movement (clicking/crepitus without locking)
4.	**IV**	Actively correctable and intermittent locking
5.	**V**	Locking only passively correctable

Table 1: Grades of Modified Quinnell grading for triggering finger

Table 2: Finger affected by triggering finger in study subjects

S. No	Affected finger	Number (n)	Percentage (%)
1.	**Index finger**	12	24
2.	**Ring finger**	22	44
3.	**Thumb**	16	32

Table 2: Finger affected by triggering finger in study subjects

S. No	Modified Quinell's grade	Number (n)	Percentage (%)
1.	**I**	-	-
2.	**II**	-	-
3.	**III**	6	12
4.	**IV**	26	52
5.	**V**	18	36

Table 3: modified Quinell's grading in the study subjects with triggering fingers

S. No	Affected hand	Number (n)	Percentage (%)
1.	**Left**	18	36
2.	**Right**	32	64

Table 4: Hand affected by triggering finger in study subjects