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To Study Percutaneous Trigger Finger Release's Effectiveness Evaluation

Dr Prafulla Borkar

Associate Professor Dept of Orthopedics, Jawaharlal Nehru Medical College, Sawangi Meghe , Wardha MS.

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Corresponding Author:

Dr Prafulla Borkar

Associate Professor Dept of Orthopedics, Jawaharlal Nehru Medical College, Sawangi Meghe , Wardha MS.

ABSTRACT

BACKGROUND:
One prevalent cause of hand pain and handicap is trigger finger. Patient satisfaction and an earlier functional recovery are the outcomes of percutaneous release. This is a quick and affordable technique that improves functional outcomes without requiring surgery. When more conventional therapies fail, percutaneous release of the A1 pulley is recommended as a safe and effective alternative for treating trigger fingers. A trigger finger was discovered to be the most prevalent ailment in adults, appearing most frequently in the middle of the fifth or sixth decade of life, with a risk of 2 to 3% in the general population and up to 10% in patients with diabetes mellitus. Notably, women (middle-aged women) are more impacted by this ailment than males are, and the middle and ring fingers are said to be the most frequently implicated fingers. The purpose of this study was to assess the outcomes of 30 patients' percutaneous release of the trigger finger using an 18G needle.

AIM: The aim of this study was to determine the clinical results and safety of percutaneous release in trigger thumbs.

MATERIAL AND METHOD:
The present investigation is a prospective observational study carried out at the orthopedic department. There were thirty patients in all. There were twenty-five women and five men. There were seven examples in the left hand and twenty-three in the right. There were four cases involving the thumb, six involving the index finger, ten involving the ring finger, and ten involving the mid finger. A proforma that was structured was used to gather data. In accordance with the selection criteria, patients were chosen upon presentation to the orthopedic consulting clinics. The patients were informed of the study's goal, methodology, risks, and advantages, and a formal signed agreement was obtained. Following the treatment, patients were monitored for a minimum of three months. During the last follow-up, patients had their finger range of motion assessed using a goniometer, which measured all three ranges.

RESULTS:
A total of 30 adult patients with trigger fingers were included in this study. The mean age was 39.45 years with a range of > 18 years. There were twenty-five women and five men. There were seven examples in the left hand and twenty-three in the right. There were four cases involving the thumb, six involving the index finger, ten involving the ring finger, and ten involving the mid finger. The thumb (56.6%) was the most commonly affected digit, followed by the index, middle, and ring fingers. Pain (66.6%) was the most common presenting symptom, followed by stiffness and catching (33.3%). After three months, both subjective and objective results were noted.

CONCLUSION:
In summary, percutaneous release represents a straightforward, low-risk, high-results therapeutic approach for the management of trigger thumb. The injection of steroids using the same needle used for release is one of the technique's main benefits. This kind of release could possibly be used as the initial course of treatment for patients with trigger thumbs, given the generally unfavorable outcomes of conservative measures. In addition to being efficient, safe, and well-tolerated by patients, percutaneous release of the trigger finger with an 18 G Needle saves the time and money associated with an open surgery. To prevent complications, it should be performed by a senior orthopedic or hand surgeon.

KEYWORDS: Trigger fingers, Percutaneous release, Success rate, A1 pulley, outpatient treatment and cost-benefit analysis

INTRODUCTION

The flexor tendon sheath thickening or its nodular thickening, resulting in a difference between the flexor tendon diameters/retinacular sheath of flexor and the A1 pulley, has been described as the cause of the trigger finger (TF), also known as stenosing

tenosynovitis. This condition contributes to the delayed and painful extension of the digit, pain, and disability.[1, 2] Pain, swelling, restricted finger motion, and a triggering feeling are the common symptoms of stenosing tenosynovitis, also known as trigger finger. The thumb or ring finger is said to be the most frequently affected finger, while the index and little fingers show the least symptoms. The main pathology is the flexor tendon becoming trapped due to the thickening of the A1 pulley, which creates a triggering mechanism. There is disagreement in the literature regarding the actual cause of this condition, and its etiology is still unknown, despite the fact that synovial proliferation and flexor sheath fibrosis are recognized as trigger factors.[3,4]

The trigger finger is one of the common causes of pain and disability of the hand.[2,5] When the patient flexes and extends the affected digit, the flexor tendon becomes painfully caught or popped.[6,7] The digit may occasionally lock in flexion and need to be passively moved in order to fully extend. Over time, secondary contractures at the proximal interphalangeal joint may result from the patient's guarding and unwillingness to fully move the digit.[8] Tendon entrapment is caused by the digital flexor tendons being mechanically impinged upon as they go through a constricted A1 pulley at the metacarpal head level.[9]

Due to its affordability, convenience of use, and lack of hospitalization requirements, orthopedic surgeons are choosing percutaneous release as their preferred technique. There are no major side effects, minimal post-operative morbidity, high patient satisfaction, and an early return to work.[10] Treatment comprises of local corticosteroid injections, splintage, hydrotherapy, analgesics, percutaneous release, and eventual open surgery in patients not responding to the above regimens.[11,12] Patient satisfaction and an earlier functional recovery are the outcomes of percutaneous release. This is a quick and affordable technique that avoids surgery and produces a superior functional outcome.[13]

The literature reports that conservative treatment has a 50–92% success rate out of the two treatment approaches. One of the conservative therapy options is to splint the finger and administer steroids or anti-inflammatory drugs.[14,15] The surgical option of releasing the A1 pulley is available if conservative treatment fails; success rates with this procedure have been recorded as high as 100%. Joint contractures, digital nerve damage, infection, and soreness around the scar among the side effects of surgical release that have been documented.[16] Since its introduction in 1958, percutaneous release procedures have shown success rates as high as 100% without any negative side effects.[17] With the benefits of being simple to use (even in an office setting), having few side effects, and having a high rate of patient satisfaction, percutaneous A1 pulley release is becoming the preferred approach for patients who are not responding to conservative treatment.[18,19]

Lorthioir initially reported a percutaneous release method using a tiny tenotome in 1958. Using a hypodermic needle, Eastwood et al. described percutaneous release. Numerous techniques utilizing diverse tools have been documented, yielding positive outcomes and little side effects (e.g., HAKI Knife; Solco, Seoul, Korea). Incomplete release, damage to tendons, arteries, and nerves, scar soreness, joint contractures, and infection are common post-operative complications following surgery.[20]

However, surgical release is reported to be involved in complications such as persistence, recurrence infection, scar tenderness, digital nerve injury, flexion contracture, and bowstringing.[21] Therefore, the aim of this study was to evaluate the rate of A1 pulley release by the percutaneous trigger finger release (PTFR) method and its complications.

MATERIAL AND METHODS

This investigation, carried out in the Department of Orthopedics, is a prospective observational research. Thirty patients in all were present. There were 25 females and 5 males present. There were 23 cases in the right hand and 7 in the left. 4 cases included the thumb, 6 cases involved the index finger, 10 cases involved the ring finger, and 10 cases involved the mid finger. A structured proforma was used to gather data. Following their presentation to the orthopedic consulting clinics, patients were chosen based on the predetermined criteria. The patients were informed about the study's goals, methodology, risks, and advantages before providing their formal written consent. Following the treatment, patients were monitored for a minimum of three months. During the last follow-up, patients had their finger range of motion assessed using a goniometer, which measured all three ranges. Direct questioning was used to gauge the patient's happiness with the procedure, and a satisfactory or very satisfactory response was accepted in the follow-up.

Inclusion criteria

- all adult patients (age> 18 years) presenting with trigger finger.

Exclusion criteria

- History of any injury to the hand and the presence of a scar or deep wound at the site of the incision.
- Trigger finger was diagnosed on the basis of clinical symptoms like pain, catching, and stiffness while those patients experiencing a recurrence of the same digit and those on anticoagulants were excluded.

Surgical Technique

The procedure's goal is to percutaneously release the A1 pulley using an 18-G needle. In the polyclinic, the skin was prepped using an antibacterial method. Using an insulin syringe, 1 cc of citanest was subcutaneously administered to anesthetize the skin covering the A1 pulley. In order to make the pulley easier to palpate, the affected thumb was hyperextended. The flexor tendon was punctured with a needle via the metacarpophalangeal crease. In order to see needle motions, the distal phalanx was slightly extended and flexed. The needle was then slightly withdrawn until there was no needle motion but phalanx motion. The A1 pulley's longitudinal axis was moved up and down by the sharp needle's edge to effect the release. Enough release was guaranteed by the abrupt release of resistance at the needle tip. While the needle was in place, free finger motions and the loss of triggering were noted. The same needle that was used for the introducer was also used to provide a 20-mg steroid injection. After the process was finished, a soft dressing was applied, and the operating time was noted. For three days, topical NSAIDs were used, with the sporadic use of paracetamol for pain management as needed. The third postoperative day saw a repetition of the clinical assessment.

Clinical evaluation

Thumb function was evaluated using a questionnaire. Questions about five activities requiring the use of the thumb were asked, and the pain-related disability was evaluated using a ten-point visual analog scale (VAS) for every single activity (VAS 0: no pain or disability; VAS 10: extreme pain or disability). The evaluated functions were as follows:

- ✓ Writing
- ✓ Opening a tight or new jar
- ✓ Carrying a heavy object (over 3 kg)
- ✓ Preparing a meal using a fork, spoon, and knife
- ✓ Turning a key

The total VAS score was obtained by adding the scores for all functions, averaging over a maximum of 50 points. All patients were instructed to vigorously move their fingers as needed during the recovery phase. To evaluate their functional range of motion, they were seen again in the clinic three months and one week after the treatment.

STATISTICAL ANALYSIS

The resultant data were entered into an SPSS version 10 statistical software program. Data were analyzed using a paired samples t-test.

RESULT: -

A total of 30 adult patients with trigger fingers were included in this study. The mean age was 39.45 years with a range of > 18 years. There were 5 males and 25 females. 23 cases were in Right Hand and 7 cases in the Left hand. The thumb was involved in 4 cases, the Index finger in 6 cases, the ring Finger in 10 cases, and the mid finger in 10 cases.

Table I: Symptoms, grading, and degree of hyperextension

Clinical features	Number (Percentage)
Symptoms at presentation	
Catching	10 (33.3%)
Pain	20(66.6%)
Stiffness	12 (40.0%)
Trigger finger grading	
Grade I- Pain and nodularity	10 (33.3%)
Grade II- Self-correctable triggering	17 (56.6%)
Grade III- Manually correctable triggering	17 (56.6%)
PIP Joint hyperextension (in degrees)	
0-5	20 (66.6%)
5-20	26 (86.6%)

The most frequently involved digit was the thumb (56.6%) followed by the index, middle, and ring fingers. The most frequent presenting symptom was pain (66.6%) followed by stiffness and catching with 33.3% each.

Table II: Information on patients

Patient Characteristic	Types	Number (Percentage)
Mean age (years)		36.48±10.12
Gender	Male/Female	5/25 (16.6%/83.3%)
Hand involved	Right/Left	23/7 (76.6%/23.3%)
Hand dominance	Right/Left	25/5 (83.3%/16.6%)
Digit involved	Thumb	4 (13.3%)
	Index	6 (20.0%)
	Middle	10 (33.3%)
	Ring	10 (33.3%)

There was complete relief of symptoms (pain/locking/catching) in 30 out of 30 fingers (100%). No patient had any recurrence in the three months period. The most frequently involved digit was the thumb (13.3%) followed by the index, middle, and ring fingers with 20.0%, 33.3%, and 33.3% respectively.

Table III: Patient Outcomes

	Number (Percentage)
Objective outcome at 3 months	
Satisfactory	20 (66.6%)
Unsatisfactory	10 (33.3%)
Subjective outcomes at 3 months	
Unsatisfactory	5 (16.6%)
Satisfactory	15 (50.0%)
Very satisfactory	10 (33.3%)
PIP Joint Hyperextension (in degrees) at 3 months	
0-5	1 (3.33%)
5-10	29 (96.66%)

Subjective and objective outcomes after three months were recorded.

DISCUSSION

One of the most frequent causes of hand disabilities and a frequent reason for patients to be referred to an orthopedic clinic is the trigger finger. The first course of treatment consists of non-surgical techniques such splinting, finger rest, and corticosteroid injections, which have a 38–93% success rate. The open release of the flexor tendon is the conventional treatment when non-surgical treatment fails, and it has an almost 100% success rate.[22] The ailment known as trigger finger has numerous treatment options. NSAIDs, local anesthetic/steroid injections, and the use of splints are all part of conservative treatment. Patients who did not respond to conservative treatment have surgery in which the A1 pulley is released. Discussions concerning the pros and cons of percutaneous release versus open surgery are currently ongoing. Percutaneous release has gained popularity due to its favorable complication rates, convenience of application, and cheaper cost.

The percutaneous surgical release technique performed by **Eastwood et al.1994**[23] is a convenient, minimally invasive, economical method with a very low complication rate, and is becoming more popular than open surgery. **Mohsen.2013**[24] in his study, reported a 97% success rate of percutaneous release in 40 trigger digits, the thumb is the most common digit, similar to our study which showed 100% successful release and the thumb was also the most common digit involved.

Mishra et al.2013[24] reported a case series of the percutaneous release of trigger fingers with the tip of a 20-gauge hypodermic needle in which they reported success rates of 95.4%, with no recurrence and concluded that the procedure was safe and effective with lower complication rates compared to open surgery. The thumb's radial digital neurovascular bundle and the A1 pulley have a strong anatomical link. Numerous studies advise against doing a trigger thumb percutaneous release and instead to proceed with an open release. **Pope and Wolfe 1995**[25] performed percutaneous release in 25 cadaveric palms and found that the radial digital nerve was as close as within 2 to 3 mm of the needle site in three of five thumbs and five of five

index fingers. **Ferhat Guler et al.2013**[26] reported digital nerve injury in 5.7% of patients who underwent percutaneous release of trigger thumb. In our study, none of the patients had such an injury.

The open release of the A1 pulley is a widely recognized therapeutic approach for all patients presenting with substantial complaints or for individuals who are not responding to conservative treatment. In spite of its success, it has drawbacks over percutaneous release, including the possibility of problems including nerve or digital artery injury and pain at the surgical site lasting up to two weeks.[27] Up to 91% of cases with single-dose steroid injections combined with percutaneous release have been reported to be successful.[28]

The results of this study demonstrated that the percutaneous method of releasing the trigger finger is a safe, economical procedure that greatly improves patient satisfaction. In contrast, open release necessitates a day care technique, the use of sterile equipment, a skin incision, and a suture. It is carried out in a clinic, requires only an anesthesia, and has demonstrated encouraging outcomes. The percutaneous release of the trigger finger turns out to be a very economical procedure in a nation with limited resources. The blind nature of the percutaneous procedure is its only drawback, although there aren't many difficulties. The reviewers are persuaded by this study, and it creates opportunities for more in-depth research in the future.

CONCLUSION:

In summary, a percutaneous release is an easy, secure, efficient, and reasonably priced way to treat trigger thumb. The injection of steroids using the same needle used for release is one of the technique's main benefits. This kind of release could possibly be used as the initial course of treatment for patients with trigger thumbs, given the generally unfavorable outcomes of conservative measures. In addition to being efficient, safe, and well-tolerated by patients, percutaneous release of the trigger finger with an 18 G Needle saves the time and money associated with an open surgery. To prevent complications, it should be performed by a senior orthopedic or hand surgeon. In expert hands, the trigger finger percutaneous release technique is a safe procedure that makes complete sense as an alternative to the open method in terms of simplicity, cost-effectiveness, less invasiveness, fewer complications, patient satisfaction, lower morbidity, and early return to work.

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