Revision of Incompletely Released Trigger Fingers by Percutaneous Release: Results and Complications

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Purpose: Percutaneous trigger digit release has been reported as a safe, effective, and quick procedure, but most surgeons convert to an open method for residual triggering after percutaneous release. This study evaluates the safety and efficacy of repeated percutaneous release for patients who had residual triggering after the initial percutaneous release.

Methods: Between January 2000 and December 2002, 31 patients with a mean age of 55 years had a repeat percutaneous release to treat residual snapping or locking symptoms. Surgery was performed in the physician's office using the tip of a 19-gauge needle mounted on a 2-mL syringe. Patients received regular postoperative follow-up examinations at 1, 6, and 12 weeks after surgery, and at the last visit, they completed a questionnaire regarding the duration of pain or swelling and when were they able to return to normal work.

Results: Twenty-eight digits (90%) were completely free of triggering. Three digits (10%) during follow-up evaluation had residual snapping. Of these, 1 patient had repeated percutaneous release, which achieved an excellent outcome; 1 patient favored an open-release technique, and 1 patient refused further treatment. No complications were identified at the final follow-up examinations. Almost all patients returned to normal work within 3 days.

Conclusions: Percutaneous A1 pulley release is an effective, safe, and convenient technique for the primary trigger finger and as a secondary procedure for patients who have residual triggering after the initial surgical procedure. (J Hand Surg 2006;31A:1288–1291. Copyright © 2006 by the American Society for Surgery of the Hand.)

Type of study/level of evidence: Therapeutic IV.

Key words: Trigger finger, percutaneous release, revision.

Trigger finger, or stenosing tenosynovitis of the thumb or finger flexor tendon, frequently occurs in adults. Triggering is produced by an enlarged tendon, swelling and thickening of the tendon's normally thin synovial covering, or thickening of the fibrous sheath through which the tendon glides.[1] Clinically, the symptoms of triggering are sometimes produced by a tendon nodule[2] or often by an enlarged tendon[1] that locks the flexor tendon at the level of the first annular pulley (A1 pulley). Patients typically complain of pain, swelling, and in some cases of having to grasp the digit with the other hand to extend the digit from its locked flexion position.

Numerous methods for treating trigger fingers have been developed. Nonsurgical treatments include extension splinting, administration of nonsteroidal anti-inflammatory drugs, and steroid injections. When conservative treatment fails, surgical release of the A1 pulley is indicated. Open release is typically performed via a small palmar incision under local anesthesia; the A1 pulley is completely visualized and opened. Although the success rate of open release is almost 100%,[3] complications have been described,[3,4] such as digital nerve

Table 1. Grades of Digit Triggering

Grade	Description
0, none	Even movement during flexion/extension
1, mild	Uneven movements during flexion/extension
2, moderate	Actively correctable; interferes with normal hand function
3, severe	Passively correctable; inability to active flex
4, locked	Fixed in flexion

injury,[4] infection,[4] stiffness,[5] weakness,[4] scar tenderness,[4] and bowstringing of the flexor tendons.[6]

Percutaneous release was first described by Lorthioir,[7] who obtained good outcomes with no complications. Several recent studies of the percutaneous release have also demonstrated favorable results.[8–11] Although percutaneous release for trigger digits is a quicker procedure[12] than the open approach, incomplete release or the need to convert to open release with this technique ranges from 0% to 11%.[8,13,14] In this prospective trial we treated patients who had residual triggering after the release with repeat percutaneous release and examined the outcomes.

Materials and Methods

From January 2000 to December 2002, 718 patients (812 digits) with grade 3 or higher triggering according to the classification of Eastwood et al[8] (Table 1) had primary percutaneous release. All were free of snapping symptoms immediately following the surgical procedure. During regular follow-up evaluations, 31 adult patients (31 digits) (10 men, 21 women; average age, 55 y) who had residual snapping or locking (≥ grade 2) after the primary percutaneous release were recognized. Table 2 presents the patients' characteristics; Table 3 presents the distribution of revision digits.

Table 2. General Characteristics of Patients

	Primary Release	Revision
Gender, n (M:F)	178:540	10:21
Mean age (range), y	52 (22–79)	55 (32–73)
Mean duration of symptoms (range), wk	4* (1–78)	2† (1–36)

*Symptom persisted before primary release.
†From primary release to revision.

Table 3. The Revision Rates for Each Digit

Affected Digits	Primary Release, n	Revision, n	Revision Rate, %
Thumb	291	11	4
Index	97	4	4
Middle	222	11	5
Ring	146	5	3
Small	56	0	
Total	812	31	4

Percutaneous Release and Follow-Up Evaluation

The primary and revision percutaneous pulley releases were performed in the outpatient department as described by Wolfe.[15]

Patients were examined at 1, 6, and 12 weeks after surgery. Postprocedure complications were recorded during follow-up examinations. At the final visit, patients completed a questionnaire to determine the dates on which they returned to normal work, motion became painless, full extension and flexion of the treated digit were achieved, and swelling subsided. Failure was recorded as persistent pain at the final follow-up examination, residual triggering (≥ grade 2), or a major complication including circulation problems, observable flexor tendon damage, or nerve injury.

Statistical Analysis

A testing hypothesis comparing the difference between the primary release vs. revision groups including successful rate and revision rate was adopted. The null hypothesis indicated that no difference existed between the proportions of 2 populations. The alternative hypothesis identified a significant difference between the proportions of 2 populations. A value of p less than $<.05$ was considered statistically significant.

Results

Of the 31 revision cases, 28 digits (90%) were completely free of triggering; revision for 3 digits (10%) failed. According to statistical analysis, the primary release failure rate (4%) was not significantly different from the revision failure rate (10%) ($p = .08$). There was no significant difference in the rate of residual triggering between digits in the primary percutaneous release group.

There were no major complications in this study. Of the 3 failed cases, 1 patient has a subsequent percutaneous release and achieved a successful outcome; 1 had open release, during which incomplete

Table 4. Results of Revision Percutaneous Release

Percutaneous Release Results	Mean Duration, d	Range of Duration, d
Return to work	>1	0–14
Postoperative swelling	1	0–7
Postoperative pain	11	1–30
Recovery of full motion	20	0–60

release of the distal A1 pulley with diffuse hypertrophic change was noted, and 1 refused further treatment.

The mean time for patients to return to normal work after repeat release was less than 1 day (range, 0–14 d). The mean time for return to normal range of motion was longer (20 d) than that required for the resolution of tenderness (11 d) and swelling (1 d). No patient with a successful outcome experienced long-term pain or loss of motion (Table 4).

Discussion

Patients with grade 3 or grade 4 trigger fingers and with failed conservative treatment require surgical release of the A1 pulley.[16,17] The open surgical procedure for trigger fingers is universally accepted and has a success rate of 97% to 100% with a recurrence rate of only 3%.[12,18,19] The procedure requires an operative facility and the surgical site requires wound care and can remain painful for up to 2 weeks; complication rates are 7% to 28%.[3–6] Since Lorthioir,[7] who first introduced the percutaneous method using a fine tenotome for trigger fingers, obtained excellent outcomes without complications for 52 patients, various procedural modifications have been used. Percutaneous division of the A1 pulley using a needle was first reported by Eastwood et al,[8] who achieved a success rate of 94%. Gilberts et al[12,19] concluded that percutaneous release was a quick procedure, was less painful, and obtained considerably better outcomes in rehabilitation than open surgery in the short term.[12]

One potential disadvantage of the percutaneous procedure is that it is a blind method; therefore, the approach can cause nerve or tendon damage. Nerve damage at the radial side of the thumb, however, has been reported only after open release and has not occurred with the percutaneous release procedure.[4,8,13,14,20]

Another concern associated with the percutaneous procedure is residual symptoms. Therefore, when percutaneous release failed, most surgeons preferred open release, which allows direct visualization of the remaining intact A1 pulley, does not damage the tendon, and achieves complete release of triggering.[21,22] Conversely, this approach is inconvenient for patients and increases the risk of nerve damage and scar formation.

In this study, the rate of residual symptoms for primary percutaneous release was 4%, which is compatible with that in other reports.[8,13,14] The failure rate for the revision group was 10%. The failure rate was not significantly different between the primary percutaneous release and revision groups, suggesting that patients for whom primary percutaneous release has failed can be treated as first time release. No difference existed in the revision rates for different digits. Although the thumb was more difficult to release because of its position during dissection, the rate of residual symptoms was approximately the same as that for the other digits.

After repeated percutaneous release for residual trigger fingers, the success rate in this study was 90% without any major complications. We propose that the reason for the residual symptoms is that during anesthetic injection, fluid volume lubricated some minor stenotic part of the tendon sheath tunnel. Consequently, even though the A1 pulley was not fully released, no snapping occurred at the time. After fluid resorption, however, residual snapping recurred as the residual unreleased pulley tightened. This can explain why triggering disappeared immediately after release, and snapping recurred within 1 week. To overcome the problem of residual symptoms using the blind percutaneous approach, patients were asked to keep the fingers in a neutral position, thereby loosening the skin when the needle was moved gently to release the A1 pulley. Sometimes we can use 2 separate release sites to release the A1 pulley as completely as possible. With a repeated percutaneous release, almost all patients returned to work immediately despite minimal local discomfort, and most pain disappeared within 1 month. Repeated percutaneous release was performed within a short period of time. Only 2 patients complained of local swelling; this swelling disappeared after 1 week. No major complications occurred, and no minor complications such as swelling or flexion contracture lasted longer than 2 months. These outcomes indicate that percutaneous release is a safe and quick procedure for incompletely released triggering that causes no scar formation, persistent pain, or wound care problems.

Received for publication April 18, 2006; accepted in revised form July 24, 2006.

The authors received funding for this study from Smith & Nephew Endoscopy.

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0363-5023/06/31A08-0005$32.00/0
doi:10.1016/j.jhsa.2006.07.015

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