Percutaneous release of the trigger thumb: is it safe, cheap and effective?

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Abstract Percutaneous release of the trigger finger and trigger thumb has recently gained popularity. The aim of this study was to determine the clinical results and safety of percutaneous release in trigger thumbs. Twenty-five thumbs of 21 patients were released percutaneously in the polyclinic under local anaesthesia. Steroid injection was performed following the release procedure using the same needle. The thumb function was evaluated by a patient questionnaire, and functional thumb scores (VAS) were calculated in the preoperative and postoperative periods. At the 1 week follow-up, four patients had signs of discomfort and triggering because of incomplete release. These patients underwent open A1 pulley release. Three superficial tendon lacerations were seen during these open procedures. There were no wound complications or signs of digital nerve or artery injury in any of the patients. The preoperative mean VAS was 26.62 (18–36). This decreased to 2.57 (0–5) at the first postoperative month ($P<0.001$) and to 2.19 (0–3; $P<0.001$) at the sixth month. When the VAS scores at the first and sixth months were compared, the difference was statistically significant. We concluded that percutaneous release of trigger thumbs is a cheap, safe and effective procedure with a low rate of complications.

Résumé La libération per-cutanée des doigts à ressaut s'est récemment développée, mais peu au niveau du pouce à cause de son orientation. Le but de cette étude était d'apprécier la fiabilité et le résultat clinique d'une telle libération sur 25 pouces chez 21 patients opérés sous anesthésie locale. Une injection de stéroïde était faite à la suite de la libération par la même aiguille. La fonction du pouce était évaluée par un questionnaire et un score fonctionnel (VAS) était calculé en période pré- et post-opératoire. Après une semaine quatre patients avaient des signes d'inconfort et de ressaut ce qui a conduit à une libération à ciel ouvert de la poulie A1. Trois lacérations superficielles de tendon étaient constatées durant ces interventions à ciel ouvert. Il n'y avait aucune complication vasculaire, nerveuse, ou cutanée. Le score pré-opératoire moyen était de 26,62 (18–36). Il diminuait à 2,57 (0–5) un mois après l'opération ($P<0,001$) et à 2,19 (0–3) ($P<0,001$) à 6 mois. Quand les scores VAS étaient comparés à 1 mois et à 6 mois de recul, la différence était statistiquement significative. Nous concluons que la libération per-cutanée des pouces à ressaut est une technique sûre avec peu de complication.

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Introduction

Stenosing tenosynovitis or trigger finger is generally characterised by pain, swelling, the limitation of finger motion and a triggering sensation [1]. It generally involves the thumb or index finger, but can be seen in any other finger [1]. The primary pathology is thickening of the A1 pulley with resultant entrapment of the flexor tendon, thus forming a triggering mechanism [2].

Of the two treatment methods, the success of conservative treatment is reported to be 50–92% in the literature. Steroid injection, anti-inflammatory drug use and splinting of the finger are among the conservative treatment measures [3, 4].

When conservative treatment fails, we have a surgical option of releasing the A1 pulley, which has success rates reported up to 100% [1]. The reported complications of surgical release are: infection, digital nerve injury, scar tenderness and joint contractures [5].

Percutaneous release was first performed in 1958, and success rates of up to 100% without any complications have been reported [6].

Nowadays, percutaneous A1 pulley release is the method of choice in patients unresponsive to conservative treatment, with the advantages of ease of application (even in the office), low complication rates and high patient satisfaction [7–9].

In this study, we aimed to evaluate the results of percutaneous release and local steroid application in patients with trigger thumb.

Patients and methods

Twenty-five thumbs of 21 patients who were unresponsive to conservative treatment were involved in this study. All patients had tenderness over the A1 pulley, tendon nodule and pain with thumb flexion and extension. Triggering was clearly observed in all patients. There were 14 female and 7 male patients, and the mean age was 38 (35–60). None of the patients had rheumatoid arthritis, diabetes mellitus or chronic systemic disease. All patients were right hand dominant. As 4 patients had bilateral involvement, 21 right and 4 left hands were involved. All patients were given information about the procedure, and the releases were performed by two surgeons who were experienced in hand surgery and percutaneous release of the A1 pulley.

Surgical technique

The aim of the procedure is to use an 18-G needle to release the A1 pulley percutaneously. The skin was prepared in the polyclinic using an antiseptic technique. The skin overlying the A1 pulley was anaesthetized by the subcutaneous administration of 1 cc of citanest using an insulin syringe. The involved thumb was hyperextended to facilitate palpation of the pulley. The needle was introduced through the metacarpophalangeal crease and into the flexor tendon (Fig. 1). The distal phalanx was slightly flexed and extended to observe needle movements, and the needle was slightly withdrawn until there was phalanx motion, but no needle motion.

Fig. 1 Insertion of the 18-G needle to release the A1 pulley

Release was performed by moving the sharp edge of the needle up and down in the longitudinal axis of the A1 pulley. The sudden relief of resistance at the needle tip ensured adequate release. Free finger movements and the loss of triggering were observed while the needle was in place, and a 20-mg steroid injection was performed using the same needle as for the introducer (Figs. 2 and 3). A soft dressing was applied after completion of the procedure, and the operative time was recorded. Topical NSAID were administered for 3 days with the occasional use of paracetamol for pain control when necessary. Clinical examination was repeated on the postoperative 3rd day.

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 analogue scale (VAS) for every single activity (VAS 0: no pain or disability; VAS 10:

Fig. 2 Administration of steroid using the same needle

Fig. 3 Photography after all of the procedures were completed

extreme pain or disability). The evaluated functions were as follows:

- 1 writing
- 2 opening a tight or new jar
- 3 carrying a heavy object (over 3 kg)
- 4 preparing a meal using a fork, spoon and knife
- 5 turning a key

The overall evaluation was done over a maximum of 50 points by the summation of scores for each function to reveal an overall VAS score. Every patient completed this evaluation form preoperatively, at 1 month postoperatively and at 6 months postoperatively.

To aid in the clinical evaluation, a VAS <5 was accepted as an excellent result. A VAS of 5–10 was accepted as a good result, a VAS of 10–15 as a moderate result and a VAS of >15 as a bad result.

Statistical analysis

The resultant data were entered into a SPSS version 10 statistical software program. Data were analysed using a paired samples t-test. The results were considered significant if $P < 0.05$.

Results

The mean operative time was 9.5 min (8–14), including the local anaesthesia of the patient. When the patients were reexamined on the third postoperative day, 21 (84%) patients had total relief of symptoms with a painless full range of motion of the thumb with no objective or subjective triggering sensation (mean VAS =4; range, 2–8). These patients were not given any additional treatment. The remaining four patients (16%; three dominant and one non-dominant) had incomplete relief of symptoms (mean

Table 1 Preoperative and postoperative 1st month VAS's

VAS score	N	Mean	SD	P
Preoperative VAS	21	26.62	4.79	0.000
Postoperative 1st month VAS	21	2.57	1.66	

VAS =35; range, 25–50). They were given oral and topical NSAID treatment and hyperextension exercises and were re-examined 1 week later. The clinical picture did not improve in any of these patients, and all underwent mini open release of the A1 pulley. In all four patients, intraoperative observation revealed incomplete release of the A1 pulley. The operative time for these open release patients was 20 (18–25) min starting with the administration of the local anaesthetic. These four patients were re-examined at the first postoperative week, and they had full relief of their symptoms except for a slight discomfort at the incision site. These patients were the 2nd, 6th, 8th and 11th patients operated on in the group of 25 patients.

When the patients (the first 21 and the second 4) were re-examined at the first and sixth months, all were satisfied with the results of the surgery and had fully returned to work and sports activities together with household chores (mean VAS =2; range, 0–4).

The preoperative mean VAS was 26.62 (18–36). This decreased to 2.57 (0–5) at the first postoperative month ($P < 0.001$) and to 2.19 (0–3) ($P < 0.001$) at the sixth month (Table 1). When the VAS scores at the first and sixth months were compared, the difference was statistically significant ($P = 0.002$) (Table 2).

Regardless of the final type of treatment (percutaneous or open), none of our patients had complications such as inflammation, oedema, digital nerve injury or intrinsic wasting. During open release, we saw superficial flexor tendon lacerations in three of four patients, but these did not interfere with tendon function (Fig. 4).

Discussion

The majority of patients with mild to moderate trigger fingers are treated with extension splints, anti-inflammatory drugs or steroid injection [10]. In the literature, the success rate of the single-dose administration of a steroid is reported to be 50%, which further decreases in the presence

Table 2 VAS's in postoperative 1st and 6th months

VAS score	N	Mean	SD	P
Postoperative 1st month VAS	21	2.57	1.66	0.002
Postoperatif 6th month VAS	21	2.19	1.54

Fig. 4 The superficial laceration of the flexor tendon seen in one of the failed cases during open surgery

of diabetes [11]. Open release has a success rate of 99% [11]. In all patients with significant complaints or in patients unresponsive to conservative treatment, open release of the A1 pulley is a universally accepted treatment method. Despite its success, when compared to percutaneous release, it has disadvantages such as surgical site pain for up to 2 weeks and potential complications such as digital artery or nerve injury [12]. Single-dose steroid injection combined with percutaneous release has a reported success rate of up to 91% [13]. In our study with the same type of treatment, our success rate was 84%, and this was in concordance with the literature.

Percutaneous release was first done in 1958 with additional tenotomy. Then the technique was modified, and success rates reaching 90% have been reported [6, 14, 15]. In our study, the success rate was 84% (21/25).

In cadaveric studies, damage to the flexor tendons were seen following percutaneous release, but these all were small longitudinal tears [16]. We also detected small longitudinal tears in three of four patients who underwent open release, but in neither percutaneously nor open released patients did we see any thumb dysfunction.

We think that the problem with the four thumbs was our anxiety about the proximity of the digital nerves with the needle insertion site. Digital nerves are just a few millimetres away from the A1 pulley [16]. As we could not see the nerves, we were afraid of causing iatrogenic nerve damage. Because of this relation of the nerve with the pulley, some authors do not favour percutaneous release [16, 17].

The cases with incomplete release were among the first cases in our list. None of the last 14 patients had complications. The failures in the first cases were attributed to our inexperience during the learning curve.

The decrease in the VAS scores from the first postoperative month was anticipated, but the continuation of this decrease at the six month examination was not. The

statistical significance of this phenomenon can be attributed to the patients' increased self confidence and regained ability to use their thumbs over time.

In the literature, no clinical difference was found between the trigger thumbs and fingers following percutaneous release with steroid injection [18]. We use percutaneous release also for trigger fingers in our clinic, and our short-term results are similar to trigger thumbs. With increasing experience, this technique can be applied safely to all fingers.

Conclusion

In conclusion, percutaneous release is a simple, safe, effective and cheap method of treatment in the management of the trigger thumb. One of the major advantages of this technique is the injection of steroids using the same needle used for release. In view of the relatively bad results of conservative treatment, this type of release could even be done as the first line of treatment in patients with trigger thumb.

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