Percutaneous trigger finger release with an MS64 scalpel

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Summary

Introduction: Trigger finger is one of the common causes of hand pain and disability. The percutaneous surgical technique is a convenient, cost-effective method with a low complication rate. The object of this study is to produce a new technique for percutaneous trigger finger release using an MS64 scalpel.

Methods: When conservative treatment fails, open or percutaneous A1 pulley release is recommended. Various methods using several instruments have been reported. We used an MS64 scalpel in percutaneous trigger finger release. An anatomical study was performed.

Results: Percutaneous release was performed in 58 chronic trigger finger cases (15 females, 18 males, mean age of 63 years). Satisfactory results were achieved in 57 (98.27%), according to Strickland’s evaluation method.

Conclusion: Percutaneous surgical release with an MS64 scalpel is a safe effective technique to treat trigger fingers Green’s grade II-IV.

Level of evidence: IV cases series.

KEY WORDS: trigger finger disorder, percutaneous release.

Introduction

Trigger finger is a frequent condition which can develop in childhood (in the thumb area). However, the highest incidence occurs for people aged 50-60, mostly females¹,².

The etiology of this condition is unknown. One can palpate a nodule on the metacarpophalangeal joint (MCP), which some Authors consider is caused by the bunching up of spiral fibers of the flexor and by the constriction of the tendon sheath that corresponds to the A1 pulley. That nodule creates a conflicting ratio between the space it takes up and the space the pulley occupies, which causes proximal locking and leads to characteristic symptoms². Structural studies have proved the proliferation of chondrocytes and the presence of type III collagen fibers in the pulley affected pulley (A1). This is why some Authors talk about a kind of fibrocartilaginous metaplasia in the pulley and on the corresponding surface of the tendon secondary to the influence of chronic compressive strength¹-⁴.

In early clinical stages, patients come to the consultation because they feel vague discomfort and also have difficulty extending one finger or more, which can be fixed with forced passive extension. This causes intense pain and makes patients feel a sort of crack.

In more advanced stages, the tendon is barely able to move into the sheath, which results in the appearance of a characteristic feature: the trigger finger. The appearance of a nodule on the thumb is more painful and incapacitating than when it occurs on other fingers as it makes it difficult to perform a pincer grasp. In all cases, the clinical features and palpation of the nodule in the flexor tendon of the affected finger proximal to the metacarpophalangeal joint suffice to make a diagnosis.

A natural resolution for the condition is possible, but in most cases hand pain and limited use need a therapeutic solution. The first treatment can consist of rehabilitation and local infiltration of corticosteroids, but in those cases in which patients do not respond to treatment, performing a surgical opening on the A1 pulley is required. This can be achieved by the conventional open technique or the percutaneous surgery described by Lorthioir in 1958, which was simplified by Eastwood in 1992 using a 19-21 gauge needle¹,²,⁴-⁹.
The aim of this study is to describe a technical modification of the percutaneous surgery for trigger finger, and to show the steps to follow and an anatomical dissection in a cadaveric model of the anatomical references on each finger. An analysis of the results obtained by that technique on a number of patients was also carried out.

**Materials and method**

The current study is a retrospective, descriptive, and observational study that was conducted at the Clinic-Malvarrosa University Hospital, Valencia (Spain). 33 patients (15 females, 18 males) were treated in 2016 by the same surgeon (58 fingers).

**Inclusion criteria:**
- Patients diagnosed with trigger finger Green’s grade II-IV10-11.
- Location on any finger.
- Aged over 15 years.
- Having referred to symptoms for more than 3 months with unsuccessful conservative treatment.

**Exclusion criteria:**
- Previous surgery on the affected finger.
- Trigger finger grade I (classification modified by Green).

All the patients underwent percutaneous release using an MS64 scalpel, and the minimal follow-up time was 6 months. The purpose, procedure, risks and benefits of the study were explained to patients from whom a formal written consent was taken. Postoperative monitoring was carried out according to the therapy protocol after 10 days, 6 weeks and 6 months. The results were evaluated and presented according to Strickland’s method12, including the involved finger, functional recovery, finger range of motion and surgical complications. Data were analyzed by SPSS v21.

**Anatomical study in a cadaveric model**

Anatomical dissection was performed to study the anatomical references (particularly the neurovascular ones) in each finger.

**Results**

For our case study, the general characteristics of the data recorded in the series are shown in Table I. The mean patient age was 63 (range between 21-87) and the mean duration of symptoms was 6.9 months (range...
between 3-18 months). The most frequent occurrence took place in the 4th and 1st fingers, and the ratio of cases according to gender (male/female) was 18/15. Source: Health history
Surgery was performed under local anesthesia and without ischemia that lasted 5 minutes on average. No case of recurrence was observed during the study period, nor were neurological lesions found. According to Strickland’s evaluation method, 100% cases showed Excellent or Good results (47/11 respectively), with total recovery of mobility. Only one case presented some discomfort and swelling of the treated finger, which the patient associated with trauma where the proximal interphalangeal joint was. After a radiographic study and magnetic resonance imaging, it was ruled out as being related to the surgery carried out in any way. The average duration of postoperative pain was 5 days and the recovery of motor function took 10 days on average. The time before returning to work was 10 days on average (Tab. II). Source: Health history
Anatomical study: the flexor tendons of the 3rd and 4th fingers followed the axis of the finger itself. However, the 2nd and the 5th fingers leaned slightly toward the carpal tunnel, a fact that must be taken into account when the surgical approach occurs (Fig. 4). In the specific case of the thumb, the anatomical course of both the collateral nerves and the vascular bundle must be known (Fig. 5). For this reason, a distal approach to the pulley and its retrograde release are safer, and there is no need to apply any proximal ap-
Discussion

Currently, open release is still the pillar of surgical treatment of trigger fingers, mostly in areas where percutaneous release is limited. Conservative management is also carried out in early stages and on patients not willing to undergo release surgery, which also includes corticosteroid injections. The main disadvantage of open treatment is the small but defined incidence of complications like infections, pain, appearance of scars, stiffness or joint weak-
ness, dislocation of flexor tendons due to injuries on pulleys and digital nerve or artery damage. The percutaneous surgical release technique performed by Eastwood et al. is a convenient economical method that is minimally invasive, and has a very low complication rate. It is becoming more popular than open surgery.

In his study, Elsayed observed a high success rate (97%) of percutaneous release with 40 fingers. The thumb and the 4th finger are the commonest ones, as in our study, with a 100% release rate. Sahu et al. reported successful results in 95.6% of patients (excellent in 82.6% and good in 13% cases). In another study, Diab analyzed 43 patients in which he reported incomplete A1 pulley release for three fingers in 6.97% cases and superficial laceration of the flexor tendon with six fingers (13.95%). Ha KI et al. reported no complications after their 185 PR procedures. Amrani et al. reported no complications, but two recurrences in their 63 PR cases. Pope et al. indicated that 10-15% of the area distal to the pulley could not have been cut by PR. Bekir did not indicate any complications in 48 cases with premature return to their daily activities. Recently, Marij et al. in their study on 52 patients treated with an 18-gauge needle, and Weiss who treating 596 trigger fingers, concluded that it was a safe and cost-effective technique.

There is a close anatomical relation between the radial digital neurovascular bundle of the thumb and the A1 pulley, as seen in the anatomical dissection (Fig. 5). Some studies recommend not performing percutaneous release on the thumb and carrying out open release instead. Pope and Wolfe performed percutaneous release in 25 cadaveric palms and found that the distance between the radial digital nerve and the

Figure 4. Anatomical view of A1 hand pulleys.

Figure 5. Thumb’s Anatomical dissection: NV= collateral nerve; FT: flexor tendon; A1: Pulley.
Percutaneous surgical release with an MS64 scalpel is a safe effective technique to treat trigger fingers that implies, minimal aggression to soft parts and fast recovery. It is a semi-invasive, very quick and simple, outpatient technique that can be applied from the beginning. It is well-tolerated, cost-effective, entails few resources, and provide satisfactory results. It is necessary to have perfect command of anatomy and have performed open surgeries before.

This surgical technique is indicated for the Grade II-IV cases of the Green Classification (inclusion criteria of the present study). The use of a specific scalpel for percutaneous surgery like an MS64 scalpel, facilitates surgical work compared to performing a cut with the bevel of a needle, and thus avoids incomplete A1 pulley releases.

With the thumb, we saw in the anatomical dissection, that distal to proximal release was safer with a lower risk of neurovascular injury.

Conflicts of interest

The Authors declare no conflicts of interest for this study.

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