RESEARCH ARTICLE

Percutaneous Release of Trigger Fingers: Comparing Multiple Digits with Single Digit Involvement

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Abstract

Background: To evaluate safety and efficacy of percutaneous release of trigger finger in multiple digits involvement in comparison with single digit involvement.

Method: A number of 100 patients (131 fingers) were treated by percutaneous release and divided into two groups: single digit (group A) and multiple digits (group B). They were followed up for one year. Success rate, pain, complications and duration of analgesic use were studied and then compared in both groups.

Results: All patients in both groups were treated successfully without any recurrence in a one-year follow-up. No complication was observed, but postoperative duration of pain was significantly different between the two groups. Period of painkiller use was also different between the two groups.

Conclusion: Percutaneous release is a safe and effective treatment for trigger fingers even if multiple digits are involved. It is also safe in thumb and index finger involvement and diabetic patients.

Keywords: Multiple digits, Percutaneous release, Trigger finger

Introduction

Stenosing tenosynovitis or trigger finger is a common cause of pain and disability of the hand in adults. The most common type occurs in the middle-aged women who are otherwise healthy (1). Multiple digit involvement is also common where the thumb is the most common involved finger followed by the ring, long, fifth, and index finger. Secondary trigger finger is common in patients with diabetes mellitus, gout, kidney disease, and rheumatoid arthritis (1).

Trigger finger has been classified into four grades. In grade 1, there is pain and tenderness over the A1 pulley with no entrapment or catching during examination. In grade 2, there is a visible entrapment but the patient is able to extend the finger actively. In grade 3, entrapment needs passive extension (grade 3A) or causes inability to actively flex the finger (grade 3B). In grade 4, entrapment causes fixed flexion contracture of the finger (2).

Surgery could be done as open or percutaneous release. Some surgeons have reported up to 26% dissatisfaction after an open release. However, percutaneous release has been reported as a safe and effective method in place of an open release. This method has 74-100% success rate and can be done in the outpatient clinics.

To the best of our knowledge, no study has been performed to date to investigate if percutaneous release for multiple digit involvement is as safe and effective as a single digit involvement. Thus, this prospective study was carried out to answer this question.

Materials and Methods

From March 2011 to June 2013, 100 patients with grade 2, 3A, 3B, and 4 trigger finger in one or more digits were treated in our upper limb surgery clinic by percutaneous release (131 fingers). The exclusion criteria were having previous surgery on the finger, congenital trigger thumb, corticosteroid injection in the last three months before surgery, diseases that involve the joints as rheumatoid arthritis or other connective tissue diseases and coexisting symptomatic carpal tunnel syndrome or de Quervain disease. Diabetic patients were not excluded from the study.

After local anesthesia using 1.5- 3 cc of 2% xylocaine, A1

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pulley was released using a 19-gauge needle according to Eastwoods and colleagues technique (3). Post-operative range of motion was recorded by taking photographs of the finger during full flexion and extension. The patients were encouraged to move the operated fingers immediately after operation and do daily mobilization according to their tolerance. All patients were followed up for 12 months.

Patients were divided into two groups: group A (single digit involvement) and group B (multiple digit involvement). Range of motion was measured immediately after the surgery, after 3 weeks, 3 months and 6 months post-operatively. All patients filled the visual pain scale chart before the surgery and after each subsequent visit. Also, they were asked to report the duration they had to use a pain killer after the operation. Then, patients were followed up for one year after surgery using phone call communications. The treatment was considered as a failure if there was pain or catching during the first three months after surgery while relapse of pain or catching after being pain free for three months was considered recurrence.

Results

In this study 76 patients had a single digit involvement (78 fingers, group A) and 24 patients had multiple digit involvement (53 fingers, group B). Mean age of the patients in groups A and group B were 52 and 50 years old, respectively ($P = 0.38$). Group A consisted 56 women (74%) and 20 men (26%) while group B consisted 22 women (92%) and two men (8%) ($P = 0.016$).

In the group A, the most common involved finger was the thumb (67%), followed by the ring (14%), long (13%), index (4%), and fifth finger (1.3%). In the group B, the most common involved finger was also the thumb (32%), followed by the long (23), ring (21%), fifth (15%), and index (9.4%) finger [Figure 1].

Range of motion was complete immediately after surgery (still under local anesthesia) and after three weeks, three months, six months and one year post-operatively. Considering visual pain scale, the two groups were statistically different at three weeks after surgery ($P < 0.001$), but no difference was observed at three months ($P = 0.35$), and six months ($P = 0.7$) post operatively, [Table 1].

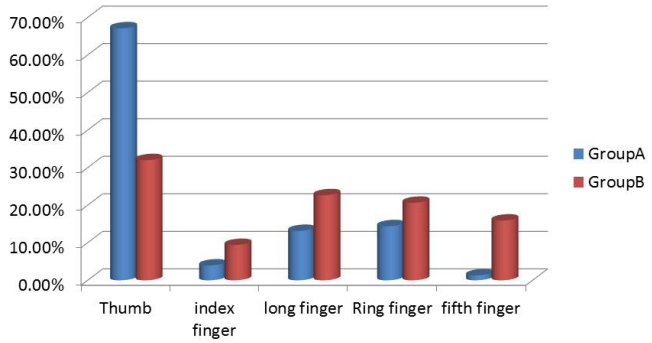

Figure1.Distribution of digits

Mean time of using painkiller was 4.36 days in group A and 11.20 days in group B ($P < 0.001$). There was no failure of treatment or recurrence in both groups. There was no complication such as neurovascular injury or flexion contracture in any patient of both groups, even in the diabetic patients (two patients in group A and three patients in group B).

Discussion

Trigger finger is a common cause of pain and disability, especially in the middle-aged women. It has been treated by several different methods including splinting, corticosteroid injection, open and percutaneous releases.

Colbourn and colleagues reported 54% resolution of symptoms by splinting metacarpophalangeal joint of the affected finger with custom made splint for 6 to 10 weeks (4). Corticosteroid injection has been supported in the literature to be effective in about half of the patients after one injection and up to 86% cure rate after the second injection (5-12). However, its relapse rate has been reported to be up to 29% (13, 14).

Open surgical release is the standard of treatment for the trigger finger. It has a high success and low recurrence rate. But it also might have potential complications such as scar discomfort (especially when multiple digits are released), infection, bowstringing and neurovascular injury (15-17). There are studies that have reported dissatisfaction rate of 26% for this method (18). Thus, tendency for minimizing the incision for A1 pulley release has led to using percutaneous release for trigger fingers. Gilberts and colleagues reported 100% success rate for percutaneous release compared to 98% for open release. Operation time and duration of pain was significantly lower in percutaneous release (19). Chao and colleagues (20) and Zyluk and Jagielski (21) reported 96% and 100% success rates for percutaneous release, respectively. Ragoovansi and colleagues (22) reported 94% cure rate for percutaneous release of 240 fingers. However, they had 10 recurrences.

This study was performed to compare the results of multiple digits versus single digit trigger finger release using percutaneous technique. It also compared the pain level using visual pain scale and also studied the period of using painkiller in the two studied groups. Patients who had a recent corticosteroid injection (three months before the surgery) or had concomitant carpal tunnel syndrome or de Quervain disease were excluded because of possible effect of these conditions on the duration of pain and using painkiller post-operatively.

Some authors have advocated against using

Table 1. Mean VPS and *P* value of both groups

Time	Group	Mean VPS	*P* value
3 Weeks	A B	0.5526 1.5417	$P<0.001$
3 Months	A B	0.0658 0.1250	$P=0.35$
6 Months	A B	0.0263 0.0417	$P=0.7$

percutaneous release on the thumb and index fingers because of the high rate of neurovascular injury, since tendon sheath and neurovascular bundle are in close proximity (23). Nevertheless we used it cautiously while considering some important rules. The average distance from A1 pulley to the digital nerves in the thumbs is 2.9 mm at the metacarpophalangeal crease. The radial digital nerve, the most vulnerable structure, passes diagonally across the flexor tendon a few millimeters proximal to the metacarpophalangeal flexion crease. In order to prevent digital nerve damage the needle should be held above the tendon in the midline of the thumb and a radial approach should be avoided. Secondly, the needle should be inserted a few millimeters distal to the metacarpophalangeal flexion crease. Thirdly, the thumb should be held in full extension during the procedure as this will move the tendon and A1 pulley anterior to the neurovascular bundle. And finally, the forearm should be placed in hyper-supination to make the palmar surface of thumb in a horizontal plane for good orientation (24).

No complication such as infection or neurovascular damage was seen in both groups. Success and complication rates of both groups were comparable to other studies so that we could consider percutaneous release as a safe and effective method of treatment in multiple digit involvement. No contracture or need for physiotherapy was recorded even in the five diabetic patients in both groups unlike Park and colleagues' study (25). They used a specific designed device for percutaneous release and this may have made a difference in the results. Nevertheless, studies with larger number of diabetic patients are required to prove safety of this method in this patient cohort.

Percutaneous release of trigger fingers and thumb is an effective and safe method of treatment. It was shown that the method is safe and effective for multiple digit involvement as well as for a single digit involvement although more duration of pain should be expected post-operatively when multiple digit are involved. This method is also safe and effective for the thumb and index fingers and in the diabetic patients in which mutiple digits are usually involved.

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References

1. Freiberg A, Mulholland RS, Levine R. Nonoperative treatment of trigger fingers and thumbs. J Hand Surg Am. 1989; 14(3);553-8.
2. Ha KI, Park MJ, Ha CW. Percutaneous release of trigger digits. J Bone Joint Surg Br. 2001; 83(1):75-7.
3. Eastwood DM, Gupta KJ, Johnson DP. Percutaneous release of the trigger finger: an office procedure. J Hand Surg Am. 1992; 17(1):114-7.
4. Colbourn J, Health N, Manary S, Pacifico D. Effectiveness of splinting for the treatment of trigger finger. J Hand Ther. 2008; 21(4):336-43.
5. Newport ML, Lane LB, Stuchin SA. Treatment of trigger finger by steroid injection. J Hand Surg Am. 1990; 15(5):748-50
6. Patel MR, Bassini L. Trigger fingers and thumb: when to splint, inject, or operate. J Hand Surg Am. 1992; 17(1):110-3.
7. Marks MR, Gunther SF. Efficacy of cortisone injection in treatment of trigger fingers and thumbs. J Hand Surg Am. 1989; 14(4):722-7.
8. Griggs SM, Weiss AP, Lane LB, Schwenker C, Akelman E, Sachar K. Treatment of trigger finger in patients with diabetes mellitus. J Hand Surg Am. 1995; 20(5):787-9.
9. Kolind-Sorensen V. Treatment of trigger fingers. Acta Orthop Scand. 1970; 41(4):428–32.
10. .Marks MR, Gunther SF. Efficacy of cortisone injection in treatment of trigger fingers and thumbs. J Hand Surg Am. 1989; 14(4):722–7.
11. Newport ML, Lane LB, Stuchin SA. Treatment of trigger finger by steroid injection. J Hand Surg Am. 1990; 15(5):748–50.
12. Benson LS, Ptaszek AJ. Injection versus surgery in the treatment of trigger finger. J Hand Surg Am. 1997; 22(1):138–44.
13. Sato ES, dos Santos JB, Belloti JC, Albertoni WM, Faloppa F. Percutaneous release of trigger fingers. Hand Clin. 2014; 30(1):39-45.
14. Kachooei AR, Nota SP, Menendez ME, Dyer GS, Ring D. Factors associated with operative treatment of de quervain tendinopathy. Arch Bone Jt Surg. 2015; 3(3):198-203.
15. Carrozzella J, Stern PJ, Von Kuster LC. Transection of radial digital nerve of the thumb during trigger release. J Hand Surg Am. 1989; 14(2 Pt 1):198-200
16. Heithoff SJ, Millender LH, Helman J. Bowstringing as a complication of trigger finger release. J Hand Surg Am. 1988; 13(4):567-70.
17. Turowski GA, Zdankiewicz PD, Thomson JG. The results of surgical treatment of trigger finger. J Hand

Surg Am. 1997; 22(1):145-9.
18. Thorpe AP. Results of surgery for trigger finger. J Hand Surg Br. 1988; 13(2):199–201.
19. Gilberts EC, Beekman WH, Stevens HJ, Wereldsma JC. Prospective randomized trial of open versus percutaneous surgery for trigger digits. J Hand Surg Am. 2001; 26(3):497-500.
20. Chao M, Wu S, Yan T. The effect of miniscalpel-needle versus steroid injection for trigger thumb release. J Hand Surg Eur Vol. 2009; 34(4):522–5.
21. Zyluk A, Jagielski G. Percutaneous A1 pulley release vs steroid injection for trigger digit: the results of a prospective, randomized trial. J Hand Surg Eur Vol. 2011; 36(1):53–6.
22. Ragoowansi R, Acornley A, Khoo CT. Percutaneous trigger finger release: the 'lift-cut' technique. Br J Plast Surg. 2005; 58(6):817–21.
23. Wolfe Hotchkiss Pederson kozin. Green's operative Hand Surgery. 6 th ed. Philadelphia: Elsevier Churchill Livingstone, 2011. P. 2076
24. Maneerit J, Sriworakun C, Budhraja N, Nagavajara P. Trigger thumb: results of a prospective randomised study of percutaneous release with steroid injection versus steroid injection alone. J Hand Surg Br. 2003, 28(6):586–9
25. Park MJ, Oh I, Ha KI. A1 Pulley release of locked trigger digit by percutaneous technique. J Hand Surg Br. 2004; 29(5): 502-5.