



## Percutaneous Versus Open Release of Trigger Finger

### KEYWORDS

Trigger finger; percutaneous; open release; A1 pulley.

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**ABSTRACT** *Background:* Trigger finger, also known as stenosing tenosynovitis, is a common disorder characterized by catching, snapping, or locking of the involved finger that leads to limitation of finger range of motion, pain, and difficulty gripping objects. It is caused by nodule formation or thickening of A1 pulley by its fibrocartilage metaplasia resulting in entrapment of the flexor tendon, thus forming a triggering mechanism.

*Material and Methods:* This was a prospective hospital based study conducted from January 2014 to December 2015. Eighty five patients having idiopathic trigger fingers were included in our study, out of these 43 patients (50.59%) were treated by percutaneous technique and 42 (49.41%) were treated by open surgical method in minor operation theatre. Statistical analysis was made based on Fischer exact test.

*Results:* The average surgical time was 4.95 minutes in percutaneous method and 23.1 minutes in open method. In the percutaneous group 18 patients (41.86%) developed a sensation of heaviness and numbness in the region of A1 pulley, similar complaint was noticed by 22 patients (52.38%) from open surgical group. Digital nerve injury indicated by hypo-aesthesia in involved digit was noted in 7 patients (16.28%) of percutaneous group and 3 patients (7.14%) of open surgical group. Residual triggering was noted in 5 patients (11.63%) from percutaneous method and none of the patients from open surgical method. Superficial infection was noted in 6 patients (14.29%) in open surgical group and none of the patients from percutaneous group developed this complication.

*Conclusion:* Though both percutaneous and open surgical release have their own advantages, both are associated with few complications of their own. Percutaneous release requires less time and when done in a proper way is as effective as open surgical release.

### Introduction

Trigger finger, also known as stenosing tenosynovitis, is a common disorder characterized by catching, snapping, or locking of the involved finger that leads to limitation of finger range of motion, pain, and difficulty gripping objects. Triggering occurs when the gliding movement of the tendon is blocked due to a mismatch between the size of the flexor tendon and the osteofibrous canal of the A1 pulley, preventing the tendon from naturally extending and returning to its initial position.<sup>1</sup> It is caused by nodule formation or thickening of A1 pulley by its fibrocartilage metaplasia resulting in entrapment of the flexor tendon, thus forming a triggering mechanism.<sup>2,3</sup> It also appears to be linked to other diseases, such as rheumatoid arthritis, gout, carpal tunnel syndrome, De Quervain's tenosynovitis, and diabetes mellitus. Trigger finger is more common in middle-aged women and frequently involves the ring finger and thumb.<sup>4</sup>

Multiple treatment methods are available. In early phases of the disease (mild cases), activity modification, nonsteroidal anti-inflammatory drugs, splinting, and intrasheath corticosteroid injections may provide complete symptom relief. Single or multiple corticosteroid injections have been shown to be effective in approximately 93% of patients.<sup>5</sup> Surgical release of A1 pulley is indicated when conservative treatment fails<sup>6</sup>, which can be performed using conventional open surgery or percutaneous release technique.<sup>7</sup> Both are associated with complications such as flexor tendon injury, digital nerve injury, digital vascular injury, scar contracture, bowstringing, continued triggering, and complex regional pain syndrome.<sup>8,9</sup>

We conducted this study to compare the incidence of recurrence and complications in percutaneous and open

methods of trigger finger release.

### Material and Methods

This was a prospective hospital based study conducted from January 2014 to December 2015. Eighty five patients having idiopathic trigger fingers were included in our study, out of these 43 patients (50.59%) were treated by percutaneous technique and 42 (49.41%) were treated by open surgical method in minor operation theatre. Under aseptic precautions hand was painted and draped. 1-2 cc of 2% lignocaine was injected subcutaneously at the site of A1 pulley for local anaesthesia.

### Surgical technique

**Percutaneous release:** 18 gauge hypodermic needle was inserted in the region of the metacarpal head [Figure 1], flexor tendon felt and needle slid along it till the proximal extent of A1 pulley was felt. The sharp edge of the needle was used to cut the A1 pulley from distal to proximal along the flexor tendon. Completeness was assessed by asking the patient to actively move the finger and check for persistent triggering. Post operatively adhesive dressing was used for two days followed by active movements of finger along with exercises using hot water bath.

**Open surgical method:** A single dose of first generation cephalosporin was given 30 minutes before the procedure. 1 cm transverse incision was made over the metacarpo-phalangeal joint, by blunt dissection flexor tendon is identified, neurovascular bundles on either side of the tendon were protected by two retractors. A1 pulley identified [Figure 2] transected from proximal to distal extent. Completeness was checked and skin was closed using a non-absorbable suture after giving a wash. Sterile dressing was applied and patient was put on oral antibiotics and

analgesics. Active mobilization was allowed as per patient's tolerance. Dressing was done on 2nd and 6th post operative day and suture was removed on 10th day.

Patient's were followed up at 1month, 3months and 6 months. At every follow-up patient was evaluated for recurrence of trigger finger and for the presence of complications.

Statistical analysis was done using Fischer exact test. A p value of less than 0.05 was considered statistically significant.

## Results

Out of the 85 patients, 18 were males (21.18%) and 67 females (78.82%). Dominant hand was involved in 44 patients (51.76%).

The average surgical time was 4.95 minutes in percutaneous method and 23.1 minutes in open method.

In the percutaneous group 18 patients (41.86%) developed a sensation of heaviness and numbness in the region of A1 pulley which disappeared in 7 days, similar complaint was noticed by 22 patients (52.38%) from open surgical group with a p value of 0.38..

Digital nerve injury indicated by hypoaesthesia in involved digit was noted in 7 patients (16.28%) of percutaneous group and 3 patients (7.14%) of open surgical group with a p value of 0.31.

Residual triggering was noted in 5 patients (11.63%) from percutaneous method and none of the patients from open surgical method with a p value of 0.0553.

Superficial infection was noted in 6 patients (14.29%) in open surgical group and none of the patients from percutaneous group developed this complication with a p value of 0.012 [Table 1].

## Discussion

Trigger finger is a common disorder characterized by catching, snapping, or locking of the involved finger that leads to limitation of finger range of motion, pain, and difficulty gripping objects. Triggering occurs when the gliding movement of the tendon is blocked due to a mismatch between the size of the flexor tendon and the osteofibrous canal of the A1 pulley, preventing the tendon from naturally extending and returning to its initial position.<sup>1</sup> It is caused by nodule formation or thickening of A1 pulley by its fibrocartilage metaplasia resulting in entrapment of the flexor tendon, thus forming a triggering mechanism.<sup>2,3</sup> It also appears to be linked to other diseases, such as rheumatoid arthritis, gout, carpal tunnel syndrome, De Quervain's tenosynovitis, and diabetes mellitus. Trigger finger is more common in middle-aged women and frequently involves the ring finger and thumb.<sup>4</sup>

Multiple treatment methods are available. In early phases of the disease (mild cases), activity modification, nonsteroidal anti-inflammatory drugs, splinting, and intrasheath corticosteroid injections may provide complete symptom relief. Single or multiple corticosteroid injections have been shown to be effective in approximately 93% of patients.<sup>5</sup> Surgical release of A1 pulley is indicated when conservative treatment fails<sup>6</sup>, which can be performed using conventional open surgery or percutaneous release technique.<sup>7</sup> Both are associated with complications such as flexor tendon injury, digital nerve injury, digital vascular injury, scar contracture, bowstringing, continued triggering,

and complex regional pain syndrome.<sup>8,9</sup>

Trigger finger was more common in females (78.82%) in our study, similarly Ferhat et al<sup>7</sup> found that females (80.46%) were more commonly involved.

Surgical time was less in percutaneous method (4.95minutes) as compared to open surgical method (23.1 minutes). The difference is because more time is required to expose A1 pulley and also to close the wound in open surgical method.

Digital nerve injury was noted in 16.28% of patients of percutaneous group and 7.14% in open surgical group. Ferhat et al<sup>7</sup> noted digital nerve injury in 2 patients(5.71%). As percutaneous method is a blind way of releasing A1 pulley it is more prone for injury to the adjoining structures though there was no statistically significant difference between the two methods.

Residual triggering was noted in 5 patients (11.63%) from percutaneous release group which was similar to observations made by Vedat Uruc et al<sup>10</sup> who found it in 3 patients (6%). All these patients underwent repeat percutaneous release and got complete relief.

Six patients (14.29%) in open surgical method developed superficial infection which got resolved by dressing and oral antibiotics with a p value of 0.012 which was statistically significant. Ferhat et al<sup>7</sup> noted superficial infection in 2 patients (3.85%).

## Conclusion

Though both percutaneous and open surgical release have their own advantages, both are associated with few complications of their own. Percutaneous release requires less time and when done in a proper way is as effective as open surgical release.

## Competing interests

The author declares that there is no competing interest.

Consent: Written informed consent has been obtained from all patients regarding publishing the details of this study along with pictures.

## Tables

**Table 1: Complications.**

Complication	Percutaneous method	Open Surgical method	p value
Digital nerve injury	7	3	0.31
Residual trigger	5	0	0.0553
Superficial infection	0	6	0.012

## Figure

**Figure 1: Percutaneous release method.**



Intra operative picture showing 18 gauge needle inserted at the level of A1 pulley.

**Figure 2: Open surgical method.**

Intra operative picture showing A 1 pulley being released by open method.

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