

# Result of Percutaneous Release of Trigger Thumb: A Prospective Study

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## ABSTRACT

**Introduction:** Trigger thumb is a common disorder characterized by pain, snapping, and locking of fingers. It usually affects the ring and thumb finger. The treatment of trigger thumb varies according to the grade of triggering. Open surgical release of A1 pulley in trigger thumb is a widely accepted treatment method having its complications like scar mark, pain at the incision site, joint stiffness, and digital nerve injuries. The percutaneous release does have good results in recent studies. It is an easy daycare procedure with low complications.

**Methods:** This study includes 28 patients with trigger thumbs who underwent percutaneous release. Patients were followed up for 6 months duration.

**Results:** There were 30 patients included in the study, only 2 patients required open release so we had an overall 93.33% success rate of percutaneous release. There was no clinical evidence of complications and nerve injury.

**Conclusion:** The percutaneous release is a safe and effective outpatient procedure in patients with trigger thumbs.

**Keywords:** Pain; Thumb; Trigger Finger Disorder

## INTRODUCTION

Trigger finger is also known as stenosing tenosynovitis is a common disorder encountered in the outpatient department. It results due to a mismatch between flexor tendon size and A1 pulley and is characterized by pain, snapping, and or locking of finger movements.<sup>1</sup> Trigger finger commonly occurs in middle-aged patients and usually involves the ring and thumb.<sup>2</sup> The exact mechanism is not known but it is blamed due to chondroid metaplasia of the A1 pulley.<sup>3</sup>

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There are associations of other diseases with trigger finger like gouty arthritis, diabetes mellitus, rheumatoid arthritis, carpal tunnel syndrome, and dequarvian's disease.<sup>4,5</sup>

Surgical release of A1 pulley is a widely accepted method of treatment for trigger thumb if conservative treatment fails.<sup>6</sup> Infection, recurrence, scar pain, stiffness, and digital nerve injuries are some of the reported complications after open surgical release of A1 pulley in trigger thumb.<sup>7,8</sup> Percutaneous technique was first introduced in 1958 by Lorthioir.<sup>9</sup> In 1992 Eastwood et al introduced a needle for percutaneous release with a good success rate.<sup>10</sup> Because of the proximity of the radial nerve of the thumb to the A1 pulley it was considered that trigger thumb should not be released percutaneous.<sup>11,12</sup><sup>13</sup> But many studies give good results using the percutaneous technique for release of A1 pulley for trigger thumb. Studies done by Patel and Moradia in 1997 and Saldana in 2001 have reported good results with the percutaneous release of A1 pulley in trigger thumb.<sup>5,14</sup> Since the percutaneous release of A1 pulley in trigger thumb, is easy, daycare procedure with low complications rate and high patient satisfaction, it is considered the treatment of choice in patients not responding to conservative methods. In this study, we aim to evaluate the results and complications of the percutaneous release of A1 pulley in patients with trigger thumb.

## METHODS

This is a prospective study done in Manipal Teaching Hospital from 15<sup>th</sup> May 2019 to 15<sup>th</sup> June 2021. Patients presenting to us with trigger thumb within 15<sup>th</sup> January 2021 were included in this study because the last follow-up was 6 months. Patients with idiopathic adult trigger thumb grade 2-4 according to Quinnell classification and failed conservative treatment were included in this study whereas patients with a history of previous surgical treatment for trigger thumb and those who required open release were excluded. Ethical clearance from the IRC of Manipal Teaching Hospital was obtained before the study. All

patients were informed about the procedure and written consent was obtained. Clinical analysis was done using visual analog pain score (VAS), grading of triggering, and patient satisfaction with the outcome.

## Surgical procedure:

Percutaneous release of trigger thumb was done in the outpatient department. All patients with trigger thumb were placed on the examination couch and the point of triggering was located. The skin was painted with 10% povidone-iodine and draped. The skin and subcutaneous tissues were infiltrated with 2% plain lidocaine hydrochloride. An 18 gauge needle was inserted at a point 1-2mm distal to metacarpophalangeal joint crease with thumb in hyperextension so that the flexor tendons become subcutaneous. The position of the needle tip was confirmed by passively flexing the interphalangeal joint and observing the movement. The needle was then withdrawn slightly till the needle stop to move so that the needle tip would lie in the A1 pulley.

The bevel of the needle was moved longitudinally from proximal to distal to cut the A1 pulley. A grating sensation was felt as the needle tip cuts through the transverse fibers of the A1 pulley and loss of this grating sensation indicated completion of the release. Then the patient was asked to flex and extend the thumb to check for the residual triggering. If triggering persisted, the needle was reinserted and an additional release was done. After completion of the procedure, a small dressing was done to cover the wound for 2 days and the patients were allowed to return to normal activities.

Post-procedure the patient was given oral analgesics and antibiotics. The patients were followed up at 2 weeks, 6 weeks, and the final follow-up was done after 6 months. The patients who were from a far place were followed up via telephone. In every follow-up, patients were evaluated using VAS, the satisfaction of patient with the technique, any complications, and recurrences of symptoms were noted.

**RESULTS**

There were a total of 30 patients in this study but 2 patients required open surgical releases that were excluded from the study. So the total number of the patient included in this study was 28. The mean age of the patient was 51.04+7.77 years (37-68 years). There were 67.9% (19) female patients. The right side thumb was involved in 22 (78.6%) patients. In this study, 25 patients were right-side dominant and 21 patients had involvement of dominant hand. Involvement of the dominant hand was found in 21 (75%) cases.

According to Quinell classification, 14 patients (50%) had grade II, 10 patients (35.7%) had grade III and 4 patients (14.3%) had grade IV triggering. The average duration of symptoms was 19.04±4.93 weeks (10-28 weeks). There was no comorbidity in 17 patients whereas 5 patients (17.9%) had type 2 diabetes mellitus, 3 patients (10.7%) had hypertension and 3 patients (10.7%) had hypothyroidism and were on regular medications. Since only 2 patients required open release in our study group, the success rate of percutaneous release of trigger thumb was 93.33%.

The mean VAS before the intervention was 6.04±1.45, which was reduced to 2.21±0.56 at 2 weeks, 1.29±0.46 at 6 weeks and 1.14±0.35 at 6 months follow up as shown in Table 1.

**Table 1: VAS before intervention and in each follow-up**

Timeline	Minimum VAS	Maximum VAS	Mean±SD
Before intervention	4	9	6.04+1.45
2 weeks post-op	1	3	2.21+0.56
6 weeks post op	0	2	1.14+0.65
6 months post op	0	2	0.5+0.63

The VAS before intervention and after 2 weeks was clinically significant with a p-value of <0.001, similarly, the VAS before

intervention and at 6 weeks and 6 months was also statically significant with a p-value of <0.001 as shown in Table 2.

**Table 2: Comparisons of VAS before intervention to each follow up**

VAS	Mean	Standard deviation (95%CI)	p-value
VAS before intervention - VAS 2 weeks	3.821	1.416 (3.273-4.370)	<0.001
VAS before intervention - VAS 6 weeks	4.750	1.404 (4.205-5.295)	<0.001
VAS before intervention - VAS 6 months	4.893	1.397 (4.351-5.434)	<0.001

VAS: visual analog pain score

None of the patients had major complications like infection, contracture, or neurovascular injuries. Two patients complained of occasional pain at the needle insertion site which did not require any analgesic in 6 weeks, which was absent at 8 weeks follow up.

**DISCUSSION**

Treatment of trigger thumb varies according to the grade of triggering. Treatment varies from conservative to interventions like steroid injection, percutaneous or open release.<sup>15</sup> Open release of A1 pulley in trigger thumb is a universally accepted treatment method. The success rate of open release in different studies showed good results. The study was done by Benson and Ptaszak in 1997 compared open release with local steroid injection and showed a success rate of surgery in trigger thumb.<sup>16</sup> Similarly the study was done by Gilberts et al in 2001 and Turowski et al in 1997 showed the success rate to be 100% and 97% respectively.<sup>17,18</sup> Despite good results, the open release is also not free from complications. It has disadvantages like pain at the incision site lasting for a few weeks, scar marks, and neurovascular injuries.<sup>20</sup> The percutaneous release of the trigger

thumb is a less invasive procedure, a daycare procedure with a short recovery period. There is no need of admission and suture in this procedure which makes it economically cheaper than the open release. The percutaneous release was started in 1958 and this technique was modified with a claimed success rate of 90%.<sup>9,10,19</sup> In our study the success rate was 93.33% which was similar to the study done by Cebesoy O et al, Tanaka et al and Ha et al whose success rate was 84%, 91%, and 92% respectively.<sup>2,18,20</sup> The reason for having good results may be that it was a direct observational procedure so if the surgeon felt that there is incomplete release they could further release the pulley in the same settings.

Digital nerve injury is considered one of the most common complications in a percutaneous release. The study done by Gilberts and Wereldsma in 2002 reported 1% iatrogenic injury to the digital nerve in the percutaneous group.<sup>21</sup> Similarly the study done by Guler F et al in 2013, 2 out of 35 patients (5.7%) who underwent percutaneous had digital nerve injury and one patient developed transient radial side hypoesthesia which lasted for 3 months.<sup>22</sup> Taylor et al reported 1 case of digital artery pseudoaneurysm after percutaneous release.<sup>23</sup> In our study we did not find any case of digital nerve injury or pseudoaneurysm. Two patients complained of numbness in the thumb which improved at 6 weeks. Damage of flexor tendons was seen following percutaneous release in cadaveric studies, the 2 patients that required open release also had minor longitudinal tear which was left alone.

## CONCLUSION

Percutaneous release of trigger thumb is a less invasive procedure with good results. The benefits of this technique are quicker procedure, less pain, a short recovery time with no scar marks, and fewer complications. We recommend for percutaneous release of A1 pulley in patients with trigger thumb. The limitations of our study are small sample size, follow-up duration could have been done in

small intervals and the study could have been compared with other techniques.

## CONFLICT OF INTEREST

None

## SOURCES OF FUNDING

None

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