A retrospective study comparing open and percutaneous trigger finger release in the Thai population [version 1; peer review: awaiting peer review]

Saran Malisorn

Department of Orthopedic, Faculty of Medicine, Naresuan University Hospital, Phitsanulok, Thailand

Abstract

Background: Over the years, open surgery has been the primary treatment for trigger finger, a prevalent issue among hand illnesses. There has been some resistance to the technique's routine use, despite the fact that the percutaneous release of triggers provides a quicker recovery than surgery. As a result, the study proposed that the percutaneous release technique outperforms open surgery. The objective of this study was to compares the trigger finger surgery's open and percutaneous releases in terms of short-term results.

Methods: From 2014 to 2020, 166 patients who underwent open or percutaneous release surgery for the trigger finger at Naresuan University Hospital were the subjects of this retrospective analysis. For one, three, and six weeks, the initial characteristics and post-operative hemorrhage, digital nerve and artery injury, surgical site pain, inability to flex the finger, and other outcomes were compared. The visual analog scale (VAS) score and the impairments of the arm, shoulder, and hand (DASH) score were also compared between the two groups.

Results: The age, sex, and number of patients in both groups were statistically comparable. Before the procedure, there was no difference between the groups in terms of DASH and VAS scores for pain; however, at six weeks, the percutaneous release group showed a substantial difference and low VAS scores. There were no differences between the groups in terms of consequences, including wound pain, damage to digital nerves and arteries, and others.

Conclusion: Based on the patients' short-term outcomes, the study found that percutaneous release of the trigger finger is just as successful as traditional open surgery.

Keywords

Trigger fingers, open surgery, percutaneous release, DASH Score
This article is included in the QUVAE Research and Publications gateway.

Corresponding author: Saran Malisorn (saranmalisorn01@gmail.com)

Author roles: Malisorn S: Conceptualization, Investigation, Methodology, Project Administration, Writing – Original Draft Preparation, Writing – Review & Editing

Competing interests: No competing interests were disclosed.

Grant information: The author(s) declared that no grants were involved in supporting this work.

Copyright: © 2023 Malisorn S. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

How to cite this article: Malisorn S. A retrospective study comparing open and percutaneous trigger finger release in the Thai population [version 1; peer review: awaiting peer review] F1000Research 2023, 12:744
https://doi.org/10.12688/f1000research.130915.1

First published: 26 Jun 2023, 12:744 https://doi.org/10.12688/f1000research.130915.1
Introduction
Trigger finger, sometimes referred to as stenosing tenosynovitis, is a prevalent issue. Trigger finger is a common hand condition, characterized by the catching or locking of a finger in a bent position before it straightens out. This prevalence estimate is supported by several studies. It has been reported that trigger finger affects approximately 2% to 3% of the general population. Daily tasks are hampered by the malformation, which causes pain, clicking, or a stumbling block when moving the fingers. Although the exact cause is uncertain, the inflammation and consequent constriction of the A1 pulley may be to blame for the flexor tendon’s reduced range of motion. An additional layer of a structure made up of chondroid metaplasia has been identified by a histological investigation, indicating that there are fibers forming on the tendon sheath’s surface. Trigger fingers primarily affects adults in their 40s and 50s, and previous research indicates that women are approximately six times more likely than men to suffer from the condition. Without treatment, the illness leads to significant long-term disability and ongoing pain. Consequently, the trigger finger needs to be treated by a doctor.

Depending on the stage, there are numerous ways to treat trigger fingers. Early-stage patients typically opt for conservative treatments such as night finger splints, physical therapy, painkillers, anti-inflammatory medicines, and steroid injections. Open or percutaneous surgery can be used to section the flexor tendon at the A1 pulley in more advanced stages. Open surgery has been used for a while and is up to 97% effective, but it can lead to post-operative pain, infection risk, longer recovery times for movements, nerve injury, and scarring. Another well-liked alternative technique is the percutaneous release of the trigger finger, which has a success rate of 74 to 94%. Less stress and a quicker recovery are provided by the percutaneous approach, but there is also a risk of digital nerve and artery injury and incomplete surgery. In this regard, clinical research comparing the outcomes of various surgical procedures in patients is critical. It might aid the expert in selecting the best course of action.

Even while the results of open surgery and the percutaneous release approach have been previously reported after three months (short-term) and two years (long-term) of follow-up, there are few studies that compared the results for patients in similar patient groups. This retrospective study compares the short-term outcomes of trigger finger percutaneous release vs routine open surgery with the expectation that the latter procedure will produce superior results.

Methods
Study design and population
The patients who underwent open surgery or percutaneous release of the trigger finger at Naresuan University Hospital between 2014 and 2020 were the participants of this retrospective cohort study. Adults over the age of 18 who scored between 2 and 5 on the modified Quinell grading scale met the inclusion criteria. Patients with temporary trigger finger, prior steroid injection treatment, treatment received less than eight weeks prior to the study, surgery for the trigger finger, tendon injuries, fractures of the affected finger or palm, degenerative arthritis, finger gout, rheumatoid arthritis, connective tissue disease, and diabetes were all disqualified from participating in the study. Additionally, it was decided that patients with a history of allergies to non-steroidal anti-inflammatory medicines, stomach ulcers or gastrointestinal bleeding, asthma, chronic liver or biliary illness, and kidney disease were not acceptable. This study complied with the Declaration of Helsinki and was approved by the ethical committee of Naresuan University.

Sample size
As previously mentioned, the sample size was calculated by comparing the two independent proportions (two-tailed test). Kloeters et al. (2016) aimed to compare three different techniques of A1 pulley release in terms of scar tissue formation and postoperative rehabilitation. The three techniques evaluated were open surgery, percutaneous release with a needle, and percutaneous release with a knife. Regarding the open surgery technique, the authors stated that open surgery was performed using a transverse incision over the A1 pulley in cases of severe contracture or a palpable nodule at the A1 pulley. In contrast, percutaneous techniques have been used in cases with a less severe degree of contracture. The open surgery proportion (p=0.97) was taken into account from the previous study, but the percutaneous release proportion (p2) was established at 0.84. The required sample size was 83 patients in each group, with a statistical power of 80% and an alpha-type error rate of 5%.

Surgical procedure
Both techniques for releasing the trigger finger were carried out in the hospital’s outpatient department while using conventional aseptic procedure. After identifying and marking the trigger location, 2 ml of 1% plain lidocaine hydrochloride was administered there to provide local anesthetic. When the flexor tendon at the A1 pulley was divided during open trigger finger release surgery, a 1 cm longitudinal incision was created. The release of triggering was then verified by stretching the finger. To stop infection, the wound was stitched and treated. The percutaneous release of the trigger digit was carried out as previously described on a different set of patients. In order to allow blood vessels and nerves to fall laterally and bring the flexor tendon closer to the skin, the patient’s injured finger was stretched to its maximum extent. Then, at the A1 pulley, a perpendicular 18 gauze needle tip was introduced into the skin. To cut the
tendon, the needle’s tip was positioned 5-8 mm from the predetermined border. The operation was finished when the
grating feeling that was caused when the needle tip sliced through the transverse fibers vanished. Additionally, by
passively moving the finger, the full release of the triggering was verified. The procedure was repeated, and gauze was
applied to the wound when the triggering continued. After either surgical procedure, the patients were permitted to go
home while receiving analgesics, antibiotics, and instructions on basic wound care. To evaluate the healing of the wound,
postoperative pain, complications, recurrence, and the time required to return to daily activity, follow-up sessions were
scheduled at 1, 3, and 6 weeks.

Data collection
The work involved gathering information from the patients’ medical records stored in the hospital computer system. The
study was approved by the ethics committee of Naresuan University. The hospital provided consent after the study was
approved by the ethics committee. The ethics committee waived the need for patient consent.

With consent from the hospital, information was gathered from the patients’ medical records and the hospital’s computer
system. The results, including bleeding, injury to the digital nerve and artery, disability of the arm, shoulder, and hand
(DASH) and visual analog scale (VAS) scores, were noted in the record book previously described.5

Statistical analysis
The terms frequency, proportion, mean, and standard deviation were used to describe descriptive data. The Chi-square
test was used to evaluate categorical covariates, while the Mann-Whitney U test was used to compare the groups for
continuous variables. Statistical significance was defined as a p-value 0.05. The analysis was conducted using SPSS
version 17 (SPSS Inc., Chicago, IL, USA).

Results
The majority (72.23%) of the 166 patients in the research were female. The quantity, sex, and percutaneous release
method of patients who underwent open surgery were not statistically significant. The age of the patients who underwent
an open release for the trigger fingers was statistically comparable to that of those who underwent a percutaneous release.
Patients over 60 years old made up a smaller portion of both categories, nevertheless. In contrast to the finger triggering
grade and the affected digit in the study groups, the hand side associated with the trigger digit was substantially different
(p=0.01) between the two patient groups (Table 1).

The baseline VAS score for pain among the patients in open and percutaneous release groups was insignificant
(6.79±1.26 and 7.03±1.54; p=0.27) as shown in Table 2, both groups had comparable DASH scores and triggering
grades. However, when measured using the faces rating scale, a significant difference between the two groups’ levels of
pain prior to surgery was discovered.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Open release</th>
<th>Percutaneous release</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td>0.72</td>
</tr>
<tr>
<td>Male</td>
<td>24 (28.92)</td>
<td>22 (26.51)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>59 (71.08)</td>
<td>61 (73.49)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td>0.48</td>
</tr>
<tr>
<td>&lt;60</td>
<td>58 (69.88)</td>
<td>62 (74.70)</td>
<td></td>
</tr>
<tr>
<td>&gt;60</td>
<td>25 (30.12)</td>
<td>21 (25.30)</td>
<td></td>
</tr>
<tr>
<td>Hand side</td>
<td></td>
<td></td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Left</td>
<td>11 (13.25)</td>
<td>42 (50.60)</td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>72 (86.75)</td>
<td>41 (49.40)</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td></td>
<td>0.36</td>
</tr>
<tr>
<td>3</td>
<td>39 (46.99)</td>
<td>31 (37.35)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>26 (31.33)</td>
<td>26 (31.33)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>10 (12.05)</td>
<td>18 (21.69)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>8 (9.64)</td>
<td>8 (9.64)</td>
<td></td>
</tr>
</tbody>
</table>
The trigger finger was fully released in each patient in both groups. However, a digital nerve lesion was documented in one patient who underwent open surgery. It was discovered during the study’s follow-up visits at one, three, and six weeks that the proportion of patients who experienced bleeding in the first week varied significantly across the groups (30.12% vs. 3.61%). Similarly, the open surgery group’s DASH score at the third post-operative visit was considerably higher than the percutaneous release groups. After the three-week follow-up, there were considerably more patients who underwent open surgery (28.92%) than underwent percutaneous release (8.43%), but none at six-weeks. In addition, as indicated in Table 3, the VAS score and face pain scale score in open surgery patients at six weeks following therapy were both considerably greater than those who had the percutaneous release of the triggers. Figure 1 depicts a graphic comparison of the DASH scores between the two groups of patients at one, three, and six weeks after surgery and before surgery. Similar to Figure 1, Figure 2 shows the variation in pain (measured as a VAS score) between patients before and after trigger finger release surgery, both open and percutaneous.

### Table 2. Summary of findings before the open and percutaneous release of the trigger finger.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Before</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Open release</td>
<td>Percutaneous release</td>
</tr>
<tr>
<td>VAS score</td>
<td>6.79±1.26</td>
<td>7.03±1.54</td>
</tr>
<tr>
<td>Faces pain scale score</td>
<td>3.04±0.81</td>
<td>3.40±0.88</td>
</tr>
<tr>
<td>Grade 1</td>
<td>40 (48.19)</td>
<td>41 (49.40)</td>
</tr>
<tr>
<td>Grade 2</td>
<td>34 (40.96)</td>
<td>30 (36.14)</td>
</tr>
<tr>
<td>Grade 3</td>
<td>9 (10.84)</td>
<td>12 (14.46)</td>
</tr>
<tr>
<td>DASH score</td>
<td>31.02±8.45</td>
<td>31.80±10.24</td>
</tr>
</tbody>
</table>

VAS: visual analog scale.

The trigger finger was fully released in each patient in both groups. However, a digital nerve lesion was documented in one patient who underwent open surgery. It was discovered during the study’s follow-up visits at one, three, and six weeks that the proportion of patients who experienced bleeding in the first week varied significantly across the groups (30.12% vs. 3.61%). Similarly, the open surgery group’s DASH score at the third post-operative visit was considerably higher than the percutaneous release groups. After the three-week follow-up, there were considerably more patients who underwent open surgery (28.92%) than underwent percutaneous release (8.43%), but none at six-weeks. In addition, as indicated in Table 3, the VAS score and face pain scale score in open surgery patients at six weeks following therapy were both considerably greater than those who had the percutaneous release of the triggers. Figure 1 depicts a graphic comparison of the DASH scores between the two groups of patients at one, three, and six weeks after surgery and before surgery. Similar to Figure 1, Figure 2 shows the variation in pain (measured as a VAS score) between patients before and after trigger finger release surgery, both open and percutaneous.

### Table 3. Summary of the findings after the open and percutaneous release of triggering finger at one, three, and six weeks.

<table>
<thead>
<tr>
<th>Variables</th>
<th>One week</th>
<th>Three weeks</th>
<th>Six weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Open surgery</td>
<td>Percutaneous release</td>
<td>Open surgery</td>
</tr>
<tr>
<td>Grade 0</td>
<td>83 (100)</td>
<td>83 (100)</td>
<td>83 (100)</td>
</tr>
<tr>
<td>Bleeding (30.12)*</td>
<td>25</td>
<td>3 (3.61)*</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Digital nerve injury</td>
<td>1 (1.20)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Digital artery injury</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>DASH score</td>
<td>8.3±8.26</td>
<td>8.63±10.01</td>
<td>0.74±0.33*</td>
</tr>
<tr>
<td>Pain in surgical wound</td>
<td>83 (100)</td>
<td>80 (96.39)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Inability to flex the finger</td>
<td>8 (9.64)</td>
<td>4 (4.82)</td>
<td>24 (28.92)*</td>
</tr>
</tbody>
</table>

* indicates a statistically significant difference.
Table 3. Continued

<table>
<thead>
<tr>
<th>Variables</th>
<th>One week</th>
<th>Three weeks</th>
<th>Six weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Open surgery</td>
<td>Percutaneous release</td>
<td>Open surgery</td>
</tr>
<tr>
<td>VAS score</td>
<td>1.02±0.68*</td>
<td>0.43±0.56*</td>
<td></td>
</tr>
<tr>
<td>Face pain scale</td>
<td>0.48±0.50*</td>
<td>0.13±0.34*</td>
<td></td>
</tr>
</tbody>
</table>

VAS: Visual analog scale; DASH: disabilities of the arm, shoulder, and hand.
*Significant <0.05.

Figure 1. The comparison of DASH scores before surgery, and post-surgery at 1, 3, and 6 weeks between the two groups.

Figure 2. The difference in pain (VAS score) before and after the open and percutaneous release of trigger finger surgery.
Discussion
The results of the traditional open and percutaneous trigger finger release surgeries were compared in this retrospective analysis. The matched patients in the two groups (in terms of sex, gender, and age) are the study’s main selling point. In the patients who underwent either procedure, there was no bleeding, impairment of the arm, shoulder, or hand, pain in the surgical site, or difficulty to flex the fingers at the six-week follow-up. All patients who underwent percutaneous release without any issues experienced a full release of the triggers. The study concludes that open surgery is still the most effective and safest option for treating trigger fingers.

Our discovery that females have higher levels of trigger finger confirms the findings of other investigations.13,14 The study’s inclusion of 72.28% individuals under the age of 60 furthered the claim that the condition is prevalent in people between the ages of 40 and 60.13 The relationship between the trigger finger and age and sex has not yet been thoroughly established. In general, fingers that are used repeatedly are more likely to develop deformities. In the study, the middle and ring fingers were affected in about 66% of the participants. The dominant hand is typically afflicted with trigger finger, and in the study, the majority of patients (68.07%) were right-handed. Similar results have already been published.14,15 Overall, 73.48% of the patients in the study showed stages 3 and 4 of triggering, which meant that the patients had irregular finger movement and sporadic finger locking but that these symptoms were actively correctable.

Patients in the open surgery and percutaneous surgery groups had insignificant baseline VAS scores for pain. However, the percutaneous release group had a significantly lower post-surgery VAS score and facial pain rating scale score when compared between the two groups at six weeks of follow-up. It suggests that open surgery was less beneficial in the patients studied than the percutaneous release approach. A prior study showing improved short-term satisfaction in patients who had percutaneous release of the trigger finger supports this conclusion.16,17 The subjective aspect of pain measurement, which depends on the patient’s age, literacy, cognitive ability, and other factors, may be the rationale for a significant difference in baseline pain scores between the groups using the faces pain scale but not the VAS score. It should be noted that VAS and face rating scales are both appropriate for assessing immediate postoperative pain.18

The open and percutaneous release methods did not result in significantly different DASH scores at baseline or at one week after surgery, however at three weeks, the score was statistically different and primarily declined from one week. Additionally, both groups’ DASH ratings decreased from baseline to one-, three-, and six-weeks following surgery.

This supports past reports’ findings that the trigger finger treatment for the patients in the study had a high rate of success when using the two procedures.16 In a brief period of time following the procedure, the percutaneous approach achieved 100% release of the finger without any problems. According to another study, there were no differences between the patients who received percutaneous release and open surgery in terms of pain in the surgical wound, digital nerve injury, or artery injury.7

The results of this investigation supported the notion that less invasive treatment options exist for trigger finger. The author is aware of the limitations of the current study after mentioning them. First, the study’s retrospective design may have contributed to bias. Second, a small amount of the outcome factors was measured quickly after the study ended. Thirdly, because the thumb has the highest risk of sustaining a digital nerve injury, individuals with trigger thumb were excluded from the study.19 Therefore, to maximize the impact of such research findings, a comparison between the trigger thumb and finger patients would be essential.

Conclusion
Based on the patients’ short-term outcomes, the study found that percutaneous release of the trigger finger is just as successful as traditional open surgery. This data may be useful in determining that the percutaneous procedure is the best option for getting better results quickly and at low risk.

Data availability
Underlying data

Data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0).
References


The benefits of publishing with F1000Research:

- Your article is published within days, with no editorial bias
- You can publish traditional articles, null/negative results, case reports, data notes and more
- The peer review process is transparent and collaborative
- Your article is indexed in PubMed after passing peer review
- Dedicated customer support at every stage

For pre-submission enquiries, contact research@f1000.com