LONGITUDINAL VERSUS TRANSVERSE INCISION IN TRIGGER FINGER RELEASE. A PROSPECTIVE COMPARATIVE STUDY

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ABSTRACT

Background: Surgery for trigger finger is done to increase the space for flexor tendon allowing the finger to bend and flex smoothly. The site and shape of the incision with regard to hand function and anatomic considerations are important for the success of the surgery. The aim of this prospective study was to compare longitudinal versus transverse incisions in trigger finger release as regard functional outcome, patients satisfaction and surgeon preference. Methods: Forty patients (44 trigger fingers) underwent surgical release; 22 fingers with longitudinal incision and 22 with transverse incision. There were 16 male and 24 female patients, with the mean age 31±5.5 years. DASH score was used to assess the functional outcome. All the patients were followed up to a period 3 to 10 months with a mean 6±0.7 months. Results: The mean DASH score improved significantly in both groups with no statistically significant difference between the two groups. Although the surgical release using longitudinal incision was shorter in duration than that of transverse incision, there was no statistically significant difference in the operative time (p=0.65). Surgeon preference was better with longitudinal incision. Conclusion: Although there was no statistically significant difference between the outcome of the patients with transverse versus longitudinal incisions regarding the operative time, functional improvement, and patient satisfaction, there was more surgeon preference with the longitudinal incision.

Keywords: Trigger finger, Stenosing tenosynovitis, A1 pulley release, longitudinal incision, transverse incision

Level of evidence: level II comparative case series.

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INTRODUCTION

Triggering of a flexor tendon, also known as stenosing synovitis, is a common hand pathology frequently seen and treated by orthopedic surgeons. It was first described by Alphonse Notta in 1850, the painful clicking while flexing/ extending the finger was the reason of the name (Trigger). Trigger finger is an impingement at the level of the hypertrophic first annular (A1) pulley due to an inflammation-derived size discrepancy of the involved flexor tendons.1

When conservative treatment (such as splinting or corticosteroid injection) failed, surgical release was indicated.2

The site and shape of the incision with regard to hand function and anatomic considerations are important for the success of the surgery. There is different skin incisions described to release the A1 pulley. Which incision the surgeon will choose most likely depends on the surgical training gain from his surgical seniors rather than having experienced and tested multiple incisions himself.3 Supposedly, this circumstance has led to strong convictions amongst some surgeons about which incision technique is superior over another.2

Although trigger finger release is considered as one of the smallest elective hand surgery procedure, most hand surgeons found that there is a considerable amount of patients that will present with a prolonged recovery period usually due to scar formation along with subsequent limitations in daily activities.4

The aim of this prospective study was to compare longitudinal versus transverse incisions in trigger finger release as regard functional outcome, patients satisfaction and surgeon preference.

PATIENTS AND METHODS

This study included forty patients with forty four trigger fingers not responding to conservative treatment for at least 3 months, and had been treated by surgical release between the period of January 2014 to January 2015 at Benha university hospital by 10 different surgeons after approval of the Research Ethics Committee of the university.

Twenty two fingers underwent surgical release via a longitudinal incision, and the other twenty two fingers via a transverse incision. A full detailed history was obtained regarding duration of symptoms and the previous management, the
effect of pain on the level of activity, and the time until presentation.

**Surgical technique:**
The type of anesthesia was either general or local IV. Under complete aseptic condition, and with the use of arm tourniquet, all the patients were placed in a supine position with the affected upper limb extended on the table.

In cases where transverse incision was planned, transverse incision was done 10-15 mm in length, and about 2-3 mm distal to the distal palmar crease (Fig.1). In cases where longitudinal incision was planned, longitudinal incision was done about 10-15mm in length at the level of the A1-pulley without crossing the distal palmar crease proximally (Fig.2).

**Postoperative care**
Directly after surgery, all patients were instructed to use the affected hand without any specific limitations. Two weeks postoperatively, the wound was evaluated again and the sutures were removed.

The Disability of the Arm, Shoulder and Hand questionnaire (DASH) score was used to assess the functional outcome. This score is interpreted from zero points (best function) to 100 points (worst function). Functional outcome is interpreted as Excellent (DASH<10), Good (DASH<20), Fair (DASH <30) and Poor (DASH>30). Patents were asked to fill in the DASH questionnaire before surgery, at one month, three months postoperative, and at final follow up. All the patients were followed up to a period3 to 10 months with a mean 6±0.7 months.

At the final follow up, all the patients were questioned about their satisfaction, and were classified into (a) completely satisfied, (b) some reservations, (c) important reservations, and (d) dissatisfied.

For surgeon preference; all the ten surgeons were questioned about operative time from skin incision to closure, easy accessibility for A1 pulley, and the danger of neurovascular injury.

**RESULT**
In our study, statistical analysis was performed using SPSS version 19.0 (SPSS, Inc, an IBM Company, Chicago, IL). It was done using a 2-tailed Student t-test, and P value < 0.05 was considered statistically significant.

Thirty six patients had a unilateral one trigger finger (26 cases with dominant hand affection and 10 cases with non dominant hand affection), while the other four patients had a bilateral affection; one trigger finger in each hand. There were 16 male and 24 female patients, with the mean age 31±5.5 years (range: 22-45 years). Regarding the anatomical distribution; there were 8 thumb, 4 index, 10 middle and 22 ring fingers. There was no statistically significant
difference between both groups of patients regarding the number of cases and fingers, age, gender, distribution, and follow up periods (Table 1).

Table 1: Patients’ characteristics.

<table>
<thead>
<tr>
<th></th>
<th>Group of Longitudinal incision</th>
<th>Group of Transverse incision</th>
<th>P value</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>22-45</td>
<td>24-40</td>
<td>NS</td>
<td>22-45</td>
</tr>
<tr>
<td>mean±sd</td>
<td>29±3.2</td>
<td>32±5.8</td>
<td></td>
<td>31±5.5</td>
</tr>
<tr>
<td>Gender (n, %):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>9 (45%)</td>
<td>7 (35%)</td>
<td>NS</td>
<td>16 (40%)</td>
</tr>
<tr>
<td>Female</td>
<td>11 (55%)</td>
<td>13 (65%)</td>
<td></td>
<td>24 (60%)</td>
</tr>
<tr>
<td>Number:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cases</td>
<td>20</td>
<td>20</td>
<td>NS</td>
<td>40</td>
</tr>
<tr>
<td>Fingers</td>
<td>22</td>
<td>22</td>
<td></td>
<td>44</td>
</tr>
<tr>
<td>Distribution (n):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thumb</td>
<td>4</td>
<td>4</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Index</td>
<td>2</td>
<td>2</td>
<td>NS</td>
<td>4</td>
</tr>
<tr>
<td>Middle</td>
<td>5</td>
<td>5</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Ring</td>
<td>11</td>
<td>11</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>Preoperative DASH:</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Range</td>
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<td>36.7-63.6</td>
<td>NS</td>
<td>34.1 - 63.6</td>
</tr>
<tr>
<td>mean±sd</td>
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<td>48.7±8.1</td>
<td></td>
<td>47.6±8.81</td>
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<td>Follow up (months):</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Range</td>
<td>3-8</td>
<td>3-10</td>
<td>NS</td>
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<tr>
<td>mean±sd</td>
<td>5.5±0.8</td>
<td>6.8±1.2</td>
<td></td>
<td>6±0.7</td>
</tr>
</tbody>
</table>

The mean DASH Score preoperative was 47.63±8.81 points (ranging from 34.1 to 63.6). According to the DASH score, all patients have preoperative poor hand function (score >30). The mean DASH scores in transverse incision group had significantly decreased by 6.5 points 1 month postoperatively, to become27.4 points 3months postoperative and reached15.6 points at the final follow up (p< 0.01). Longitudinal incision group had significantly decreased by 12 points 1 month postoperatively, to become19.2 points 3months postoperative and reached 9 points at the final follow up (p< 0.01). There were no statistically significant difference in improvement of mean DASH scores between the two groups (p=0.87).

Almost all wounds healed and sutures removed within 15 days (range 12-21 days post-operative). All cases of both groups regained a full ROM of MP joint of the operated finger at the final follow up.

Regarding patients’ satisfaction after doing the surgery, 38 patients were completely satisfied, 2 patients were satisfied with some reservations. These two patients were related to longitudinal incision group, and had a superficial infection in the form of local redness and hotness without discharge and were treated by systemic antibiotics and regular dressing for about 3 weeks post operative.

The mean operative time from skin incision to closure was 9 minutes for transverse incision (range 7-14 minutes) while for longitudinal incision was 6 minutes (range 4-10 minutes). Although the surgical release using longitudinal incision was shorter in duration than that of transverse incision, there was no statistically significant difference in the operative time between the two groups (p=0.65)

All 10 surgeons' consensus that the longitudinal incision allows better accessibility and provides less risk to neurovascular injury.

**DISCUSSION**

The tendons that flex the fingers glide easily with the help of pulleys which hold the tendons close to the bone. This is similar to how a line is held on a fishing rod. Trigger finger occurs when the pulley becomes too thick, so the tendon cannot glide easily through it. Early recommendations was surgical treatment of trigger finger as it was straightforward and highly effective, while prolonged conservative treatment was unreliable and expensive. Local injection is now generally agreed to be the first line of treatment. Surgery is reserved for individuals in whom injection treatment has failed or due to other pathology.

In trigger finger release surgery, both transverse and longitudinal incisions are usually used. In our case series, surgical release of the trigger fingers had a very satisfactory outcome, with early recovery of the patients, and with no serious complications. There was no statistically significant difference between patients with transverse and longitudinal incisions regarding operative time, functional improvement, and patient satisfaction. However, all the ten surgeons’ consensus that cases with longitudinal incision had shorter mean operative time. This might be due to that the longitudinal incision might allow more adequate exposure and easy accessibility to longitudinally oriented A1 pulley. Also, the longitudinal incision might carry less risk of injury to the underlying neurovascular bundles as it was made between the nerves, so it was generally a safer approach to the tendon sheath. Although all cases of both
groups regained a full ROM of MP joint of the operated finger at final follow up, ROM could be allowed early in patients with longitudinal incision as it was in line of finger range, and creates less wound tension and a smaller scar, instead of patients with the transverse incision that the line of finger motion make the wound in tension.

Adverse events between 5 and 36 % in the trigger finger release have been reported, including recurrent triggering, nerve injury and wound healing problems such as infections, wound adhesions, and painful scar tissue irritation. The most reported complaints were wound healing irritations as well as pain and tenderness of scar tissue.9

In our study, superficial infection had occurred in two cases with longitudinal incision group whereas no superficial infection had occurred with transverse incision group. However, this complication might be related to patient general condition, the sterilization procedure, or defective wound care, but definitely was not related to the type of incision.

In the rare event of an infection that requires surgical drainage, it’s pretty easy to extend the longitudinal incision to wash out the infection. This added more value to the use of that incision.

**CONCLUSION**

Although there was no statistically significant difference between the outcome of the patients with transverse versus longitudinal incisions regarding the operative time, functional improvement, and patient satisfaction, there was more surgeon preference with the longitudinal incision as it allows better accessibility to A1 pulley, carries less risk of neurovascular injury, and allows early range of finger motion.

**Conflict of Interest:** The author declares that he has no conflict of interest.

**Ethical Approval:** All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and national research committee

**Informed Consent:** Informed consent was obtained from all individual participants included in this study.

**REFERENCES**


