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# Steroid Injection Versus Open Surgery in the Treatment of De Quervain's Tenosynovitis

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## Abstract

**Aim:** This study aimed to compare steroid injections and open surgery in the treatment of De Quervain's tenosynovitis.

**Materials and Methods:** Between January 2013 and April 2015, a total of eighty-two patients (65 females, 17 males; mean age: 40.3 years; range: 20 to 71 years) who were admitted , were retrospectively included. The patients were assigned into two groups: Group 1 undergoing open surgery and Group 2 receiving steroid injections. The rates of recurrence and satisfaction were evaluated. The patients undergoing surgery were also evaluated for the surgical site infection, nerve injury, wound opening, and limited range of motions of the joints. The patients receiving steroid injections were evaluated for subcutaneous atrophy, fat necrosis, weakening or rupture of tendons, and depigmentation.

**Results:** The mean follow-up was 12 months (range: 6 to 22 months). Recurrence occurred in eight patients (20%) in the steroid injection group; however, no recurrence was seen in the open surgery group. Satisfactory or very satisfactory results were achieved in all patients in the surgery group (p=0.04). There were no complications in both groups.

**Conclusion:** Although steroid injection is a therapeutic option in De Quervain's tenosynovitis, open surgery appears to be a more beneficial method with relatively low recurrence and complication rates.

**Keywords:** De Quervain's tenosynovitis, open surgery, steroid injection

## Introduction

De Quervain's tenosynovitis is one of the most common forms of stenosing tenosynovitis encountered by hand surgeons. This tenosynovitis was first described by Fritz de Quervain (1). De Quervain's tenosynovitis causes radial wrist pain that increases with activity (2). Steroid injection into the tendon sheath is the primary treatment in uncomplicated cases (3). Although steroid injection is common, complications, such as subcutaneous atrophy, fat necrosis, weakening or rupture of tendons, and depigmentation, have been reported after this treatment regimen (4-7). Surgical release, which provides a precise and permanent solution in most cases, is considered for steroid-refractory patients and for patients whose complaints last over 6 months (8, 9). Since the rate of recurrence and complication is lower after surgical treatment, it has been widely used currently. In the present study, we aimed to evaluate the efficacy of open surgery versus steroid injection in patients with De Quervain's tenosynovitis.

## Materials and Methods

A total of 82 patients (65 females and 17 males) who were admitted between January 2013 and April 2015 were homogeneously divided into two groups. Open surgery was performed in 42 patients (35 females and 7 males) who were included in the first group and steroid

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injections were given to 40 patients (30 females and 10 males) who were included in the second group. Informed consent was obtained from each patient. The study was approved by Necmettin Erbakan University Meram School of Medicine Ethics Committee (22/09/2017) (2017/1018) and was conducted in accordance with the principles of the Declaration of Helsinki.

The patients were diagnosed through medical history and positive Finkelstein test results performed during physical examination. The Finkelstein test was performed to show the pain that occurs by the ulnar deviation of the wrist, while the thumb is being locked in the palm, which is one of the diagnostic criteria of the disease (10, 11). An X-ray was obtained for each patient to differentiate arthritis of the thumb, metacarpophalangeal joints, and scaphoid-trapezium-trapezoid (STT) joints; arthrosis of radiocarpal and intercarpal joints; and fracture of scaphoid. An extensor pollicis brevis (EPB) entrapment test was performed on the patients with recurrent disease after steroid injection. A sensitivity of 81% has been reported for the EPB entrapment test in identifying patients having a septum for the EPB tendon with the failure of corticosteroid injection (12). The test consists of two parts. First, the patient is requested to bring the metacarpophalangeal joint to a forced extension. Secondly, the carpometacarpal joint of the patient is abducted by the examiner in a stretched manner. Pain during the second part of the test suggests that there may be a separate compartment for the EPB (12).

All of the open surgeries were performed under regional intravenous anesthesia (RIVA). A tourniquet was applied to all patients to carefully identify the sensory branches of the radial nerve. During the surgery, an oblique or transverse skin incision was performed over the first dorsal compartment, about 1 cm proximal to the radial styloid process. To identify the sensory branches of the radial nerve passing obliquely over the compartment, deep layers of the skin were gently dissected longitudinally. After the skin and subcutaneous tissue were dissected, the annular ligament was finely incised using a scalpel. The release of the tendons of abductor pollicis longus (APL) and EPB in the proximal and distal region was confirmed (Figure 1). In case of another septal formation, it was also released. After hemostasis, the skin was anatomically closed with 4/0 prolene sutures. The wound was dressed and a bulky bandage was applied. In the early postoperative period (on Day 1), the dressings of the patients were made smaller to easily allow wrist movements, and serious advice was given to the patients and their relatives about the frequent mobilization to completely maintain the range of motion of the joints. With this advice, it was emphasized to bring the wrist to full flexion-extension with the support of analgesics, particularly in the early postoperative period.

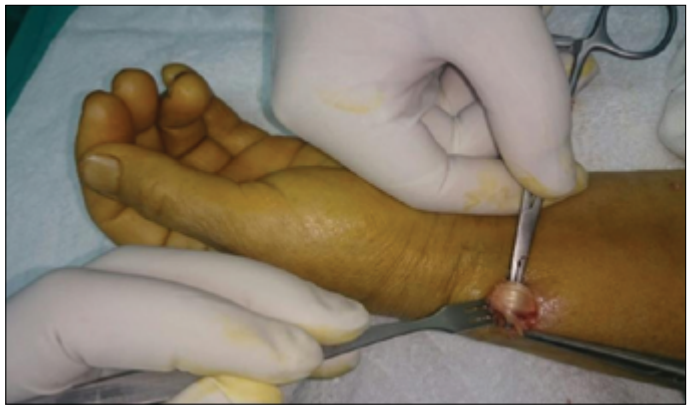

**Figure 1.** Release of the first dorsal extensor compartment

In patients who underwent steroid injection, injection was administered using a dorsoradial approach as a standard procedure. First, the radial styloid was found, steroid was injected to the distal region of the APL and EPB tendons, with a 45-degree angle toward the radial styloid (Figure 2). During injection, the presence of resistance indicated that it was on the tendon; therefore, the needle was withdrawn and injected around the tendon. After injection, active/passive extension and flexion movements were initiated.

In the postoperative period, a non-steroidal anti-inflammatory drug and oral antibiotic (amoxicillin/clavulanate potassium 1 g twice a day) were prescribed for 1 week. Dressings were changed every 3 days. Sutures were removed at the postoperative second week, and the patients were examined at 6, 12, and 24 weeks and at 1 year. The recurrence rate and satisfaction after intervention were investigated in both groups using the 10-point visual analog scale (VAS). The overall satisfaction rates were evaluated based on a 10-point scale score: 1-3, very dissatisfied; 4-5, dissatisfied; 6-7, satisfied; ≥8, very satisfied.

Complications of wound site infection, nerve injury, wound opening, and limited range of motions of the joints were evaluated in operated patients. In addition, complications, such as subcutaneous atrophy, fat necrosis, weakening or rupture of tendons, and depigmentation, were evaluated in patients who received steroid injection.

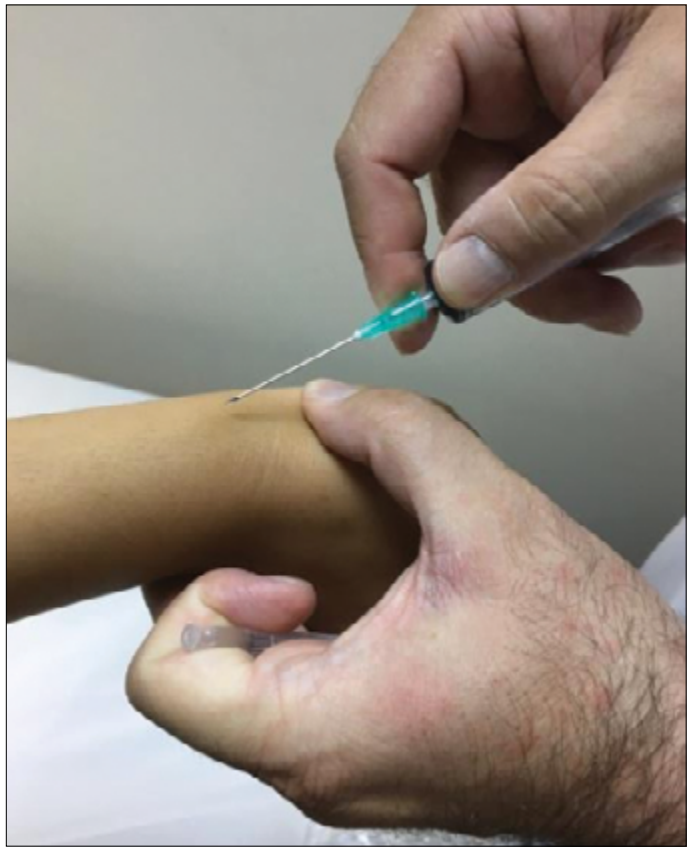

**Figure 2.** Steroid injection

**Statistical analysis**

The Number Cruncher Statistical System (NCSS) 2007 and Power Analysis and Sample Size (PASS) 2008 statistical software (NCSS, LLC; Kaysville, Utah, USA) program were used for statistical analysis. Descriptive data were primarily presented as means. A p value of <0.05 was considered statistically significant.

## Results

The mean age of the patients was 40.3 (range: 20-71 years) years. Demographic and clinical data of the patients are presented in the Table 1.

The mean follow-up was 12 (range: 6–22 months) months. In the steroid injection group, recurrence was seen in eight (20%) patients. In addition, EPB entrapment test was positive in eight patients with recurrence following steroid injection.

In our study, the trigger thumb was also present in two patients who underwent surgery. Surgery of the trigger thumb was performed in the same session. No recurrence was observed in the surgery group. No serious complication occurred in any patient. Open surgery was performed in patients with recurrence; these patients did not recur after surgery.

All the patients who underwent surgery indicated that they were satisfied or very satisfied with the surgical treatment (p=0.04). Ten patients who received steroid injection indicated that they were dissatisfied or very dissatisfied. Two patients reported that they were dissatisfied due to severe pain after injection, although their complaints resolved. Eight patients were very dissatisfied due to recurrence (Table 2).

**Table 1.** Demographic and clinical data of patients

| | **Open surgery (n=42)** | **Steroid injection (n=40)** |
|---|---|---|
| Age, mean (range) | 40 (20-70) | 41 (21-71) |
| **Sex, number (%)** | | |
| Female | 35 (83.3) | 30 (75) |
| Male | 7 (16.7) | 10 (25) |
| **Side, number** | | |
| Right/left | 32/10 | 34/6 |
| Dominant/non-dominant | 36/6 | 35/5 |

**Table 2.** Patient satisfactiona

| **Satisfaction rating (score distribution[a])** | **Open surgery, number (%)** | **Steroid injection, number (%)** | **p** |
|---|---|---|---|
| Very satisfied (8-10) | 38 (90.4) | 10 (25) | 0.04 |
| Satisfied (6-7) | 4 (9.6) | 20 (50) | 0.04 |
| Dissatisfied (4-5) | 0 (0) | 2 (5) | 0.04 |
| Very dissatisfied (1-3) | 0 (0) | 8 (20) | 0.04 |

[a]Patient satisfaction was measured by a 10-point visual analog scale

## Discussion

Several case series have been reported that De Quervain's tenosynovitis is a common occurrence, particularly in females between the third and fifth decades of life. Although some reports have shown that it most commonly involves the dominant hand, the relationship with this disease has not been fully clarified yet. However, the facts that the disease is seen less frequently in males and that the dominant hand is not related to this condition are the main reasons for the uncertain etiology (13). In our study, consistent with previous reports, De Quervain's tenosynovitis was more common in female patients, and it most commonly affected the dominant hand. In addition, De Quervain's tenosynovitis was diagnosed radiographically. Ultrasonography (USG) examinations and magnetic resonance imaging (MRI) can be also performed to identify the anatomic variations in patients and to confirm the diagnosis (14, 15). USG and MRI were not performed in the present study, and the diagnosis was based only on radiographic findings using X-rays.

Many authors have suggested that the steroid injection into the tendon sheaths as the first-line treatment in De Quervain's tenosynovitis is effective. In a study conducted by Harvey et al. (16), corticosteroids were administered to patients once or twice, and success was achieved in 80% of the patients after a 9-year follow-up period. In the aforementioned study, 10 of 11 patients in whom treatment had failed, APL and EPB tendons were found to be in separate compartments during surgical release. In another study, Witt et al. (17) reported that they achieved improvement in 62% of the patients after steroid injection. In a study in which patients were followed up to 3 years, only 12% of the patients underwent surgery after the injection (18). Overall, these study findings indicate that the tendons are in separate compartments or showed separate septations in surgical patients in whom steroid injection had failed (19-22). In our study, improvement was achieved in 80% of the patients in the steroid injection group and 20% of them needed surgery. This finding is consistent with the existing literature. The EPB entrapment test was also positive in patients with recurrence; open surgery was performed in these patients and no recurrence was seen (12).

In literature, it has been reported that complications, such as subcutaneous atrophy, fat necrosis, weakening or rupture of tendons, and depigmentation, may occur following steroid injection for the treatment of De Quervain's tenosynovitis (4-7). In our study, no complications were seen in either group.

Furthermore, some authors have suggested that steroid injection is part of treatment for De Quervain's tenosynovitis; however, surgical intervention should be performed when the non-surgical treatments are inadequate or when the patient is expecting a rapid and precise outcome (23). In a study by Lee et al. (24), 33 patients with De Quervain's tenosynovitis underwent open surgery and they reported that the results were very good after a 6-year follow-up. Surgically, a transverse incision was used and no complications were observed. Although the results are similar to our study, the length of the follow-up time was reported in the literature.

Bouras et al. (25) reported in their series of 20 cases that the outcomes were close to perfection after open surgery, and they showed that

complications were not noted using longitudinal incision. Abrisham et al. (26) also reported that open surgery was superior and longitudinal incision was better than transverse incision after a 5-year follow-up period. In our study, oblique or transverse incision was used and no complications were observed. Therefore, we suggest that although the direction of surgical incision is critical, the attention of the surgeon also affects the surgical success.

Complications, such as wound site infection, nerve injury, wound opening, and limitation of the range of motion of the joint, can be seen following open surgery (27). Volar subluxation of tendons as a rare complication has been also reported in literature. Altay et al. (28) performed partial excision of the extensor retinaculum during open surgery to avoid the subluxation complication. They found that the results were consistent with those of complete excision of retinaculum and no complications were observed. In our study, complete excision was performed and no volar tendon subluxation was observed.

### Study limitations

The implications of this study are limited by its retrospective design and the relatively small number of patients.

## Conclusion

Although steroid injection is a treatment option for De Quervain's tenosynovitis, open surgery seems to be a more useful method with relatively low recurrence and complication rates.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the ethics committee of Necmettin Erbakan University School of Medicine.

**Informed Consent:** Written informed consent was obtained from patient who participated in this study.

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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