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**Mohd. Ishaq Ganaie**

PG Scholar, Department of  
Orthopaedics, Govt. Medical  
College, Srinagar, Jammu and  
Kashmir, India

**Rahi Akhter**

PG Scholar, Department of  
Orthopaedics, Govt. Medical  
College, Srinagar, Jammu and  
Kashmir, India

**Nadeem Ali**

Lecturer, Department of  
Orthopaedics, Govt. Medical  
College, Srinagar, Jammu and  
Kashmir, India

**Aasif Ashraf Vaid**

PG Scholar, Department of  
Orthopaedics, Govt. Medical  
College, Srinagar, Jammu and  
Kashmir, India

### Effectiveness of corticosteroid injection in the treatment of De Quervain's stenosing tenosynovitis

**Mohd. Ishaq Ganaie, Rahi Akhter, Nadeem Ali and Aasif Ashraf Vaid**

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#### Abstract

**Introduction:** De Quervain's tenosynovitis is a condition that involves stenosis of the first dorsal compartment of wrist, which contain abductor pollicis longus and extensor pollicis brevis running through it, resulting in wrist pain and impaired wrist movement. Treatment method includes immobilization, steroid injections and surgical intervention. The aim of this study was to determine the outcome of corticosteroid injection in patients with De Quervain's tenosynovitis.

**Materials and Methods:** In this study a total of 48 patients with De Quervain's tenosynovitis confirmed by clinical examination, USG and pain interfering with daily activities of life, managed with corticosteroid injection were taken into study. Treatment efficacy was measured by assessing reduction in severity of pain and tenderness on the radial side of wrist and negative Finkelstein test. The severity of pain was noted on Visual analogue scale (VAS 0-10) before and after intervention.

**Results:** At 3 weeks, short-term responses included complete or nearly complete control of signs and symptoms in 28 (58.33%) patients, with zero VAS. 11 (22.92%) patients experienced partial response. Only 9 (18.75%) patients failed to show significant changes after the first injection. At six weeks follow-up 45 (93.75%) patients were symptoms free and fully satisfied with the results. We found no recurrence except 3 (6.25%) in this series of patients after 24 weeks of follow-up.

**Conclusion:** We conclude that one or two local steroid injections in the first dorsal compartment leads to early improvement in patients with de Quervain's tenosynovitis.

**Keywords:** De Quervains tenosynovitis, local steroid, methylprednisolone

#### Introduction

De Quervain's tenosynovitis is a condition that involves stenosis of the first dorsal compartment of wrist, which contain abductor pollicis longus and extensor pollicis brevis running through it. It was recognized by De Quervain in 1895<sup>[1]</sup> at Kocher's Clinic in Berne, Switzerland. He described this condition in 5 cases of which all were female patients. This problem is more common in those who do a skilled job that requires an extended thumb or the wrist in ulnar deviation like in housewives. The severely incapacitating handicap brought on by this illness limits everyday activities. In recent days, the condition was found to represent thickening of tendon sheath rather than tendinitis owing to lack of histopathological evidence of any inflammation in specimens.

Histopathologically there is no inflammation but thickening of tendon sheath and myxoid degeneration due to mucopolysacchride accumulation<sup>[2]</sup>. So this causes intrinsic degeneration of the involved tendons. Due to thickening of tendon sheath and retinaculum there is impairment in normal movement of APL and EPB tendons resulting in wrist pain and impaired wrist movement<sup>[3]</sup>. Pain is progressive if left untreated and thus causes decreased wrist function.

The diagnosis is made by history and physical examination. Symptoms consist of pain or tenderness at the radial styloid sometimes radiating to the thumb, forearm or shoulder and on physical examination there might be swelling at the radial styloid with tenderness and crepitations on palpation. Finkelstein's test (deviating the wrist to the ulnar side, while grasping the thumb, results in pain) is in typical cases positive. A positive Finkelstein's test has a between observer repeatability. Unfortunately there is no golden diagnostic confirmatory test for de Quervain's tenosynovitis. In the literature a variety of terminology (e.g. tendinitis, peritendinitis, tenosynovitis, tenovaginitis) and case-definitions are used for this condition.

**Corresponding Author:**

**Aasif Ashraf Vaid**

PG Scholar, Department of  
Orthopaedics, Govt. Medical  
College, Srinagar, Jammu and  
Kashmir, India

In 1998 and 2001 efforts have been made to construct reliable classifications and case-definitions for soft-tissue rheumatic disorders of the upper limb, including de Quervain's tenosynovitis [4-6].

There is no consensus in the management of this condition [7]. It has been reported that treatment modalities like, rest, massage, cold and heat applications, diathermy, splints and counter irritants, are not effective in this condition [3]. Non-surgical treatment, consisting of local corticosteroid injections, bracing, physical therapy, and thumb spica cast, is mostly rewarding. In resistant cases, surgery is performed to release of the first dorsal compartment of the wrist [8]. Surgery (dividing or excising a strip of the covering sheet of tendon) has been reported to be curative in 91% of patients, but it has been associated with higher costs and sometimes-surgical complications [9].

Objective of this study is therefore to assess outcome of local corticosteroid injections for de Quervain's tenosynovitis.

### Materials and Methods

This prospective study was conducted in Govt. Hospital for Bone and Joint Surgery, an associated hospital of Govt. Medical College, Srinagar after clearance by institutional ethical committee and took place from July 2019 to August 2021. In this study a total of 46 patients confirmed by clinical examination, USG and pain interfering with daily activities of life were taken into study. On physical examination the area at and around the radial styloid (first dorsal compartment of wrist) was tender, and the Finkelstein test was positive in all patients. All patients previously had a treatment of the condition with oral and local NSAIDs for more than 5 weeks and had shown no response and were therefore not satisfied with treatment.

However, patients with history of chronic joints disease, osteoarthritis, rheumatoid disease or fracture around the wrist joint, patients with previous history of local steroid infiltration, patients with history of diabetes mellitus and patients under the age of 18 years were excluded from the study.

### Intervention

All patients were given one local injections of 40 mg (1 ml) methylprednisolone and 1 ml of 1% xylocaine hydrochloride using 24 or 26 gauge needles along the line of the tendon, just proximal or distal to the styloid at the maximum tender site. The Xylocaine injection was performed after the area was sterilized with a povidone-iodine scrub and wiped with alcohol. Subsequently, using a separate syringe and 25-gauge needle, 1 ml (40 mg) of methylprednisolone acetate was placed into the tenosynovial sac in the same manner as the Xylocaine. Stretching of the synovial sheath by volume effect was observed.

For early clinical response each patient examined two weeks after the injection, and then followed fortnightly for 24 weeks. Treatment efficacy was measured by assessing reduction in severity of pain and tenderness on the radial side of wrist and negative Finkelstein test. The severity of pain was noted on Visual analogue scale (VAS 0-10) before intervention, at follow-up of 12 weeks and 24 weeks after intervention, with 0 no pain, 1 to 3 as mild, 4 to 6 as moderate and 7 to 10 as severe pain.

### Results

The average age of the study population was 43.8 years (range 24-62) years. There were 14 (29.17%) males and 34

(70.83%) females. The right hand was affected in 29 (60.42%) and left in 19 (39.58%) patients (Table 1). The mean duration from the onset of symptoms to enrolment for this study was 3 (range 2-5) months. At the start of study the severity of pain on 10cm VAS was recorded. 26 patients had VAS score 8, 17 patients had 6 and 5 patients had 4. Out of 48 patients 9 (18.75%) patients were given second injection 3 weeks after first injection, as they claimed no response.

**Table 1:** Demographic characters of enrolled population (N=36).

Characters	Frequency	Percentage
<b>Gender</b>		
Male	14	29.17
Female	34	70.83
<b>Side</b>		
Right	29	60.42
Left	19	39.58
<b>Age group</b>		
18-30 Years	6	12.50
31-40 Years	17	35.42
41-50 Years	13	27.08
51-60 Years	9	18.75
>60 Years	3	06.25

At 3 weeks, short-term responses included complete or nearly complete control of signs and symptoms in 28 (58.33%) patients, with zero VAS. 11 (22.92%) patients experienced partial response. Only 9 (18.75%) patients failed to show significant changes after the first injection. At six weeks follow-up 45 (93.75%) patients were symptoms free and fully satisfied with the results. We found no recurrence except 3 (6.25%) in this series of patients after 24 weeks of follow-up. The adverse reaction of steroid although seen in 16 (33.33%) of patients but were transient. Temporary pain at the site of injection was reported by 9 (18.75%) patients, which subsided in 4 to 10 days. Minimal skin color lightening to frank subcutaneous atrophy occurred in 7 (14.58%) patients. No instances of post-injection infection or tendon rupture occurred.

**Table 2:** VAS score at different follow-ups

Time	Mean	St. Deviation	Range
Pre-injection	6.90	1.12	4-8
3-weeks follow-up	2.10	0.85	0-6
6-weeks follow-up	0.90	0.20	0-6
12-weeks follow-up	1.20	0.42	0-6

### Discussion

Prior to 1950, symptomatic De Quervain's tenosynovitis was treated almost exclusively by surgical release. Medical therapy, consisting of rest, splinting, and physiotherapy, was thought to be ineffective. After Hollander's introduction of the use of hydrocortisone in 1951, the clinician could offer the patient a choice between medical treatment and surgery. However, despite several studies showing efficacy of local injection, particularly with hydrocortisone, acceptance of this treatment for De Quervain's tenosynovitis was not forthcoming [10]. In the 1960s, the long-acting corticosteroid derivatives were introduced, notably methylprednisolone, triamcinolone, and betamethasone [11]. These "timereleased" preparations have the advantage of a more sustained clinical effect. As has been demonstrated with flexor tenosynovitis of the hand, the longacting preparations have greater efficacy than the soluble preparations, such as hydrocortisone. In addition, a recent survey showed that betamethasone,

triamcinolone, and methylprednisolone were the corticosteroids most frequently used for injection, and that, among orthopedists, De Quervain's tenosynovitis was the fourth most common extraarticular condition that is treated by injections. The present study was designed to confirm the short-term effectiveness of local corticosteroid injection, without immobilization, in the medical management of De Quervain's tenosynovitis, as well as to demonstrate its safety in terms of serious adverse reactions.

The average age of the study population was 43.8 years and 70% patients were females in our study. Mehdinasab SA, Alemohammad SA [7] in their study reported 86.3% female patients, with mean age of all patients 32.6 years.

In this study 45 (93.75%) of our patients were successfully controlled with local injection of the area without immobilization. All of our patients had previously tried other form of treatment (rest and oral NSAID's). Topical Local steroid injection is now accepted as standard treatment for DeQuervain disease. High level of success has been reported for local steroid injection in various studies. Richie and Eriner reviewed seven papers and concluded that local steroid injection is effective in 83% of patients. This cure rate was 61% for patients receiving injection and splint, and 14% for patients with splint only and it was 0% for those receiving rest or non-steroid anti-inflammatory drugs. It was found to be the most effective and successful treatment for this condition. In their analysis it was noticed that 327 wrists were injected and followed up for 9.6 months and no tendon rupture was found [12]. Avci *et al.* claimed 100% success rate [13]. Takuya Sawaizumi, (2007) performed local injections of Triamcinolone for patients with De Quervain's disease, and they claimed 94% success rate. 90% of patients were fully satisfied, relapse was seen in 26% of patients, and complications were seen in 32% [14].

McDermott JD *et al.*, (2012) reported that at 6-week follow-up, 36 of the 37 wrists checked in 36 patients (97%) had relapse of symptoms. However 14% of wrists had recurrence of symptoms. No complications were noted [15]. This is in contrast to this study where we observed some minor complications in 16 (33.33%) cases, this may be due to the comparatively prolong follow of 24 weeks in contrast to study of McDermott JD *et al.*, where it was 6 weeks only.

Our study indicates that local injection therapy with corticosteroids for de Quervain's tenosynovitis provided by a primary care provider is an effective alternative to surgical therapy and we suggest that initial treatment should be injection therapy with 1-2 local injections with corticosteroids and in case of insufficient response or recurrence the patient should be referred for surgical treatment. The limitation of our study is a short term follows up. No recurrence was detected in 6 months of follow up. We believe that a future study will be needed on this subject.

## Conclusion

We conclude that one or two local steroid injections in the first dorsal compartment leads to early improvement in patients with de Quervain's tenosynovitis.

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