

# OUTCOME OF STEROID INJECTIONS IN PATIENTS WITH DE-QUERVAIN'S TENOSYNOVITIS

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## ABSTRACT

**Objective:** To determine the outcome of steroid injections in patients with de Quervain's tenosynovitis.

**Material and Methods:** This Descriptive case series was conducted in the Department of Orthopedics Surgery, Hayatabad Medical Complex, Peshawar from April 2017 to Jan 2018. Patients of any gender, age group 18-55 presenting with de Quervain's disease were included. Sample size was 97, using 95% confidence interval, and 10% margin of error, under WHO software for sample size calculation. Positive test means ulnar deviation of the wrist with flexed thumb lead to pain; outcome was determined by obtaining negative Finkelstein's test at 3 weeks follow up.

**Results:** Total No of 97 patients with de Quervain tenosynovitis (Positive Finkelstein's test) were selected and Finkelstein's test was performed at three weeks after steroid injection to study its effect. 96% of the patients were female and in 99% disease was noted on the dominant side. The mean age in study was  $33.9 \pm 5.3$  SD. Efficacy was observed to be 95% however its association with age has p value .000 and gender .000.

**Conclusions:** Local steroid injection in patients with de Quervain's tenosynovitis is effective at three weeks in term of Finkelstein's test.

**Keywords:** Local, steroid, injection, de Quervain's tenosynovitis.

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**This article may be cited as:** Raza W, Bakar A, Awan S, Qadir RI. Outcome of Steroid Injections in Patients with De-Quervain's Tenosynovitis. J Med Sci 2020 April;28(2):162-166

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## INTRODUCTION

Named after Swiss Physician Fritz de Quervain, De Quervain tenosynovitis is a painful disabling condition affecting hand. It is more prevalent in manual workers, can be treated by conservative and surgical means. Working population are more at risk of developing De Quervain's tenosynovitis<sup>1</sup>, which is a painful condition and may limit day-to-day activities. The most probable cause is thickening of the extensor retinaculum of the wrist<sup>2</sup>.

In 1895 Fritz de Quervain, a Swiss physician first described this condition. Pain in the region of the wrist joint, due to Stenosing tenosynovitis of first dorsal web space of extensor pollicis brevis and abductor pollicis longus tendon<sup>3</sup>.

The prevalence of de Quervain's tenosynovitis was 0.5% in men and 1.5% in women commonly encountered in orthopedic clinics and diagnosed clinically. New stud-

ies in worker show its prevalence to be higher than in the community. De Quervain's is also written as disease of pregnancy and lactation<sup>4</sup>.

The signs and symptoms of de Quervain's tenosynovitis includes pain or tenderness and sometimes swelling at the radial styloid with tenderness<sup>5</sup>. Ulnar deviation of the wrist with flexed thumb lead to pain. Classical pain is over radial styloid radiating to anatomical snuff box and thumb<sup>6</sup>.

De Quervain's tenosynovitis can be treated by conservative and operative mean<sup>7</sup>. The conservative treatment includes oral anti-inflammatory drugs ice, heat therapy and steroid infiltration along the tendon sheath<sup>8</sup>. Conservative means are enough to resolve the self limiting disease of pregnancy complete relief of symptoms by the end of lactation is observed<sup>4</sup>. A use of thumb splint for resting is most popular<sup>9</sup> but is cumbersome and has been observed with poor results in the working community. Surgical treatment includes release of the first dorsal compartment and removal of any septa if present<sup>7,8</sup>. The result of surgical treatment is much better than the conservative, but at the cost of operating theater time, risk of infection, permanent damage to superficial branch of radial nerve and instability<sup>10</sup>.

De Quervain's tenosynovitis is painful disabling condition of the wrist; treatment is conservative and oper-

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**Date received:** 27-11-2019

**Date revised:** 18-03-2020

**Date accepted:** 20-05-2020

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ative. Most studies are done on operative treatment, which is invasive expensive needs operation theater anesthesia setup and possible complications.

Studies done on the conservative treatment uses splints more often, which in case of removable are expensive and fixed splinting for three weeks or so, may not be tolerated well in working people. As found effective in my study, family physicians and orthopedic surgeons can be recommended to use local steroid injection for de Quervain's tenosynovitis as an outpatient department procedure to avoid un-wanted surgical intervention<sup>11</sup>.

## MATERIAL AND METHODS

This descriptive case series was conducted over a time period of 6 months from 15-04-2017 to 30-01-2018 in department of orthopedics surgery, Hayatabad Medical complex Peshawar. Patients of any gender, age group 18-55 presenting with de Quervain's disease were included in the study.

However, patients with history of chronic joints disease osteoarthritis rheumatoid disease or fracture around the wrist joint on x-ray were excluded. Also patients with previous history of local steroid infiltration in the region which may interfere with outcome of study and patients under treatment of endocrinology or history diabetes mellitus with fasting blood sugar 120 mg/dl as steroid injection have diminished effects in those patients were also excluded.

Furthermore, patients with wound or focus of infection around wrist on clinical examination were also not included as injections are contraindicated to control selection bias and confounding variable as these had different prognosis and would affect the overall result of the study.

Sample size was 97, using 50% effectiveness of steroid injection, 95% confidence interval, and 10% margin of error, under WHO software for sample size calculation.

After the approval from the hospital ethical committee all the patients meeting the inclusion criteria, in orthopedic outpatient department with pain in first dorsal compartment while grasping the thumb and deviating the wrist to ulnar side were selected. Written informed consent was taken.

Patients were given one local injections with 40 mg (1 ml) methylprednisolone along the line of the tendon, just proximal or distal to the styloid at the maximum tender site by the researcher in supervision of senior orthopedics surgeon. All the patients were discharged and advised to follow up at three weeks.

At three weeks follow up finkelstein test (Positive test means was deviation of the wrist to the ulnar side,

while grasping the thumb, results in pain) was done to determine intervention effectiveness. All of the above information including name age sex gender is recorded in predefine Performa. Strict exclusion criteria followed to control confounders and biases in the study.

Data was entered in SPSS version 10. The mean +\_ standard deviations calculated for continuous variables like age. The frequencies and percentages calculated for categorical variables like sex, affected side, and Finkelstein test. Effectiveness is stratified among age sex and other analgesics used to see the effect modifiers. Results described and presented in the form of tables.

## RESULTS

Total of 107 patients were registered who came with complaints of pain at base of thumb with positive Finkelstein's test. 9 of them did not come for follow up visit and were excluded from the study. Three patients in those 9 later on undergone surgery for the disease so these patients who were initially registered in study were excluded because of follow up test at three weeks was not done, one of the female was diagnosed as case of diabetes mellitus and was also excluded.

Age distribution was analyzed as most of the patients 63(64.9%) were in age range 30-40 years followed by 23(23.7%) patients below 30 years and 11(11%) patients above 40 years of age. Mean age was observed to be 33.9 with STD deviation of  $\pm 5.3$  (as shown in Table 1)

Gender distribution among 97 patients was analyzed as female predominant disease, more in pregnancy, 26 out of 96 were having pregnancy and 13 postpartum 4 of those with bilateral disease. 96% of my patients were female age ranges 23 to 40 years. Only 3 males were registered who fulfils the inclusion criteria of follow up after 3 weeks. Interestingly ages in male population effected were on higher side, 40 plus. (As shown in Table 1). Site affect among 97 patients were analyzed as 96 patients had laterality on right side while only one patient had laterality on left side.

In this study there were 23 patients age less than 30 years, all female and had outcome observed to be 100% in this group. 63 patients were from 30 to 40 years age group, 61 females showed efficacy of steroids and 1 male and 1 female patient were observed to have positive Finkelstein's test at three weeks. There were only nine patients with age more than 40years; in this group 2 males and a female patients' steroids were observed to be non effective in term of Finkelstein's test in De Quervain tenosynovitis as shown in Table no 4, 5, 6)

Outcome was observed to be 95% however it was noted to have association with age and gender P value 0.000 and 0.000 respectively.

**Table 1: Age & gender distribution (N=97).**

Age & gender	Frequency	Percentage
< 30 years	23	%23.7
40-30 years	63	%64.9
> 40 years	11	%11
Male	3	%3.1
Female	94	%96.9

**Table 2: Age wise efficacy of steroid.**

Age wise efficacy	Efficacy	Efficacy	Total
	Yes	No	
< 30 years		23	23
40-30 years	62	1	63
40 & above	8	3	11
Total	93	4	97

Chi square was applied in which P value 0.00

**Table 3: Gender wise efficacy of steroid.**

Age wise efficacy	Efficacy	Efficacy	Total
	Yes	No	
Male	1	2	3
Female	92	2	94
Total	93	4	97

Chi square was applied in which P value 0.00

## DISCUSSION

In our study total of 107 patients were registered who came with complaints of pain at base of thumb with positive Finkelstein's test. Nine of them did not come for follow up visit and were excluded from the study. Three in those 9 later on undergone surgery for the disease so these patients who were initially registered in study were excluded because of follow up test at three weeks was not done; one of the female was diagnosed as case of diabetes mellitus and was also excluded. All the patients were advised avoid grasping and lifting with the wrist while ulnar deviation.

Prevalence of .7% to 2.1% in general working population and 5% to 1.3% in community is noted<sup>12</sup>. According to wolf and colleagues de Quervain's tenosynovitis had a significantly higher rate in Women of at 2.8 cases per 1000 person-years, compared to men at 0.6 per 1000 person-years women had a significantly ( $p < .0001$ ) Female. A male -to- female ratio as high as 1: 8 have been reported. There appears to be an increased prevalence in women during the later stages of pregnancy and in the early postpartum period, which is often bilateral<sup>4-13</sup>. Avci and colleagues termed de Quervain's as a disease of pregnancy and lactation which usually is self-limited and responds well to conservative treatment. They conducted a randomized prospective study on 19 wrists of 18 patients with de Quervain's disease who were either pregnant or breast-feeding<sup>4</sup>.

Sawaizumi observed a mean age of 46 years' minimum age reported 22 yrs; there were 14 men and 22 women, With 24 dominant hands and 2 cases of bilateral involvement<sup>14</sup>. The mean ages for the patients in the 7 observational studies varied between 38.0 and 49.4 years in review study conducted by Rechies<sup>10</sup>. In Iranian study by Alemohammad the mean age of all patients was 31.2 years (range 21 – 61 years)<sup>9</sup>.

In our study female predominance was significant and disease was observed more in pregnancy, 36 out of 96 were having pregnancy and 23 lactating mothers 4 of those with bilateral disease. The female age recorded in our study is on lower side because of the early marriages and early pregnancies in our region. 96% of patients were female age ranges 23 to 40 years. Only 3 males were registered who fulfilled the inclusion criteria of follow up after 3 weeks. Interestingly ages in male population effected were on higher side (more than 40). Mean age was observed to be 33.9 with STD deviation of 5. De Quervain's tenosynovitis is noted to be in the dominant hand 99 % of the times and was observed in one non dominant hand in sample size of 97.

459 wrists were studied in a Systemic review of seven observational studies, efficacy of splints steroids and splints and steroids were observed to be 14%, 61% and 83% respectively<sup>10</sup>. In this study, efficacy of steroids verses steroids and splints were noted to be higher in steroids group which is described as wolf law of tendon healing and remolding in accordance to force and stresses upon them. In another study in which nimsulide had been studied alongside local steroids, they observed steroids to be effective in 68% of the cases with nimsulide and 67% otherwise at 7th day <sup>15</sup>.

In a Dutch study the short and long term effects of corticosteroid and placebo were studied<sup>16</sup>. Their observation was, steroids are effective in comparison with placebo in short as well as long term of immediate treatment response, severity of pain, improvement as perceived by participant and functional disability. They were only able to include 21 patients for the sample size of 50 which was calculated before the study. They get to the conclusion of steroid significance in terms of subjective improvement of pain<sup>16</sup>.

A study conducted in Iran comparative trail on casting and steroids with casting. They included 73 patients 37 in steroid group efficacy was observed to be 85.6%<sup>9</sup>. Although they excluded any patient with pregnancy, steroids and casting efficacy had significantly higher rate of cure than casting alone. Another study finds steroids to be 89% effective and they also needed a second injection if the symptoms persist after one injection. They emphasize on the correct placement of the injection in the tendon sheath<sup>14</sup>.

In our study there were 23 patients aged less than 30 years all of which were female and efficacy was observed to be 100% in this group. 63 patients were from 30 to 40 years' age group, of which 62 were females and one male patient. 61 females showed efficacy of steroid injection in this age group and one female and one male patient were observed to have positive finkelstein test at three weeks. There were only nine patients with age more than 40 yrs; in this group 2 males and 1 female patient's steroids were observed to be non effective in term of finkelstein test in De Quervain's tenosynovitis.

A positive Finkelstein test is the diagnostic criterion for de Quervain tenosynovitis. The test is performed by making a fist with the thumb inside the fingers. On passive ulnar deviation of wrist by the examiner, the dosrolateral wrist pain is aggravated. The Finkelstein test is done bilaterally to compare the involved side with uninvolved one<sup>17</sup>.

Test was done on initial visit for the confirmation of the disease and then repeated after three weeks of the injection. Initially it was observed to be positive but could not be elicited at third week except for the three patients in whom steroid was considered to be not effective. A single visit permanently cured the symptoms in almost half of the patients. Nowadays 2 and 4 site injection technique has been introduced and randomized trials are available to show better results of 90% and above in the relief of symptoms. In our study steroids are 96.9% effective in term of Finkelstein test.

The results of our study coincides with Avci, who reported 100% efficacy in pregnancy and lactation<sup>4-13</sup>; which is in agreement with the results observed in our study in patient age group below 30 years. The de Quervain tenosynovitis occurring during pregnancy frequently responds well to the conservative treatment. The symptoms in pregnant women may resolve spontaneously either at the end of pregnancy or at the end of breast feeding<sup>4</sup>.

Though this will also need further studies in pregnancies and postpartum to establish its true natural history and response. The efficacy of steroids in our study indicated statistically significance association with age and gender however the sample size was taken to determine the efficacy of steroids only. So this will need further studies and larger sample size to establish these associations with effectiveness.

Results for the age group of more than 40 years with efficacy of 70% are in consistent with that of other studies. The possible explanation for this again is chronic degenerative disease and probable congenital variations in this area.

## LIMITATIONS

The concepts of eccentric loading are applied and all the patients are advised to avoid gripping and lifting in

ulnar deviation of the hand and to do passive stretching exercise. This can act as confounder with steroids in outcome of the disease, but this again will need further research.

Short duration follow-up was main shortcoming of our study. We were not able to follow the patients after three weeks. Any recurrence after three weeks was not recorded. The predesigned Performa was deficient in terms of recoding of the association like pregnancy.

Outcome measure was only Finkelstein test. No other outcome measurement pain scale or Perceived improvement is recorded. Control on injection in the correct tendon sheath needs ultrasonography control, which was not available and may have resulted in wrong site injections in non-responders.

## CONCLUSION

Steroid injections are effective in more than 90% of the patient in terms of Finkelstein test. Results are suggestive of significantly better efficacy of steroids in younger age and female gender.

## RECOMMENDATIONS

De Quervain tenosynovitis is painful disabling condition of the hand in people who performs manual work. It can be safely treated by general practitioner. Sound knowledge of anatomical land marks and injection in to the tendon sheath is the key to success.

Further studies needed to know about the prevalence in our region. Disease association with pregnancy needs further evaluation for its pathology and its response to steroids.

Cadaveric studies in our region will be also helpful to know about anatomical variation of 1st dorsal compartment in our region. Conservative management like physiotherapy and eccentric loading in tendinopathies need to be evaluated for their efficacy.

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**CONFLICT OF INTEREST:** Authors declare no conflict of interest

**GRANT SUPPORT AND FINANCIAL DISCLOSURE:** NIL

# AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

**Raza W:** Concept, study design, data acquisition.

**Bakar A:** Drafting the manuscript.

**Awan S:** Critical review.

**Qadir RI:** Analysis & interpretation of data.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.