

# Comparison of the Outcome of Pain Relief Between Corticosteroid Injection with Thumb Spica Cast and Casting Alone in the Treatment of de Quervain's Tenosynovitis.

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## Abstract

**Background:** To compare the frequency of pain relief between corticosteroid injection combined with casting and casting alone in management of de Quervain tenosynovitis.

**Methods:** Seventy patients with de Quervain's Tenosynovitis in age ranging from 18 to 70 years were recruited for the study. Two groups each containing 35 patients were formed by dividing the patients randomly. Group A was given injection triamcinolone with thumb spica cast and group B was given thumb spica cast alone. The VAS pain score at presentation was recorded for each patient. Both groups were compared regarding pain relief by recording VAS pain score at 4 weeks after presentation. The results were analyzed with the help of SPSS version 10. A p value of 0.05 was considered significant.

**Results:** Mean/average age of the patients was  $43.79 \pm 16.015$  years (mean  $\pm$  SD). In both groups, there was no statistically significant difference for the age and pre-treatment VAS pain score (p values 0.464 and 0.482 respectively). In group A (Corticosteroid injection plus thumb spica cast) there were more patients which were pain free at the end of the study (88.5% in group A, 62.9% in group B, p value 0.012).

**Conclusion:** Corticosteroid Injection plus thumb spica cast is more effective for reducing pain in de Quervain's Tenosynovitis as compared to thumb spica cast alone.

**Key Words:** De Quervain's Tenosynovitis, corticosteroid injection, thumb spica cast.

## Introduction

De Quervain, a Swiss surgeon, first defined stenosing tenosynovitis at the first dorsal compartment of the wrist in 1895.<sup>1</sup> It occurs usually in adults 30 to 50 years old. Incidence in women is ten times more as compared to men. It affects the extensor pollicis brevis

(EPB) and abductor pollicis longus (APL) tendon sheaths.<sup>2</sup> It is mostly caused by excessive use or an increase in repetitive activity. It results in micro trauma from repetitive gliding of the first dorsal compartment tendons under the sheath of the first compartment over the styloid of the radius, which leads to thickening of the extensor retinaculum of the wrist. Later on, the condition was found to represent tendinosis as opposed to tendinitis owing to absence of evidence of any inflammation in histopathological specimens. It occurs typically in adults ranging from 30 to 50 years old and women are more at risk. Women are affected six to ten times more frequently than men.<sup>2-9</sup> It is usually caused by overuse or an increase in repetitive activity, bringing about shear micro trauma from repetitive gliding of the first dorsal compartment tendons (abductor pollicis longus or APL, and extensor pollicis brevis or EPB) under the sheath of the first compartment over the styloid of the radius prompting thickening of the extensor retinaculum of the wrist.<sup>10,11</sup> Symptoms comprise of pain or tenderness at the radial styloid at times radiating to the thumb, shoulder or forearm. On physical examination there might be swelling at the radial styloid with tenderness and crepitations on palpation.<sup>12,13</sup>

For diagnosis Finkelstein's test is done. Diagnosis is usually concluded by a positive test result.<sup>14</sup> Finkelstein's test (deviating the wrist to the ulnar side, while grasping the thumb, results in pain) is positive in typical cases.<sup>15,16</sup> Non-surgical treatment, comprising of local corticosteroid injections, bracing, physical therapy, and thumb spica cast, is mostly rewarding.<sup>17</sup> Surgery is performed in resistant cases to release the first dorsal compartment of the wrist.<sup>18</sup> There is no accord on the best protocol for wrist immobilization. Some authors advocate full-time splint or cast application for four to six weeks, with the justification that tendonitis will resolve with strict rest. Some studies showed that an general success rate for a

thumb spica cast plus corticosteroid injection was 87% and for thumb spica cast alone was 36%.<sup>19</sup> However, some studies have compared the efficacy of thumb spica cast plus corticosteroid injection versus corticosteroid injection.<sup>20</sup>

### Patients and Methods

After the approval from ethical committee of the Rawalpindi Medical University , the data collection was started. Patients were diagnosed after history and physical examination and included in the study by fulfilling the inclusion criteria. After discussing risk and benefits of the treatment modalities with the patients, their consent was taken and only those were included in the study who gave written informed consent. Patients were randomly selected by lottery method and equally distributed to two groups. Group A (n=35) received injection triamcinolone and thumb spica cast. Group B (n=35) was applied only thumb spica cast.

The patients in Group A were given One ml (10mg) of triamcinolone acetonide and 1 ml of 1% lidocaine hydrochloride mixed in 5 cc syringe with 25 gauge needle at the site of maximum tenderness and thumb spica cast was applied after VAS scoring. The patients in Group B were given only thumb spica cast after recording their VAS score. Both group’s casts were removed at three weeks and gentle physiotherapy was started. Both the patients were assessed at four weeks meanwhile discouraging them to use any painkiller. They were assessed through VAS score. The VAS scores were compared for both pre and post treatment at four weeks interval and pain relief was assessed. Mean and Standard Deviation were calculated of pain score and age. Comparison of pain relief at 4 weeks interval after treatment in both groups was done. Effect modifiers like age and gender were controlled by stratification. Post stratification Chi-Square test was applied and a p value of ≤0.05 was considered significant.

### Results

Mean age of patients was 43.79±16.015. Mean VAS at presentation was 83.99±8.927, while in group A the mean pre-treatment VAS was 83.23±8.207, while in Group B the pre-treatment VAS was 84.74±9.654 .There was no significant difference between the pre-treatment VAS between the two groups (p=0.482). The mean pre-treatment VAS of male patients was 85.33±8.751, while that of female patients was 82.98±9.034, there was no significant difference between the pre-treatment VAS between the two genders (p=0.277). After 4 weeks the VAS of the

patients was reassessed, recorded and analyzed. The mean VAS post-treatment was 27.39 ±11.540. In Group A, the mean VAS post-treatment was 24.51±8.480, while in Group B, the mean VAS post-treatment was 30.26±13.467 (Table 1). In Group A, 88.57% (31/35) patients were found to be pain free, while in Group B 62.86% (22/35) were pain free. Chi-square test was applied and the difference of pain relief between the two groups was found to be statistically significant (p= 0.012) (Table 2). Effect modifiers like age and gender were controlled by stratification. Post-stratification chi-square test was applied. Patients were stratified into 3 groups based on their age. The 3 groups were compared and p-values were calculated for each group. Group 1 had patients between the ages of 18 and 35 years and the p-value was 0.006. Group 2 had patients between the ages of 35 and 55 years and the p-value was 0.097. Group 3 had patients between the ages of 55-70 years and the p-value was 0.899 (Table 3). Stratification was also done based on gender of the patients and the results were compared. 14 of the 15 male patients in group A reported being free from pain at 4 weeks (p=0.013), while 17 of the 20 female patients in group A reported being free from pain (p=0.256) (Table 4&5).

**Table 1. Pain score comparison among groups at 4 weeks**

	VAS at 4 weeks	p- Value
Group A	24.51±8.480	0.036
Group B	30.26±13.467	

**Table 2: Comparison of pain relief between groups.**

	Pain Relief		p- Value
	Yes	No	
Group A	31	4	0.012
Group B	22	13	

**Table 3: Comparison of pain relief between different age groups**

Age Group (years)	Group A		Group B		p-value
	Yes	No	Yes	No	
18-35	15	0	7	5	0.06
36-55	10	1	6	4	0.097
56-70	6	3	9	4	0.899

**Table 4. Comparison of pain relief between Male patients.**

	Pain Relief		p- Value
	Yes	No	
Group A	14	1	0.013
Group B	8	7	

**Table 5. Comparison of pain relief between Female patients**

	Pain Relief		p- Value
	Yes	No	
Group A	17	3	0.256
Group B	14	6	

## Discussion

De Quervain's Tenosynovitis, although a seemingly insignificant condition, is very serious disorder for the patient as it hinders the performance of the basic function of the hand, the use of the thumb.<sup>13</sup> Various methods of treatment for De Quervain's Tenosynovitis have been advised over the years including analgesics, splinting, multiple corticosteroid injections and surgical release, but the cost effective of all the options is a thumb spica cast, Intralesional corticosteroid injection is the most effective with cure rates of upto 50% .The combination of these two treatment modalities gives the best outcome with immobilization by the cast and anti-inflammatory action by the steroid. The results of the combination of the two treatment is hypothesized to be much better than a single modality alone. This was the main purpose of our study to determine the efficacy of thumb spica cast and intra-lesional corticosteroid injection in relieving the pain of de Quervain's Tenosynovitis when it is compared with a cast alone. Sawaizumi, T., et al. evaluated the efficacy of triamcinolone in 36 patients. They injected twice with interval of 2 weeks and found that 90% were satisfied.<sup>13</sup> de Quervain's tenosynovitis as it occurs more often in the female gender, particularly in the mothers who have infant children.<sup>5</sup> Akram, M., et al in their study of 80 patients with de Quervain's Tenosynovitis injected corticosteroids (methylprednisolone acetate) first at presentation and then at 2 weeks in non-responding patients. Their results showed that 98.75% patients were symptom free at 12<sup>th</sup> week, but 25% of patients showed adverse reactions to the steroid injections<sup>14</sup>. Mehdinasab S A and Alemohammad et al, compared corticosteroid injection (methylprednisolone acetate) plus thumb spica and casting alone. Their results are comparable to our results as the injection group showed a success rate of 86.5%. The VAS pain score in their study also showed a very significant reduction in the injection group with the pre-treatment VAS score at 97.16±2.31 while after treatment with steroid injection and thumb spica cast the VAS dropped to 6.70±6.82. The result of the cast group, in contrast to our results, showed a failure rate of 63.9% while our results showed a failure rate of 37%. This may be due

to difference of technique in the application of the cast, the duration of cast application and after care of the cast<sup>5</sup>. Mardani-Kivi, M., et al. Their study compared the efficacy of corticosteroid injection with and without thumb spica cast. His results showed that the group with combination therapy had a success rate of 93% while the group with only corticosteroid injection had a success rate of 69%.<sup>20</sup>

According to pain relief criteria, that was set at the beginning of the study, a VAS pain score of ≤3 after treatment, a total of 53 patients were considered to be pain free at the end of the study, while 17 patients were considered to be in pain. Of the 53 pain free patients, 31 belonged to the group that was treated with both the cast and steroid injection .Thus 89% of the patients that were given the combination treatment were pain free at 4 weeks, while in the other group who were treated with the thumb spica cast alone 13 patients were considered to be still in pain , showing a success rate of 63% in this group. The difference of the number of patients who were pain free among the the two groups was statistically significant (p=0.012).

## Conclusion

1. Corticosteroid injection with Thumb Spica Cast is more effective in reducing pain in de Quervain's Tenosynovitis than Thumb Spica Cast alone.

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