

Original Article

Frequency of De Quervain's Tenosynovitis in Carpenters of Lahore

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Abstract

Background: De Quervain's tenosynovitis is described as overuse tendon injury and characterized by painful movements of the fibro-osseous sheath of the extensor pollicis brevis and abductor pollicis longus tendons in which pain is aggravated by thumb movements and wrist movements during functional activities. **Objective:** To evaluate the frequency of de Quervain's tenosynovitis in carpenters of Lahore. **Methods:** A survey was consisting of 103 patients conducted and selected by non-probability convenient sampling in six months; duration. Data collection was done by using the standard 'Patient Rated Wrist/Hand Evaluation' questionnaire after taking the informed written and verbal consent. The standard Finklestein test helped in diagnosing this condition. The participants who experienced pain at the wrist, over the extensor pollicis brevis and abductor pollicis longus tendons were considered positive for tenosynovitis. Frequency and percentages were calculated for categorical variables. **Results:** The results showed that the frequency of de Quervain's tenosynovitis with positive Finklestein's test was 50.45%, 25.2% for worst ever pain, 26.2% with repetitive wrist movements and 25.2% while doing work job in carpenters of Lahore. The Finklestein's test was positive in 71 (69%) carpenters and 32 (31%) showed a negative test. The mean pain score for positive Finkelstein's test was 6.93 ± 20.40 and for negative F test was 5.24 ± 15.91 . The difference was statistically significant at $p < 0.001$. Among carpenters, age and work duration were strongly correlated ($r = 0.807$) and there is a moderate correlation between age and the total score ($r = 0.78$). **Conclusion:** It was concluded that most carpenters have a moderate level of pain during repetitive wrist movements while working. While a majority of the carpenters have positive Finkelstein's test. Significant results were found showing moderate pain levels with positive tests. A strong correlation was found between age and duration of work.

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Introduction

De Quervain's tenosynovitis (DQT) is entitled after the Swiss surgeon, Fritz de Quervain, who first termed it in 1895. This condition causes

tendon entrapment affecting the first dorsal compartment of the wrist resulting in thickening of tendon sheaths of extensor pollicis brevis (EPB) and abductor pollicis longus (APL) and friction when tendons pass through the

fibro-osseous tunnel located along the radial styloid process at the distal wrist. Pain is aggravated by thumb movements and wrist radial and ulnar deviations.¹ The disease has various synonyms like texting tenosynovitis, washer woman's sprain or blackberry thumb.² DQT is considered an overuse injury, not necessarily accompanied by inflammation and represented by painful movements of the fibro-osseous sheath of both tendons.³ It may be more suitable to consider this as tendinosis instead of tendinitis as pathologic changes demonstrate collagen perplexity and mucoid changes rather than inflammation. Though DQT appears to be self-limited in the majority of patients.⁴ It can also be considered a job-related problem since it is associated with continuous micro-trauma (due to excessive typing or computer work). The disease is relatively frequent and to avoid surgery early diagnosis is required, which becomes essential when the sheaths become thickened and get fibrosed.⁵

It is often seen in participants with repetitive use of the wrist and thumb, but the pain may be aggravated by activity requiring the same ulnar deviation then with a clenched fist and thumb flexion at the metacarpophalangeal joint. Housekeeping, lifting, typing, bowling or knitting, have also been associated with DQT. The dominant hand of 30-50 years old active adults has usually affected especially females (approximately 3:1) and is common in pregnant and lactating mothers. The mechanism of injury involves lifting a baby by picking the child up under the axilla, with the webbing between the index finger and thumb under the baby is common.³ This condition occurs commonly with increased occupational demands like extended computer work, an athlete especially who follows high-resistance training that includes weight lifts and in carpenters doing repetitive movements of hands.² A broad community-

based study done in the UK demonstrated that the prevalence of DQT was 1.3% in women as compared to 0.5% in men.⁶ The literature clearly states that repetitive pushing, prolonged and sustained gripping (while using a hand tool) and repetitive thumb movements (such as typing) as the main risk factors.⁷ Other studies have professed these findings with patients complaining of pain in the wrist while using the thumb, reduction in gripping strength, and as a result, dropping objects due to pain.⁸ High-risk occupations and activities related to de Quervain's disease (DQD) include knitting, piano playing, golfing and endeavoring new kinds of repetitive work or resuming job after a vacation. Although the incidence and prevalence are not well-known for DQD, reports from some degree of studies indicate that females are affected more frequently than males. In a study of 146 female workers in highly repetitive jobs, 8% were found to have this condition.⁹ In U.S 30,074 who had worked over 12 months, 0.46 % reported tenosynovitis.¹⁰

Women have a significantly higher rate of this tenosynovitis at 2.8 cases per 1000 person-years, as compared to men at 0.6 per 1000 person-years. Age greater than 40 is also a substantial risk factor. There is also a racial difference, with blacks at 1.3 per 1000 person-years parallel to whites at 0.8.¹¹ Patients of DQT typically complain of pain and tenderness on the radial aspect of the distal radius aggravated by movements of the thumb. The pain in DQD is due to friction of the tendons against zone seven of the first extensor compartment. This can cause primary tendinopathy that consequently results in thickening.

Different tests had been described for the diagnosis of this condition but the most famous test like Finkelstein's or Eichhoff's test (FT). To perform FT, the assessor firmly grasps the thumb of the patient, the other hand holds the ulnar side of the forearm in neutral pro-

supination then applied the traction on his thumb, pulling it longitudinally in the direction of medial deviation. This maneuver can exacerbate painful symptoms. Other tests can be performed to assess for DQD, such as Brunello's test. Although, wrist hyperflexion and thumb abduction is a specific test used to assess DQD and therefore they can be adopted for the assessment of the initial phases of tenosynovitis.¹²

DQT has been treated widely by non-invasive techniques such as immobilization of the wrist and hand in a cast or it could be the injection of corticosteroids and local anesthesia into the first dorsal compartment.¹³ Besides, numerous treatment options are also employed for this disease, ranging from splinting to surgical release. Most of the participants are treated with corticosteroid injections but the effects of the splint with and without steroids are not clear.¹⁴ Ultrasound-guided injections are also beneficial for the condition without any side effects.¹⁵

The management of DQD is non-operative in the first instance, and surgery is taken into account if conventional treatment failed. These perioperative complications such as wound infection, four transient lesions of the radial nerve and delayed healing can occur.¹⁶ Yoshikawa *et al.*, reported a subject having a locked left thumb along with DQD. While bathing her baby one month postpartum she suddenly got her left thumb locked, and realized that she could not radially abduct it due to the thickening of the APL tendon shown by MRI. Resting her thumb for one month in a splint did not improve her symptoms and movements, thus eventually she underwent surgery. Tendon gliding was restricted proximally because of nodular formation in the tendon distal to the first dorsal compartment. Surgically extensor retinaculum and the synovium around the tendon were excised resulting in an improvement in thumb locking.¹⁷

Conventional treatment has been widely used like rest with splint/cast and corticosteroid use. This method is most effective in acute cases after the onset of the syndrome. Because some patients have a fear of the side effects of probable steroids and each of these treatment options has its benefits and weaknesses.¹⁸ Lane *et al.*, conducted a retrospective study to compare splintage with anti-inflammatory drugs and corticosteroid injections used to manage DQD. Participants were divided into three groups based on symptom severity: minimal, mild, and moderate or severe. About 15 patients with mild symptoms got relief from this. It is concluded that this classification will help surgeons in selecting the most efficient option.¹⁴

While considering the positive relation between thumb pain and repetitive activities, the latest studies are required on this topic to let people know about the risk factors associated with this disease. Previous studies agree with the fact that DQT is common in carpenters due to their repetitive wrist and hand movements. Even though this condition is widely faced by people in various occupations, so far, not enough studies have been accomplished regarding this issue. Therefore, the current study was designed to determine the frequency of de Quervain's tenosynovitis among carpenters of Lahore.

Methods

This cross-sectional survey performed on male carpenters working in various wood markets of Lahore aged between 25 and 55 years was selected by non-probability convenient sampling in six months. The sample size was calculated by using Epitool following standard formula: $N = \frac{Z^2 \times P \times (1-P)}{d^2}$ where z^2 =standard normal variance, p =expected true proportion and d =desired precision. The 10% was the chance of error along with a 90% of the confidence interval. Subjects were excluded from participating in a survey if they have any

deformity of the wrist and hand or have a history of fracture, surgery or any systemic disease.

Data collection was done by using a standard Patient Rated Wrist/Hand Evaluation (PRWHE) questionnaire after taking informed written and verbal consent. In addition to that, some baseline close-ended questions and demographic data were added to access the complete data required for the study. FT was incorporated for the diagnosis of this condition. The respondents were instructed to make a fist with the thumb folded inside the fingers. The examiner stabilized the forearm and deviated the wrist. For the participants who experienced pain at the wrist, over the APL and EPB tendons, the test was considered positive for them. SPSS software version 25 was utilized for the entrance of data following its analysis respectively. For categorical variables, frequency and percentages were calculated. T-test was used and the p-value

was considered significant as ≤ 0.05 . The correlation between age and work duration was calculated.

Results

The results showed that the frequency of DQT in carpenters of Lahore with positive FT was 50.45%, 25.2% for worst ever pain, 26.2% with repetitive wrist movements and 25.2% while doing work job. The majority of carpenters have a moderate level of pain experienced during repetitive wrist movements and continuous work on the job. The FT was positive in 71 (69%) carpenters and 32 (31%) showed a negative test. The mean pain score of positive FT was 6.93 ± 20.40 and the pain score for negative FT was 5.24 ± 15.91 . The difference was statistically significant at $p < 0.001$. Among carpenters, age and work duration were strongly correlated ($r = 0.807$) and there is a moderate correlation between age and the total score ($r = 0.78$).

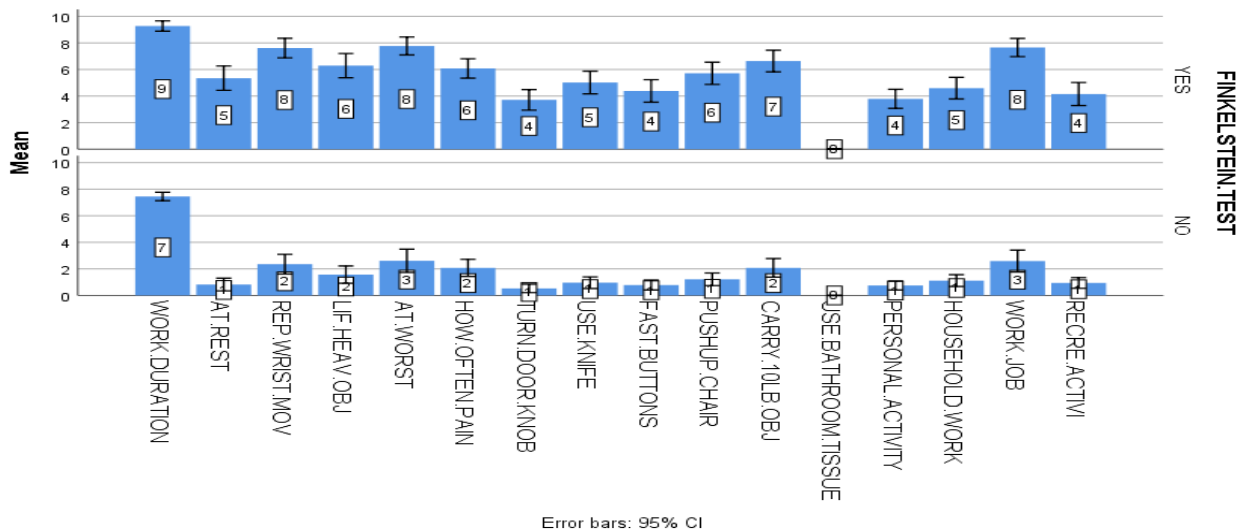


Figure-I: Finklestein's test

Table-I: Descriptive statistics of the respondents

Variables	N	Minimum	Maximum	Mean	Standard Deviation
Age (years)	103	0.00	10.00	28.17	6.88
Work duration (hours per day)	103	0.00	10.00	8.37	1.56
Pain at worst	103	0.00	10.00	6.21	3.80
Work job	103	0.00	10.00	5.15	3.70
Repetitive wrist movement	103	0.00	10.00	5.01	3.73
Carrying 10 lb Object	103	0.00	10.00	4.38	3.54
How often pain occurs	103	0.00	10.00	4.10	3.17
Lifting heavy object	103	0.00	10.00	3.95	3.70
Pushup chair	103	0.00	10.00	3.49	3.32
At rest	103	0.00	10.00	3.11	3.46
Use knife	103	0.00	10.00	3.01	3.17
Household work	103	0.00	10.00	2.87	2.93
Fast buttons	103	0.00	10.00	2.60	2.96
Recreational activity	103	0.00	10.00	2.56	2.91
Personal activity	103	0.00	10.00	2.28	2.52
Turn door knob	103	0.00	10.00	2.14	2.65
Total score	103	0.00	100	36.28	27.77

Table-II: Frequency of having positive Finklestein's test

Test	Frequency	Percent
Positive	71	69%
Negative	32	31%
Total	103	100.0%

Table-III: Mean, standard deviation and p-values using t-test

Finkelstein Test		N	Mean	S.D	t-test	p-value
Pain Score	Yes	71	6.93	20.40	11.55	<0.001
	No	32	5.24	15.91		

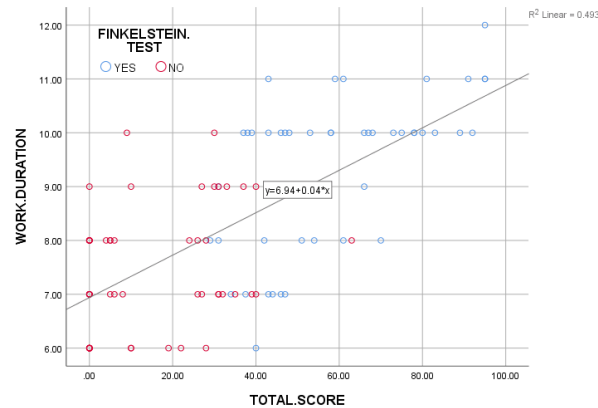


Figure-II: Correlation between age and work duration

Discussion

DQT most commonly arises due to the overuse of the thumb musculature which is characterized by pain that spread over the surface of the radial aspect of the wrist and is intensified by ulnar deviation of the hand. The results showed that the frequency of DQT in carpenters of Lahore with positive FT was 50.45%, 25.2% for worst ever pain, 26.2% with repetitive wrist movements and 25.2% while doing work job. The FT was positive in 71 (69%) carpenters and 32 (31%) showed a negative test. The mean pain score for positive Finkelstein's test was 6.93 ± 20.40 and the pain score for negative Finkelstein's test was 5.24 ± 15.91 . The difference was statistically significant at $p < 0.001$. Among carpenters, age and work duration were strongly correlated ($r = 0.807$).

A study showed a strong and consistent association between DQD and sustained or repeated wrist bending and twisting. This confirms results for hand-wrist tendinitis observed among workers highly exposed to wrist flexion/extension, pronation/supination and, more generally, sustained or repeated postures of the hand and wrist.¹⁹ Finkelstein's test is widely accepted and used by clinicians for the diagnosis of this disease.²⁰ However, it lacks specificity

and may be positive in cases of osteoarthritis of the wrist or first metacarpophalangeal joint and flexor/extensor hand-wrist tendonitis, which frequently overlap with this tenosynovitis.¹⁹

Gaubou *et al.* investigated that DQD had diversely been used for its clinical assessment. The Eichhoff's test was compared with another test to compare its precision, the author established a prospective study on 100 participants who presented pain over the lateral aspect of radial styloid process in three years, and wrist hyperflexion and thumb abduction test to assess DQD by comparing clinical presentation using those tests with the results on ultrasound. The results supported that the wrist hyperflexion and thumb abduction test was a more precise means for the diagnosis of DQD than Eichhoff's test and thus would be implemented to guide clinical assessment in the initial phases of DQT.²¹ As there is no gold standard test for confirmation of DQT. Results of the FT are deemed pathognomic for this tenosynovitis, used in the current study to diagnose patients.

In the current study, DQT among carpenters of wood markets of Lahore was studied. It should be done with a large sample size in other cities too. Other things like radiculopathy,

tendinopathy, post fractures and traumatic cases need to be studied as well. Other factors like mobile phone usage and posture should also be addressed in upcoming studies.

Another major limitation is with a new era of technologies; carpenters are using a variety of machines for work. So, there is a difference in results between those using machines and using manual tools. As this was a cross-sectional survey, the impact of mobile phone usage could not be assessed which according to previous literature has effects on the occurrence of the disease. Another major limitation is the presence of males only in this study so the male to female ratio was not equal and changes over time cannot be determined.

Conclusion

It was concluded that most carpenters have a moderate level of pain during repetitive wrist movements while working. While a majority of the carpenters have positive Finkelstein's test. Significant results were found showing moderate pain levels with a positive test. A strong correlation was found between age and duration of work.

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