

Prevalence Of De-Quervain's Tenosynovitis In Carpenters

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Abstract

Background

The incidence of various musculoskeletal conditions in carpenters, which mostly includes conditions related to wrist and hand due to repetitive movements. De Quervains Tenosynovitis is a condition which occurs due to repetitive ulnar deviation which has significant prevalence in carpenters. De Quervains Tenosynovitis may causes pain affecting the performance of carpenters in carpentry.

Objective

The purpose of this study was to assess pain due to De Quervains Tenosynovitis by using Numerical Pain Rating Scale (NPRS) and to determine prevalence of De Quervain's Tenosynovitis by the Finkelstein test in carpenters

Methods

50 participants were selected according to inclusion and exclusion criteria. A written informed consent was taken from participants in the language best understood by them. Pain was assessed by Numerical Pain Rating Scale (NPRS) and Finkelstein test was performed on participants. The data was collected and was statistically analyzed.

Result

38% of total participants assessed had De Quervains Tenosynovitis. The more is the number of years of experience in carpentry the more is the prevalence of De Quervains Tenosynovitis in carpenters.

Conclusion

This study concluded that Prevalence of De Quervains Tenosynovitis is significant in carpenters due to their repetitive wrist movements and it can be reduced by proper ergonomic advice.

Keywords

De Quervains Tenosynovitis, Carpenters, NPRS, Finkelstein test

Introduction

De quervain's is the inflammation of the tendon sheath of Abductor Pollicis Longus and Extensor Pollicis Brevis at the point where they cross the styloid process of radius. The tendon sheaths get thickened and sometimes on palpation crepitus can be felt. Movement of the thumb are very painful.¹ Physical examination may reveal swelling and tenderness in the region of first dorsal compartment. De Quervain's tenosynovitis affects the both abductor pollicis longus (APL) and the extensor pollicis brevis (EPB) at the point where they pass through a fibro-osseous tunnel (the first dorsal compartment) from the forearm into the hand. The tendon that connects the thumb to the hand is responsible for the movement of thumb abduction. Patients with De Quervain's tenosynovitis have difficulty gripping objects and performing their daily activities.²

Tendons are specialized form of connective tissue unity muscles and bone and as such have functions essential to normal mobility. Extensor Pollicis Brevis originates on posterior surface of the radius below the origin of the abductor pollicis longus; and from the interosseous membrane and inserted on dorsal surface of the base of the proximal phalanx of the first digit. Posterior interosseous nerve (C7, C8) supplies the Extensor Pollicis Brevis muscle. It extends the proximal phalanx and metacarpal of the thumb Abductor Pollicis Longus originates on upper parts of the posterior surfaces of the ulna and the radius, and from the interosseous membrane inserted on the tendon usually splits into two parts: one part is attached to the lateral side of the base of the first metacarpal, and the other part is attached to the trapezium. Further fasciculi may become continuous with the Opponens Pollicis, or with the abductor pollicis brevis. Posterior interosseous nerve (C7, C8) supplies the Abductor Pollicis Longus muscle. It causes abduction and extension of the thumb at the carpometacarpal joint.³

This disorder is the most common injury involving the wrist and often occurs in individual who regularly use a forceful grasp coupled with ulnar deviation of the wrist. It has been proven by previous studies that carpenters experience various types of work -related Musculoskeletal Disorders, which are group of painful disorders due to repeated basis or overuse. Out of these, 20.1% are known to experience some form of hand and wrist pain.⁶

The term work related musculoskeletal disorders is used in reference to condition also called



cumulative trauma disorder, repetitive strain injury. This condition involving muscles, tendons or nerves are generally manifested by pain, discomfort, tingling in body region. During framing and interior finishing activities, carpenters work with tools often held overhead or below waist level, while sometimes balancing on ladders or the structural frame itself. Fabricating wooden forms for pouring concrete requires forceful use of hand held power tools, grasping heavy wood, manual hammering.⁶

Diagnosis is usually concluded by a positive Finkelstein's test. To perform the Finkelstein test, the examiner grasps the thumb firmly with one hand, while the other holding the forearm in resting position in neutral-pro-supination. A firm traction is then applied on the patient's thumb, pulling it longitudinally and in the direction of slight ulnar deviation to the wrist.⁴ A negative test indicates patient does not feel any pain radiating up the inside of his/her arm from the thumb. A positive test is indicated by pain over the abductor pollicis longus and extensor pollicis brevis tendons at the wrist.⁵

Numerical Pain Rating scale is the simplest and most commonly used scale, it can be used to assess pain in conditions such as De Quervain's Tenosynovitis. The Numerical Pain Rating Scale is most commonly 0 to 10, with 0 being no pain and 10 being the worst pain imaginable. Subject can rate the pain during activity and also during the rest. Advantages of Numerical Pain Rating Scale include simplicity, reproducibility, easy comprehensibility, and sensitivity to small changes in pain.

Need For Study

Carpentry involves monotonous, highly repetitive task like cutting, assembling, pressing and finishing and various other activities that involve long hours of work in different abnormal postures and movements. Work-related factors reported involve movements with forceful manual exertion and a repetitive awkward wrist movement because of their wrist action they are prone to De-Quervain's tenosynovitis. Hence to find out the prevalence of De Quervain's tenosynovitis in carpenters is necessary.

Aim And Objectives

AIM :

- To find out prevalence of De Quervain's Tenosynovitis in Carpenters

OBJECTIVES :

1. To assess pain due to De Quervain's Tenosynovitis by using Numerical Pain Rating Scale (NPRS)
2. To determine prevalence of De Quervain's Tenosynovitis by the Finkelstein test in carpenter

Material And Methodology

METHODOLOGY:

- Study design : Observational study
- Sampling method : Convenient sampling
- Sample size : 50
- Study population : Carpenters
- Study Setup : In and around Pune

MATERIAL :

1. Consent Form
2. Data collection sheet
3. Notepad and Pen

INCLUSION CRITERIA:

1. Wrist pain while working
2. Carpenters with at least 5 years of experience
3. Willing participants

EXCLUSION CRITERIA :

1. Wrist Fracture , Scaphoid fracture
2. Rheumatoid Arthritis

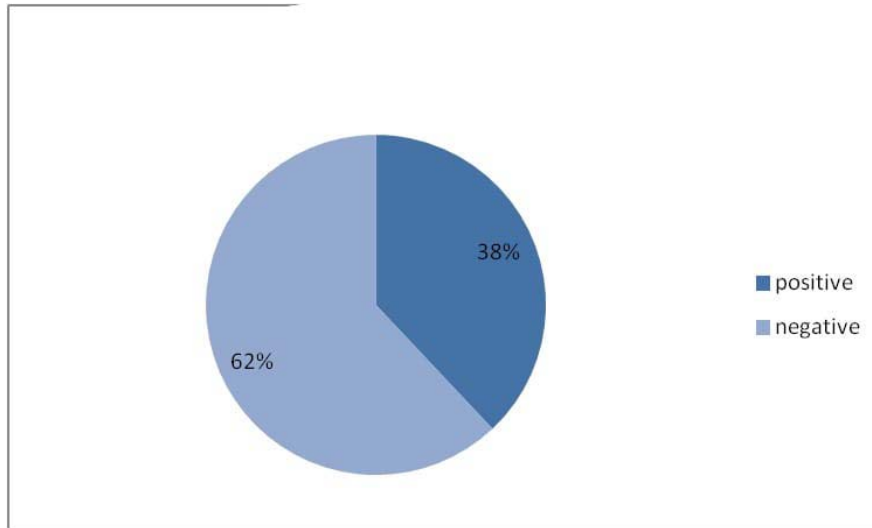
OUTCOME MEASURES :

1. Numerical Pain Rating Scale (NPRS)
2. Finkelstein Test

Result And Data Analysis

Table 1 : Percentage of Finkelstein Test of all participants

| | | |
|-----------------|-----------|------------|
| Positive | 19 | 38% |
| Negative | 31 | 62% |

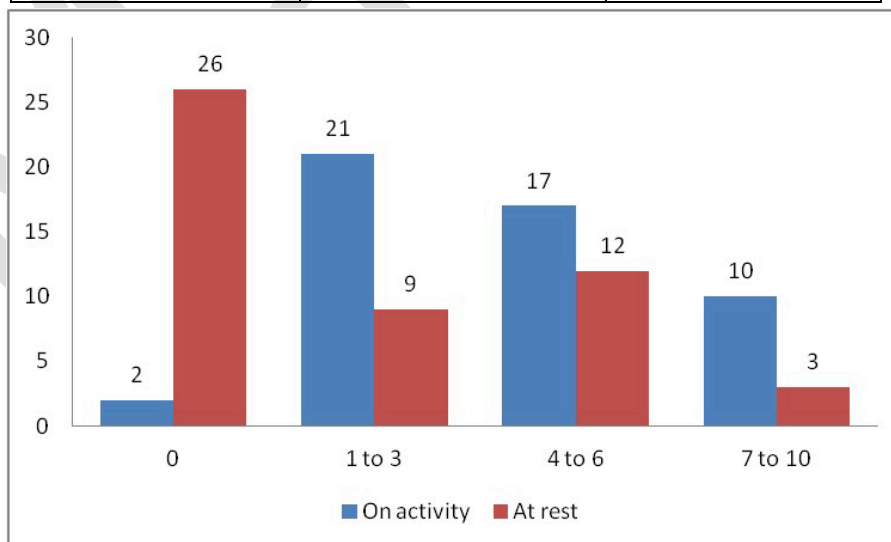


Graph 1 :Percentage of Finkelstein Test of all participants

Interpretation: Percentage of Finkelstein test shows 38% population positive for test 62% negative

Table 2: Numerical Pain Rating Scale (NPRS) (On activity and At rest) of all participants

| NPRS | On activity | At rest |
|-------------|--------------------|----------------|
| 0 | 2 | 26 |
| 1-3 | 21 | 9 |
| 4-6 | 17 | 12 |
| 7-10 | 10 | 3 |

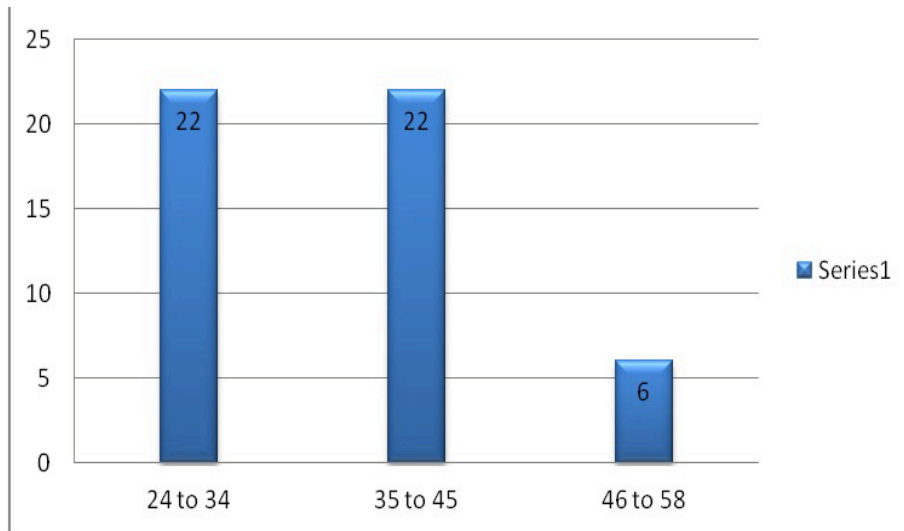


Graph 2 : Numerical Pain Rating Scale of all participants

Interpretation: In this graph of NPRS 10 participants experiences severe pain on activity while 3 participants experiences severe pain at rest

Table 3: Age wise distribution of all participants

| Age | Total participants | Percentage |
|-------|--------------------|------------|
| 24-34 | 22 | 44% |
| 35-45 | 22 | 44% |
| 46-58 | 6 | 12% |



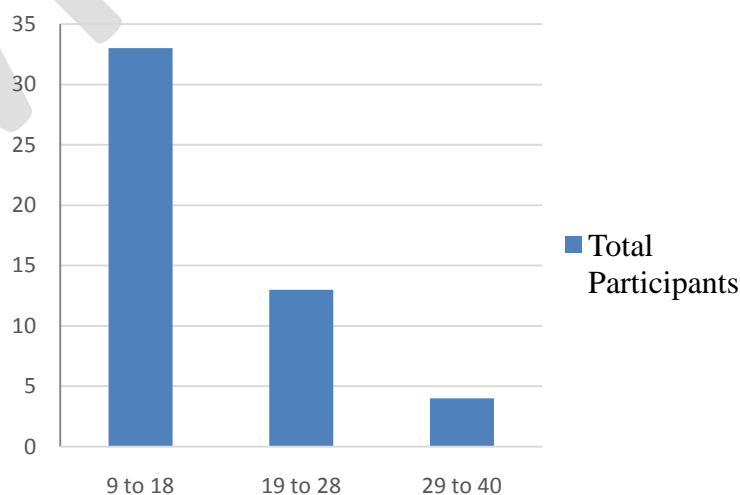
Graph 3 : Age wise distribution of all participants

Interpretation: Age wise distribution among total population including 22 participants from age group 24 to 34 and 35 to 45 . 6 participants from age group 46 to 58

Table 4 : Carpenters Experience

| Experience | Total participants | Percentage |
|------------|--------------------|------------|
| 9-18 | 33 | 66% |
| 19-28 | 13 | 26% |
| 29-40 | 4 | 8% |

Graph 4 : Carpenters Experience



Interpretation : Experience in years in carpenters including 33 participants from experience 9 to 18 , 13 participants from 19 to 28 and 4 participants from 29 to 40.

Discussion

The current study was conducted to determine the prevalence of De Quervains Tenosynovitis in 50 carpenters with inclusion criteria of minimum 5 years of experience of carpenters in carpentry. Number of working hours per day is also considered while selecting population for current study. Numerical Pain Rating Scale (NPRS) has been used to assess the pain of carpenters at wrist joint including both on activity and at rest. The prevalence was studied using Finkelstein test which is an active test commonly used to detect presence of De Quervains Tenosynovitis, wherein the subject makes a fist with thumb inside the fingers and then deviates the wrist towards the ulnar side⁴. This aggravates the Abductor Pollicis Longus and Extensor Pollicis Brevis tendons. The result of the study showed, On performance of the test, it was found that 38% of the total population had overall positive result i.e. 38% of the total population had positive test regardless of side. Thus it was concluded that there is moderate prevalence of De Quervains Tenosynovitis in carpenters. According to number of years of experience in carpentry, it showed that the more numbers of years of experience the more positive result for Finkelstein test. Participants with experience between 9 and 18 (n=33), 3 participants tested positive accounting for 9.09%. Similarly for number of years of experience between 19 and 28, total participants were 13, accounts for 84.61% for positive 12 participants. Range of experience from 29 to 40 tested positive for all the participants i.e. n=4, showed 100% result. On consideration of age group of carpenters as the age increases population tested showed positive results for Finkelstein test as their experience in carpentry also exceeded. Age group of 46 to 58 years of carpenters has 100% result and diagnosed with De Quervains Tenosynovitis. Also age group from 35 to 45 showed 50% positivity for test performed among 22 participants. The study done by Grace Lemasters titled as Prevalence of work related musculoskeletal disorders in active union carpenters suggests that work related musculoskeletal disorders of the upper extremities in particular shoulder and hands or wrists, were most prevalent among all carpenters particularly drywall or ceiling and formwork subspecialties. Drywall and ceiling installation involves the use of screw guns, which are often held in awkward positions. This requires workers to reach overhead for long periods of time, putting them at risk for injury. Hence there is chances of prevalence of upper extremity work related musculoskeletal disorders⁶. De Quervains Tenosynovitis is disease known to be caused due to high repetitive task involving repeated wrist movements for a prolonged period of time. Carpentry is a profession that involves the monotonous, highly repetitive task like cutting, assembling, pressing and finishing and various other activities that involve long hours of work in different abnormal postures and movements. Work-related factors reported involve movements with forceful manual exertion and a repetitive awkward wrist movement. Pratibha Maurya, Gokhale Priyanka, Anagha Palkar underwent a study on Prevalence of De-Quervain's Tenosynovitis in Tailors. Authors used Finkelstein test to determine De-Quervain's Tenosynovitis. A study was conducted with 100 subjects, who were selected according to the inclusion and exclusion criteria. Out of those participants, 75% had DeQuervain's Tenosynovitis. The study concluded that the prevalence of DeQuervain's Tenosynovitis is more in tailors because of their working pattern.⁷ When more experienced carpenters were tested for Finkelstein test they showed positive results, while less experienced carpenters were tested negative for Finkelstein test. Although Finkelstein test is negative in less experienced carpenters they have pain in wrist because of prolonged hours of working. Now a days repetitive movements of wrist joint has been reduced due to arrival of more advanced technologies in carpentry. Advanced technologies such as table saw, jig saw, handheld sanders, nail gun, wood router, grinding machine, etc has replaced the old fashioned tools such as coping saw, pannel saw, hammer, hand drill, crosscut saw, etc in more or less amount, which lessened the work of wrist joint musculature. This advanced technologies has reduced labour of carpenters who were prone De Quervains Tenosynovitis. This explains the reason behind the negative results of Finkelstein test in less experienced carpenters. Occurrence of pain in less experienced carpenters might be due to other

reasons, mostly being lifting heavy objects, and pulling or pushing of heavy objects. Taking time to exercise, proper positioning of hand and wrist while performing work, avoiding extreme ulnar and radial deviation, and during wrist movements keeping forces low these all ergonomic changes will be helpful in preventing De Quervain's Tenosynovitis and hence improving their performance. It has been observed that the intensity of pain varies according to experience of carpenters in carpentry.

Conclusion

This study concluded that prevalence of De Quervain's Tenosynovitis is significant in carpenters due to their repetitive wrist movements and it can be reduced by proper ergonomic advice

Limitations

1. Sample size was less
2. Advanced technology in carpentry showed low prevalence of De Quervain's Tenosynovitis

Future Scope

1. Similar study can be done in different professions
2. Musculoskeletal conditions can be assessed in same population depending on nature of work
3. Different age group can be considered

References

- 1) Essential of Orthopedics and Applied Physiotherapy, 2ed by Jayant Joshi, pg no. 39
- 2) Mak, Jenson. (2018). De Quervain's Tenosynovitis: Effective Diagnosis and Evidence-Based Treatment. 10.5772/intechopen.82029.
- 3) Human Anatomy Regional and Applied Dissection and Clinical, volume 1 Upper limb and Thorax, 4ed by BD Chaurasia
- 4) Goubau JF, Goubau L, Van Tongel A, Van Hoonacker P, Kerckhove D, Berghs B. The wrist hyper flexion and abduction of the thumb (WHAT) test: a more specific and sensitive test to diagnose de Quervain tenosynovitis than the Eichhoff's Test. *J Hand Surg Eur Vol.* 2014 Mar;39(3):286-92. doi: 10.1177/1753193412475043. Epub 2013 Jan 22. PMID: 23340762.
- 5) Orthopedic Physical Assessment, 5ed by David J. Magee, PhD, BPT, Pg no 439-440
- 6) Lemasters GK, Atterbury MR, Booth-Jones AD, Bhattacharya A, Ollila-Glenn N, Forrester C, Forst L. Prevalence of work related musculoskeletal disorders in active union carpenters. *Occup Environ Med.* 1998 Jun;55(6):421-7. doi: 10.1136/oem.55.6.421. PMID: 9764103; PMCID: PMC1757596.
- 7) Maurya P, Priyanka G, palkar A. Prevalence of De Quervain's tenosynovitis in tailors. *International Journal of Health Sciences and Research.* 2020Feb;10(2):2249-957.
- 8) Stahl S, Vida D, Meisner C, Stahl AS, Schaller HE, Held M. Work related etiology of de Quervain's tenosynovitis: a case-control study with prospectively collected data. *BMC Musculoskeletal Disorder.* 2015;16:126. Published 2015 May 28. doi:10.1186/s12891-015-0579-1
- 9) Barr AE, Barbe MF, Clark BD. Work-related musculoskeletal disorders of the hand and wrist: epidemiology, pathophysiology, and sensorimotor changes. *J Orthop Sports Phys Ther.* 2004;34(10):610-627. Doi:10.2519/jospt.2004.34.10.610
- 10) Cheimonidou AZ, Lamnisos D, Lisacek-Kiosoglous A, Chimonas C, Stasinopoulos D (2019) Validity and reliability of the finkelstein test. *Trends Med* 19: DOI: 10.15761/TiM.1000183
- 11) Essential Orthopaedics, 6ed by J. Maheshwari, MS Ortho, pg no 303