

Prevalence of De Quervain's Tenosynovitis in Cobblers

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ABSTRACT

Aim: To study the prevalence of De Quervain's Tenosynovitis in cobblers.

Objective: To assess De Quervain's Tenosynovitis using the Finkelstein's test in cobblers.

Methodology: 350 subjects were selected according to the inclusion and exclusion criteria. A written informed consent was taken from the subjects, and were explained about the procedure. The Finkelstein test was performed in the dominant hand of the subject. A positive test indicated by a sharp shooting pain over the abductor pollicis longus and extensor pollicis brevis tendons at the wrist contributing to the painful entrapment of these two tendons. The data was collected and further evaluated statistically.

Statistics & Results: Total 350 Cobblers were included in the study out of which 35% of total population assessed had De Quervain's Tenosynovitis. When assessed within this positive result, 84% showed symptoms perceiving in right hand, and 16% in their left hand particularly based on the hand of dominance of the cobblers.

Conclusions: The study concludes that the prevalence of De Quervain's Tenosynovitis is fairly high in cobblers due to their self-limiting working pattern and requires ergonomic interventions and awareness about postural correction to prevent further musculoskeletal problems.

Keywords: De Quervain's Tenosynovitis, Cobblers, Finkelstein Test, Work Related Musculoskeletal Disorders, Wrist Tendonitis.

INTRODUCTION

Cobblers are often involved in their era old profession of repairing footwear. Along with repairing varieties of footwears, they repair leather goods and other rubber materials as well. This lifelong craftsmanship also includes dragged sitting with forward inclined posture. A habitual overuse pattern of wrist and hand arises to a common accretive movement complaint. "De Quervain tenosynovitis" named after the Swiss surgeon, Fritz de Quervain, who first described this disease in 1895. [1]

The pain, which is the main complaint, gets worse by abduction of thumb and an ulnar

deviation of the wrist, these symptoms are aggravated by resisted motion of thumb where pain and swelling is caused near the base of thumb or dorsa-radial side of the wrist. Movements of the thumb like extension and moving the thumb down or away from the palm are performed with the help of these two muscles. De Quervain's Tenosynovitis is commonly seen in patients with history of repetitive hand and wrist movements. [2] Gripping, and grasping various objects like hammer or an awl while cobbling may develop tenderness, soreness at the base of the thumb, which arises swelling or pain that extends from distal to lateral forearm

were among the signs and symptoms noticed in the subjects. Thickening and swelling of the wrist may also be present.

The pathophysiology can be diverse, and may include Rheumatoid Arthritis, rheumatoid psoriatic, or other inflammatory arthritic disorders, localized trauma, or crystalline disease (i.e., Gout). It may develop in conjunction with diabetes mellitus, or thyroid disease which results in tendon adhesions or thickening. The assumption is generally grounded on the clinical examination and history. Wrist radiographs may be obtained to count essential pathology in distal radius or carpal bones; But carpometacarpal (CMC) arthritis may or may not be a characteristic. Other diagnostic studies are rarely useful. On radiographs, soft-tissue calcification at the first dorsal compartment maybe imaged sometimes, but more generally, radiographs are completely normal. [3]

The disease has various synonyms including texting tenosynovitis, washer women's sprain or blackberry thumb. [4] Differential diagnosis include 1st CMC Osteoarthritis, Intersection syndrome, Wartenberg's syndrome, Ganglion, Scaphoid fracture. [5]

A positive test is indicated by pain over the abductor pollicis longus and extensor pollicis brevis tendons at the wrist and is indicative of a Para tenonitis of these two tendons. [2] [6] It has been observed that the major occupational risk factors for these repetitious, sustained or forceful manual exertion occurring over time may jeopardize the integrity or functioning of the soft tissues which are producing inflammation in the tendons or causing compression of peripheral nerves which may lead to a group of cumulative trauma disorders. Also known as "repetitive strain injuries of hand", or "overuse syndrome". [6] [7]

As proven by previous studies, the most common cause is chronic overuse of the wrist and hand musculature, Cobbler's experience various problems due to Work Related Musculoskeletal Disorders (WRMSD), which are a group of painful disorders. The results of this present investigation revealed workers who are involved in the job of repairing footwears

are sitting with folded legs continuously in a constrained space throughout the day while carrying out their activity. The prevalence of discomfort/pain in different body regions in a year was majorly noted in low back (100%), neck (96%), knee (76%), both shoulder (33%), both elbow (40%) right hand (30%), both hands (28%) while being engaged in highly repetitive tasks, hand sewing skills which requires coordination of hand and vision, while sitting for longer duration. This posture forces the head and trunk to remain in forward inclined causing excessive load on the worker's body. [8]

Diagnosis is generally concluded by a positive Finkelstein's test which involves thumb metacarpophalangeal (MCP) joint flexion with a clenched fist combined with an active or passive wrist ulnar deviation which causes reproduction of pain at the radial styloid process, which is caused due to restricted gliding of APL and EPB tendons. It's the most standard finding. [2] [9]

NEED FOR STUDY

A cobbler, also known as a shoemaker, sew, cut, stitch, mend, polish shoes every day. In order to get the shoe repair job done, cobblers often use a variety of tools like knives, hammer, Awl, thread, needles, and their own creativity.

The Work-Related Musculoskeletal Disorders are known to hamper workers in variety of occupations, and are a significant cause of lost time, disability and medical expenses.

The job of a cobbler involves sitting in a forward inclined posture, along with forceful manual exertion and an awkward wrist posture. Hence, such postures when adopted during any work may have a great impact on the health of the workers which may affect them mentally and physically.

There also have been studies to prove various musculoskeletal problems and ergonomic risk factors occurring in cobblers due to prolonged sitting hours and constant work load affecting in various areas of body. However, there is lack of studies in literature that have studied specifically on De Quervain's

tenosynovitis in Cobblers and hence this study has been carried out.

METHODOLOGY

This was an observational study conducted in a metropolitan city in a duration of 18 months where 350 participants were selected using convenient sampling method who were Cobblers by profession aged 30-40years.

INCLUSION CRITERIA: Individuals willing to participate and who have been working as cobblers for at least 5 years, working hours of cobblers must be 7-8 hours per day, in the age group of 30-40 years.

EXCLUSION CRITERIA: Participants having history of musculoskeletal or

inflammatory disorders of hand or wrist, Pathological, Neurological or Vascular Symptoms, history of hand or wrist fractures, any history of tendon injuries or repairs, Carpal Tunnel Syndrome, and participants with a part- time jobs involving extensive work using hand.

PROCEDURE

350 Subjects were selected according to the inclusion and the exclusion criteria. Before starting the study, a written consent form was taken from each subject in the language best understood by them. The individual was explained about the test which will be performed on them. Demographic data of the participant (Name, Age, and Gender) was noted.

Patient position	Therapist position	Instructions to the patient	Test results
Sitting on chair with forearm supported in mid-prone.	Therapist sitting on lateral side of the patient. The therapist stabilizes the forearm and deviates the wrist towards ulnar side. The test is performed on both the hands.	The patient makes a fist with the thumb inside the fingers and ask the patient to do ulnar deviation.	A positive test indicates by pain over the abductor pollicis longus and extensor pollicis brevis tendon at the wrist and is indicative of a tendonitis of these two tendons. ^[2]

RESULT

The subjects in this study comprise of cobblers aged between 30-40 years and included 350 participants. The data was collected from local railway stations as well as tiny roadside shops and analyzed carefully for the prevalence of De Quervain's Tenosynovitis in cobblers. Out of which a total of 122 (35%) participants showed positive results which was indicative of De Quervain's Tenosynovitis in Cobblers. Within this positive result, 84% showed symptoms perceiving in right hand, and 16% in their left hand particularly based on the hand of dominance of the cobblers.

This indicates that there is prevalence of De Quervain's Tenosynovitis in Cobbler's.

TABLE 1- FINKELSTINE TEST RESULT

FINKELSTEIN TEST – RESULTS	
FINKELSTEIN TEST - Negative	228
FINKELSTEIN TEST - Positive	122
Total Population	350

Interpretation: The above data suggests out of total 350 subjects, 122 subjects (35%) showed positive test results, which indicates presence of De Quervain's Tenosynovitis in cobblers. And 228 (65%) showed negative test results while the Finkelstein test was performed on the following subjects.

TABLE 2- REPRESENTS DOMINANT HAND DISTRIBUTION CHART

DOMINANT HAND	NO. OF SUBJECTS	PERCENTAGE
RIGHT	293	84%
LEFT	57	16%

Interpretation: The data above suggests that about 84% of subjects who are cobblers by profession have pain in the right hand,

whereas 16% of subjects have pain in the left hand based on the dominance of their hand while performing daily chores.

TABLE 3- REPRESENTS COMPARISON OF MORBIDITIES AMONG COBBLERS

MORBIDITY	NO. OF SUBJECTS	PERCENTAGE
DM	43	12%
DM HTN	32	9%
HTN	25	7%
DM HTN THY	8	2%
AASTHMA	4	1%

Interpretation: In this population the result elaborates prevalence of Diabetes Mellitus ranging at the highest (12%) when compared

to other comorbidities, DM/HTN ranging at (9%), HTN at (7%), DM/HTN/THY ranging at (2%), Asthma at (1%) respectively.

TABLE 4- REPRESENTS TOTAL YEAR OF WORKING AMONG THE COBBLER POPULATION.

YEARS OF WORKING	NO. OF SUBJECTS	PERCENTAGE
5-10 YEARS	215	61%
11-15 YEARS	129	37%
More than 15 YEARS	6	2%

Interpretation: The data above illustrates work profile based on their experience as a cobbler in this field, 61% of population had a work experience between 5-10years, 37% of them worked for 11-15 years, and 2% of population worked for more than 15 years in the age group of 30-40 years.

DISCUSSION

The goal of the undertaken research was to determine how common is the incidence of De Quervain's Tenosynovitis among the 350 cobblers between the ages of 30 and 40. The population was selected according to the inclusion criteria based on number of working hours, Age, years of experience as a cobbler. Prevalence was found with Finkelstein test, [1] [2] a provocative test frequently used to identify DQT in general population, where an individual makes a fist with thumb inside the fingers and then deviates the wrist towards the direction of ulnar side, this elicits pain on the surface area of wrist where tendons passing over abductor pollicis longus and extensor pollicis brevis meet. [1] On carrying out the test, it was found out that 35% of total population had overall positive test results regardless of the side. And within this positive result, 84% was found out in the right hand, and 16% in the left-handed based on the dominant hand criteria of the individual while working. Thus, this determines there is a significant prevalence of De Quervain Tenosynovitis in cobblers. Out of 350

cobblers, 122 cobblers who filled the questionnaire and came positive were experiencing pain at the base of the thumb/wrist while performing the Finkelstein test (35%) and negative results were obtained in another 228 (65%) who were pain free.

In correlation to various studies resulting pathophysiological changes, ranging from overuse to inflammatory pathology as Rheumatoid Arthritis or Gout, Systemic changes such as Diabetes Mellitus, or Thyroid which may result in tendon adhesion or thickening.[3] The current study concludes the prevalence of (Diabetes Mellitus) is 12%, (Diabetes, Hypertension) is 9%, (Hypertension) is 7%, (Diabetes, Hypertension, and Thyroid) is 2%, (Asthma) 1% in the total examined population.

Work profile of the Cobblers: The results showed that 215 respondents had an experience of 5-10 years, 129 had experience of 11-15 years, followed by 6 people who had experience of more than 15 years. Whereas, nearly (80.57%) - 282 respondents spent 12-14 hours on work, and (19.42%) 68 respondents spent 10-12 hours daily on the work station. According to Samsuzzaman et al. study among shoemakers in Kolkata found 81.87% of them were working more than 12 hours per day. Workers who were involved in lifelong job of repairing footweares are exposed to many risk factors, which lead them to various health hazards including work related

musculoskeletal disorders, skin ailments, and visual discomforts.^[14]

According to the Pandey D et al. study, the lower back, shoulder, neck, wrist and hand were the most commonly affected areas in cobblers.^[8] The study done by Le Manac'H et al. 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, with influence of postural factors risk of DQD claims to be higher than other upper-extremity MSD in this population.^[11] The study done by Silverstine et al. showed coherence between workers exposed to such repetitive, sustained or forceful movements when occurring overtime might jeopardize the integrity or functioning of the soft tissues producing inflammation of the tendons or compression of the peripheral nerves, causing restricted gliding of APL and EPB tendons leading to group of cumulative trauma disorders (CTD's) also been referred to as "Repetitive strain injuries"^[6] "Overuse syndromes" or "Repetitive motion injuries". Awkward postures (wrist deviation, flexion, hyperextension, and finger pinching) were risk factors for hand CTD's which may cause workers to develop musculoskeletal disorders.^{[17] [18]}

De Quervain's tenosynovitis is a condition that's linked to extremely repetitive work that requires wrist bending over an extended period of time. The repetitive tasks include stitching, shoe polishing, hammering nail into the shoe, etc. Even, P Sharma et al, concluded by using Nordic Musculoskeletal Questionnaire and observed that such strenuous task led to MSK disorders, 80% of cobblers had pain in their lower back and knee, 77.33% on their upper back, 57.33% in their wrist and 50.67% in their neck. The psychophysical parameters during postural analysis revealed wrist posture scores being high in the workers. The VAS score of 6.27 supports being drained as uninterrupted sitting and applying force while getting the work done

with deviated posture caused stress on the workers wrist, hand and forearm. Such movements while working repetitively contributed with spine are open to injury of Work-Related Musculoskeletal Disorders.^[13] Tools and equipment used to mend shoes were also regarded as a potential threat such as hammer, needles, Awl, variety of dyes and glues. Exposure to such equipment may add adverse effects on the physiological system.^[16] All of these preceding data provide certainty to the idea that De Quervain's Tenosynovitis is a self-limiting issue that cobblers deal with on daily basis.

Finkelstein's test is widely accepted and used by clinicians for the diagnosis of this disease.^[10] 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.

The study done by Wu F, Rajpura et al. investigated that Finkelstein test had diversely been used for its clinical assessment which produced fewer false positive results and less patient discomfort. The Eickhoff's test was compared with another test to compare its precision, the author established a prospective study on 36 asymptomatic participants, 72 wrists were examined using both tests with a minimum gap period of 24 hours between the tests. The results supported that the wrist hyperflexion and thumb abduction test was a more precise means for the diagnosis of De Quervain's disease implemented to guide clinical assessment in the initial phases of DQT.^[15] As there is no gold standard test for confirmation of DQT. Results of the Finkelstein test is deemed pathognomonic for this tenosynovitis, and used in the current study to diagnose patients.

Thus, the current study concluded the prevalence of De Quervain's Tenosynovitis using Finkelstein test is fairly high in 350 cobblers (35%). In comparison to a prior investigation which was conducted by Noor Jannat et al.^[12] study, wherein the tailors and barber's prevalence of DQT 80.5% in the total population of 333 participants, consequently it

was determined that DQT was more common in tailors than the barbers while performing same tasks alike cobblers such as ulnar deviation, flexion, gripping and pinching movements. Subsequently studies stated, forearm and hand disorders have traditionally been undervalued in favor of neck, low back and shoulder disorders.

Through this study the demonstration of definite prevalence of De Quervain's Tenosynovitis in Cobblers was conducted under the assumption with an understanding that most of the daily activities involved in cobbler's occupational hours would contribute to extensive use of forearm, hand, wrist and fingers including De Quervain's Tenosynovitis is known susceptible to cause inflammation over the tendons of APL and EPB where the pain is brought on by fibrous sheath hardening. Therefore, regardless of the severity of this condition it is possible that there is a connection between the De Quervain's tenosynovitis and the type of job cobblers often conduct.

This assumption was proved by the 35% overall positive result in the given population, which clearly establishes the need for a simple treatment protocol that can be easily followed by the cobblers, as well the ergonomic advice that not only focuses on the posture and the long sitting hours, but also on the care for wrist and hand activities and its position.

CONCLUSION

From the above study and results, it is concluded that the prevalence of De Quervain's Tenosynovitis is seen in cobblers with 35% of total positive test results after performing Finkelstein test caused due to atypical usage of thumb and wrist musculature, with sustained or repeated wrist bending and twisting, hammering along with personal and work-related factors in a longer run may lead to more damage and can increase probability of De Quervain's Tenosynovitis Disease.

Clinical Implications

As it is known that there is a high chance of hand dysfunction by being engaged in

repetitive activities, force and pressure while sewing or mending shoes, we can use this study to prevent further incident or to aggravate existing De Quervain's Tenosynovitis. Cobblers can be advised to take frequent breaks while working and resting the hand in between. Further, an ergonomic workstation design will be useful in upgrading their workplace wellbeing. Conservative management includes application of ice, in severe cases adding a forearm supported thumb spica splint immobilizer along with corticosteroid injection, anti-inflammatory medications and occupational therapy may be helpful. Iontophoresis maybe used to deliver anti-inflammatory medications for edema control and stimulate healing. Following therapeutic Ultrasound and soft tissue massage to relax tightened muscles, to improve tissue extensibility, assist with pain relief and promote healing of tendons. Flexible equipment's or modified techniques for activity performance is revitalized to allow for neutral wrist positioning during activities such as repetitive grasping and lifting, which techniques for activity performance is revitalized to allow for neutral wrist positioning during activities such as repetitive grasping and lifting, which places the wrist in ulnar deviation with the thumb MP joint in flexion.

Limitations

Only male subjects were included in the study. People with age above 40 years were not included as there might be higher chances of false positives due to longer work experience in the field. A more accurate assessment can be done by using various scales to assess pain/level of discomfort/degree of damage. Here, cobbler's dominant hand was taken into consideration which can bring minimal changes when considered in bilateral cases, as it is also used for most of the activities. Handcrafted artisans (Cobblers) had taken part purely based on their manual work, none of the cobblers used any machinery therefore machine users (Footwear manufacturing companies) might be at a slight advantage as opposed to manual cobbling workers.

Declaration by Authors

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REFERENCES

1. Satteson E, Tannan SC. De Quervain Tenosynovitis. [Updated 2023 Nov 22]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK442005/>
2. Magee DJ. Orthopaedic physical assessment-E-Book. Elsevier Health Sciences; 2014 Mar 25.
3. Adams JE, Habbu R. Tendinopathies of the hand and wrist. JAAOS-Journal of the American Academy of Orthopaedic Surgeons. 2015 Dec 1;23(12):741-50.
4. Ali M, Asim M, Danish SH, Ahmad F, Iqbal A, Hasan SD. Frequency of De Quervain's tenosynovitis and its association with SMS texting. Muscles, ligaments and tendons journal. 2014 Jan;4(1):74.
5. Kate Thorn. De Quervain's Tenosynovitis. Physioplus Course. 2021
6. Silverstein BA, Fine LJ, Armstrong TJ. Hand wrist cumulative trauma disorders in industry. Occupational and Environmental Medicine. 1986 Nov 1;43(11):779-84.
7. Maurya P, Priyanka G, Palkar A. Prevalence of De-Quervain's tenosynovitis in tailors. International Journal of Health Sciences and Research. 2020 Feb;10(2):2249-957.
8. Pandey, Deepika & Vats, Aditi. (2020). Prevalence of Musculoskeletal Problems among Cobblers in Footwear Repairing Work. Current Journal of Applied Science and Technology. 39. 68-72. 10.9734/cjast/2020/v39i4831200.
9. Goel R, Abzug JM. de Quervain's tenosynovitis: a review of the rehabilitative options. Hand. 2015 Mar;10(1):1-5.
10. Sluiter JK, Rest KM, Frings-Dresen MH. Criteria document for evaluating the work-relatedness of upper-extremity musculoskeletal disorders. Scandinavian journal of work, environment & health 2001;27 Suppl 1:1-102. Le Manac'h AP, Roquelaure Y, Ha C, Bodin J, Meyer G, Bigot F, Veaudor M, Descatha A, Goldberg M, Imbernon E. Risk factors for de Quervain's disease in a French working population. Scandinavian journal of work, environment & health. 2011 Sep;37(5):394-401.
11. Jannat N, Islam F, Aslam M, Hannan MA, Raza A. Prevalence Of De Quervain's Syndrome Among Tailors And Barbers. Journal of Xi'an Shiyou University, Natural Science Edition [Internet]. 2023 Jan 1;19(01 JANUARY 2023): 286-93.
12. Sharma, Aditya & Bara, Anugrah. (2020). Analysis of Ergonomics Risk Factor Among Cobblers at Jabalpur, India. 10.1007/978-3-030-51549-2_48.
13. Pandit, Dr & Bhattacharyya, Dr & Bhattacharya, Dr. (2014). Menstrual Hygiene: Knowledge and Practice among Adolescent School Girls In rural areas of West Bengal. IOSR Journal of Dental and Medical Sciences. 13. 19-24. 10.9790/0853-16631924.
14. Wu F, Rajpura A, Sandher D. Finkelstein's test is superior to Eichhoff's test in the investigation of de Quervain's disease. Journal of hand and microsurgery. 2018 Aug;10(2): 116.
15. Todd L, Puangthongthub ST, Mottus K, Mihlan G, Wing S. Health survey of workers exposed to mixed solvent and ergonomic hazards in footwear and equipment factory workers in Thailand. Annals of occupational hygiene. 2008 Apr 1;52(3):195-205.
16. Feldman RG, Goldman R, Keyserling WM. Classical syndromes in occupational medicine. Peripheral nerve entrapment syndromes and ergonomic factors. American journal of industrial medicine. 1983;4(5):661-81
17. Browne CD, Nolan BM, Faithfull DK. Occupational repetition strain injuries: Guidelines for diagnosis and management. Medical Journal of Australia. 1984 Mar;140(6):329-32

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