

PREVALENCE OF DE QUERVAIN'S TENOSYNOVITIS IN CANVAS PAINTERS

Original Research

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ABSTRACT

Background: De Quervain's tenosynovitis, also known as De Quervain's syndrome or disease, is a common wrist condition affecting the tendons on the thumb side of the wrist. This condition involves inflammation and irritation of the tendons controlling thumb movement, specifically the extensor pollicis brevis (EPB) and abductor pollicis longus (APL). Pain is typically reproduced during resisted thumb movements, especially when these tendons glide within the fibrous tunnel under the radial styloid and extensor retinaculum.

Objective: The primary objective of this study was to determine the prevalence of De Quervain's tenosynovitis among canvas painters who frequently perform repetitive wrist and thumb movements.

Methods: A cross-sectional survey was conducted from January to April 2023, involving 97 canvas painters aged 20 to 40 years who painted for more than 4 hours per day. Participants were recruited from various institutions, including NTU, FITIF, The University of Faisalabad, and Agriculture University. Informed consent was obtained, and participants completed the Patient-Rated Wrist Evaluation (PRWE) questionnaire to assess pain intensity and functional limitations. The Finkelstein test was performed to confirm the diagnosis of De Quervain's tenosynovitis. Data analysis was conducted using SPSS version 20 software.

Results: Out of 97 participants, 49 (50.5%) tested positive for De Quervain's tenosynovitis using the Finkelstein test, while 48 (49.5%) tested negative. The gender distribution showed that 38.1% of participants were male and 61.9% were female, with a mean age of 24 years (SD = 4.5). Pain levels, as per the PRWE, ranged from mild to severe, with 33% experiencing moderate pain and 17.5% reporting severe pain.

Conclusion: The study concludes that De Quervain's tenosynovitis is prevalent among canvas painters, affecting 50.5% of the population surveyed. The repetitive hand and wrist movements involved in canvas painting, such as gripping brushes and applying pressure, contribute significantly to the development of this condition. Proper education and preventive measures are essential to mitigate risks associated with repetitive strain injuries in this population.

Keywords: Canvas painters, De Quervain's syndrome, De Quervain's tenosynovitis, Finkelstein test, Occupational health, Pain prevalence, Repetitive strain injury, Tendon inflammation, Thumb tendons, Wrist pain.

INTRODUCTION

De Quervain's tenosynovitis is the condition affecting first dorsal compartment of wrist. This condition generally involves pain and inflammation around the base of thumb which affects the tendons of wrist. Tendon of abductor pollicis longus (APL) and (EPB) are mainly involved, which passes through under extensor retinaculum. Due to repetitive activity of wrist and continued strain, the tendons became swollen. Extensor retinaculum sheath which covers the first compartment of wrist also inflamed. Pain occurs when the tendon of APL and EPB undergoes resisted sliding (1). De Quervain's tenosynovitis is swelling and inflammation of tendon sheaths (2). It primarily affects two tendons: extensor pollicis brevis and abductor pollicis longus. It is characterized as repetitive strain injury that causes pain in radial aspect. Abductor pollicis longus abducts the thumb and insert at first metacarpal bone at base of thumb. Extensor Pollicis Brevis insert at proximal phalanx at thumb. Tendon sheath is formed by connective tissue, especially synovial membrane. Extensor retinaculum is a fibrous band that wraps across back or dorsal side of wrist. Main symptoms of tenosynovitis are pain, aching, weakness, tenderness and burning sensation. In 1895, Fritz De Quervain's introduced the term De Quervain's tenosynovitis that have various names like De Quervain's disease, texting tenosynovitis, washer woman sprain, BlackBerry thumb, first dorsal compartment tenosynovitis (3). The thumb is the first digit of human hand that is also called pollex, but it is classically not stated to as a finger. The thumb has a unique and extensive range of motion. The thumb has ability to move in different directions and wide range of motion. This range of motion significantly contributes in the skill to grasp and hold items (4). Extensor retinaculum is fibrous band that is wrapped across back of wrist. Two tendons; APL and EPB pass underneath this band. There is also triangular inwardly intended area on radial side of wrist which is called anatomical snuff box. It appears with a thumb extension. Anteriorly, it is surrounded by APL and EPB tendons, posteriorly EPL tendons. Scaphoid and trapezium form the floor of anatomical box. Superficial fascia and skin covers the roof of anatomical box. APL tendons present in wrist snuffbox can cause De Quervain's tenosynovitis. Hand dorsum has 6 extensor compartments. Snuffbox is surrounded by 1st and 3rd compartments. There is inflammation in APL tendon due to repetition and overuse especially by grasping or gripping. Pain occurs usually at poster lateral area of wrist that radiates to thumb (5).

De Quervain's tenosynovitis is caused by using the thumb repetitively. It is increased by deviating thumb ulnarly. It may be linked with playing piano, fishing and golfing. Tenosynovitis can also be caused by repetitive texting. Fibrous sheath may get inflamed which is surrounded by tendons. Tissue irritation may be caused by movements that put strain on the thumb. The condition can be worse if we use movements in repetition. It can also be caused by injuries and arthritis (6). There are following symptoms that affect the normal activity of life which are pain at base of thumb, swelling at thumb joint, difficulty in moving thumb and difficulty in grasping and holding something. Patient experiences dysaesthesia such as feeling of numbness, tingling, cramping and burning sensations. According to some researches etiology, repetitive work cause micro trauma in thumb and wrist due to lifting heavy load in pregnancy, rheumatoid arthritis like inflammatory arthritis and in diabetes due to neuropathy and vasculopathy (7). This condition is basically more prone to individuals that carried repetitive hand movements like golfing and tennis. Along with inflammation at the side of thumb in wrist, when a person moves the thumb, numbness and popping sounds within the thumb also hear (8). Finklestein demonstrated that repeated pinching & gripping in direction of ulnar side can cause pain. Hand dominance may include mechanisms of degeneration (9).

There are several risk factors which may increase the chances of developing De Quervain's tenosynovitis in individuals. Repetitive motions with the thumb and wrist such as typing, any type of injury in thumb can cause inflammation of tendon. Medical conditions such as diabetes and rheumatoid arthritis also lead to De Quervain's tenosynovitis. Pregnancy and motherhood is also main risk factor of De Quervain's tenosynovitis due to hormonal changes and laxity in joint and muscles (10, 11). Painting includes repetition & wrist position is linked with paint brush types. Increased ulnar deviation is caused by handle type of paint brush. Muscle groups are significantly affected by hand & wrist positions that can cause fatigue, trauma and discomfort. Bad wrist position, Repetitive activities & exaggerated muscle activity can cause pain. Increased ulnar deviation is caused by handle type of paint brush. Bad wrist position, repetitive activities & exaggerated muscle activity can cause pain (12). The purpose of this study was to focus on canvas painters who undergo overuse such as repeating particular wrist motion and the maintenance of uncomfortable wrist position. It includes swelling near the base of the thumb and numbness along the back of thumb and index finger. The research program aimed to determine whether canvas painters suffer from De Quervain's tenosynovitis. This condition can be caused by repetitive movements of the wrist such as flexion, extension, ulnar deviation.

METHODS

A cross-sectional survey was conducted from January to April 2023, involving a total of 97 canvas painters recruited from the National Textile University (NTU), the Institute of Art and Design at GC University Faisalabad (FITIF), The University of Faisalabad, and the Agriculture University. Participants were selected using purposive sampling, ensuring their willingness to collaborate and fully participate in the study. Screening of participants was completed through a self-generated form, developed according to inclusion and exclusion criteria, after obtaining informed consent from each participant. The criteria for inclusion required participants to be between the ages of 20 and 40 years, with a painting duration of approximately 4 to 5 hours per day and at least two years of experience. Both amateur and professional painters were included, allowing a broader representation of the canvas painting community.

Participants who had a history of previous wrist surgery, any wrist fracture, systematic musculoskeletal disorders such as rheumatoid arthritis, finger fractures, a history of cancer, or elbow disorders like tennis elbow were excluded from the study. Before data collection, informed consent was obtained from each participant. The researchers explained the study's procedure thoroughly to ensure understanding and compliance. To assess the intensity of pain and functional limitations of the wrist, participants completed the Patient-Rated Wrist Evaluation (PRWE). This questionnaire, known for its high reliability, was used as the primary tool for assessing pain levels and the impact on wrist function. Additionally, the Finkelstein test, a standard diagnostic method for De Quervain's tenosynovitis, was performed on each participant to confirm the diagnosis. This test involves the participant making a fist with the thumb inside and ulnar deviation of the wrist, which helps identify pain in the extensor pollicis brevis and abductor pollicis longus tendons.

The data collected from the PRWE questionnaire and Finkelstein test was entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 20 software. This analysis helped to quantify the prevalence and severity of De Quervain's tenosynovitis among the canvas painters, providing a statistical basis for the study's findings. The use of these validated assessment tools ensured the reliability and accuracy of the data collected throughout the survey period. Moreover, the study's methodology emphasized a standardized approach to participant selection, screening, and evaluation to maintain consistency and rigor in the research process, aligning with established research protocols in clinical settings. The structured and comprehensive approach used in this study facilitated the accurate determination of the prevalence of De Quervain's tenosynovitis in this specific population, reflecting a careful balance between thorough data collection and participant welfare throughout the research process.

RESULT

The gender of the participants included in the study. 38.41 % were the male participants and 61.86 % were the female participants. Mean age of participants was 24. Standard deviation was 4.5 while minimum value was 20.00 and maximum value was 35. Out of 97 participants, 35 participants were painting 4 to 5 hours per day. 44 participants were painting 5 to 6 hours per day. 18 participants were painting more than 6 hours per day.

Table 1: Paintings hours

	Frequency	Percent
4-5 hours	35	36.1
5-6 hours	44	45.4
>6 hours	18	18.6
Total	97	100.0

Table 1 illustrates the distribution of canvas painters based on their daily painting hours. Out of the total 97 participants, 36.1% painted for 4-5 hours per day, 45.4% painted for 5-6 hours per day, and 18.6% painted for more than 6 hours per day, showing a varied range of time spent painting among the participants.

Table 2 Presence of Finkelstein test

	Frequency	Percent	Valid Percent	Cumulative Percent
Positive	49	50.5	50.5	50.5
Negative	48	49.5	49.5	100.0
Total	97	100.0	100.0	

Table 2 shows the results of the Finkelstein test among the 97 canvas painters. A total of 49 participants (50.5%) tested positive for De Quervain's tenosynovitis, while 48 participants (49.5%) tested negative. This indicates that the prevalence of De Quervain's tenosynovitis in this population is 50.5%, highlighting that nearly half of the painters do not exhibit symptoms based on this diagnostic test.

Table 3 PRWE (pain and difficulty level)

	Frequency	Percent
1-20 pain/difficulty	24	24.7
21-40 mild pain/difficulty	24	24.7
41-60 moderate pain/difficulty Valid	32	33.0
61-80 severe pain/difficulty	17	17.5
Total	97	100.0

PRWE (pain and difficulty level) of 24.7% participants have very mild pain. 24.7% of participants have mild pain and difficulty. 33% of participants have moderate pain and difficulty level in canvas painters. 17.5% of participants have severe pain and difficulty level.

DISCUSSION

This study was conducted to determine the prevalence of De Quervain's tenosynovitis. We collected data from 97 canvas painters within the age group of 20-40 years. Out of 97, participants, 61.86% were females and 38.14% were males. Prevalence of De Quervain's tenosynovitis in female is 28.87 while the prevalence of De Quervain's tenosynovitis in male is 16.49. The total prevalence of De Quervain's tenosynovitis in canvas painters is 52. 35 participants spend 4-5 hours painting per day and 18 participants spend more than 6 hours painting. We selected population based on inclusion criteria of work as a painter and number of hours they work. Prevalence was determined using Finklestein test in which subject keep thumb inside while making a fist and then ulnarly deviate the wrist (13). This aggravates extensor pollicis brevis and abductor pollicis longus tendons. On performance, we found that 52% of the total population had the disease. Thus, we concluded that De Quervain's tenosynovitis has significant prevalence in canvas painters.

The study conducted by Pratibha in which it was concluded that De Quervain's tenosynovitis results from repetition and overuse and is the cause of pain. Factors related to work include activities with exertion and abnormal posture of the wrist. MSK disorders related to work may be due to forceful, repetitive and abnormal postures. The population of tailors (100 subjects) was selected based on inclusion and exclusion criteria. Finklestein test was performed (14). 75% of subjects showed positive results (15). The study conducted by James Agostinucci in which they compared right angle and standard style paint brush. Hand and wrist posture have major effects on muscles, trauma and discomfort. MSK disorders related to repetitive movements and poor positions of the wrist cause problems. Painting causes high risk of developing overuse syndromes due to its nature of repetitive tasks. Standard paint brushes require the position of the wrist that causes repetitive strain on muscles and tendons. Ulnar deviation produces greater activity of muscles compared to neutral position of wrist. They concluded that forceful wrist and hand activities, sustained effort and repetitive work with the hand in position of grasping are common risk factors that cause De Quervain's tenosynovitis (12). De Quervain's tenosynovitis is caused by chronic overuse and is inflammatory condition that involves first dorsal tendon compartment of wrist. The study conducted by Faiza and Tahira in which they determined the prevalence of De Quervain's tenosynovitis among medical students (16). They included 137 students by non-probability sampling technique that filled the questionnaire and concluded that out of 137 students, 44 experienced pain and 93 were pain free. The disease was prevalent in females. Female gender, sustained wrist bending and work related symptoms in extreme posture were factors of de quatrain (17).

One limitation of this study is that it was conducted in a single area, specifically Faisalabad, which may restrict the generalizability of the findings to a broader population of painters across different regions. The study environment being limited to this specific locality could affect the representation of the overall population. Additionally, we did not specifically analyze gender differences in the prevalence of De Quervain's tenosynovitis, which limits the understanding of whether males or females are more affected by this condition (18). Furthermore, the assessment of symptom severity and progression relied on self-reporting and clinical evaluations, which may introduce subjectivity and reduce the accuracy and reliability of the results, as objective measurements were not utilized. To address these limitations, future studies should aim to include a larger sample size and expand the research to other cities in Pakistan to enhance the generalizability of the findings. It would also be beneficial to examine the association between the condition and different levels of experience among professional and amateur painters, as well as conduct gender-specific analyses to gain a clearer understanding of the prevalence across demographics (19).

CONCLUSION

It was concluded from the study that the prevalence of De Quervain's tenosynovitis in canvas painters is 50.5%. Canvas painters frequently use repetitive hand and wrist movements, including gripping brushes, applying pressure, and making fine motor movements with their thumbs. According to the results there is a significant relationship between Finkelstein test and Total Patient Rated Wrist Evaluation Score. If the condition is left overlooked or untreated, it may become worse, so education and training is necessary for all the canvas painters.

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