



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 9, Issue, 3(F), pp. 25032-25035, March, 2018

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Research Article

PREVALENCE OF DE QUERVAIN'S TENOSYNOVITIS AND ITS EFFECT ON PINCH STRENGTH IN MOBILE USERS

***Dharti Hingarajia., Dharti Patel., Himani Desai and Vidhi Dora**

Department of Physiotherapy, SPB Physiotherapy College, Surat, Gujarat, India

DOI: <http://dx.doi.org/10.24327/ijrsr.2018.0903.1777>

ARTICLE INFO

Article History:

Received 15th December, 2017
Received in revised form 25th
January, 2018
Accepted 23rd February, 2018
Published online 28th March, 2018

Key Words:

De Quervain's tenosynovitis, Pinch strength, Mobile users

ABSTRACT

Background & Purpose: purpose of present study was to find prevalence of de quervain's tenosynovitis in mobile users and to find the effect of de quervain's tenosynovitis on pinch strength in mobile users.

Subjects: 100 students - males and females aged between 18-25 years.

Method: Demographic data, anthropometric data, type and details of mobile use, finklestein's test, VAS, Pinch Strength was assessed for all the participants.

Results: The result of present study shows that prevalence of De Quervain's tenosynovitis is 46% in mobile users and mean tip, palmar and key pinch strength in affected population are 3.90, 3.48, 4.19 respectively and non affected population are 3.69, 4.48, 4.89 respectively.

Conclusion: The result of the present study concluded that the prevalence of De Quervian's tenosynovitis is 46% in mobile users and there is no effect of De Quervian's tenosynovitis on pinch strength in this population.

Copyright © Dharti Hingarajia et al, 2018, this is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

The hand is a "multitool" on which humans have always depended to master everyday life ⁽¹⁾ and with the new occupational and professional demands the prevalence of this condition is also increasing gradually ⁽²⁾.

Fritz De Quervain was the first in 1895, who defined De Quervain's tenosynovitis as a painful complain of the wrist as stenosing tenosynovitis of thumb abductors around the radiostyloid process⁽³⁾.

The literature review reveals the precise etiology of De Quervain's tenosynovitis which includes an acute Trauma, new exercise or may be the result of cumulative microtrauma^(4,5).

Thus, adults who use their hands and thumb in repetitive manner are more likely to have De Quervain. The patients who experience progressive pain and some degree of limitation in deeds, some degree of morbidity may be accompanied with the disease.

People love their Smartphones, some of them to the point of obsession, sneaking a peek at the mobile an astonishing 150 times a day. According to Nokia, an average person used to check phone every six-and-half minutes in a 16-hour waking cycle. Cell phones having standard number pad often use a predictive text entry or other method in order to make input

easier, helping a lot but not enough to counteract how often most people text. Smart phones are even worse where they do have full keyboards to make input easier they have larger surfaces for the thumb to travel over and can often involve both thumbs⁽⁶⁾.

However explosive use of text messages may now have lead to a new, modern affliction, namely texting tenosynovitis, Blackberry Thumb, Washer Woman's Sprain, Gamer's thumb, teen texting tendonitis, WhatsAppitis, Radial styloid tenosynovitis; which involve repeated thumb pinching and wrist movement^(4,7).

No matter how fast or how slow you text, excessive texting is not good for our fingers including wrist and thus this condition can be triggered by a stenosing inflammation of the tendon sheath in the first dorsal compartment of the wrist with symptoms like dysesthesias, such as numbness, tingling, burning, and cramping^(8,9).

Previous studies support the fact that text messaging can strongly be related to De QUERVAIN'S tenosynovitis, Even though De QUERVAIN'S tenosynovitis is rapidly intensifying problem faced by the young adults, so far, not enough research has been done to support and aware people regarding it. Also there is few works done to know the effect of De Quervain's tenosynovitis on pinch strength in mobile users. So present

*Corresponding author: **Dharti Hingarajia**

Department of Physiotherapy, SPB Physiotherapy College, Surat, Gujarat, India

study will be carried out to know the prevalence of De Quervain's tenosynovitis and its effect on pinch strength in mobile users.

- Primary aim was to find prevalence of de quervain's tenosynovitis in mobile users
- Secondary aim was to find effects of de quervain 's tenosynovitis on pinch strength in mobile users.

MATERIAL AND METHODS

1. **Study design:** Observational study
2. **Sample size:** 100
3. **Study duration:** 6 months
4. **Sample selection:** Purposive sampling technique
5. **Study setting:** SPB physiotherapy college, Surat
6. **Population:** student of SPB physiotherapy college

Inclusion Criteria

- Those who own and use mobile phone
- Age:18-25
- Sex: male and female
- Those who are willing to participate

Exclusion Criteria

- Those who don't have mobile phone
- Those who have known medical and surgical conditions
- Any previous injury or trauma to wrist and hand
- Those who were diagnosed as de quervain's disease and other conditions related to wrist and hand
- Those who are not willing to participate

Materials and Tools

- Proforma(annaixure-2)
- Mechanical pinch gauge
- Weighing machine
- Stadiometer

Outcome measures

- VAS
- Finkelstein Test
- Pinch strength (Tip, Palmar, Key)

Procedure

A Convenient sample of 100 students, aged between 18 to 25 years were taken from the SPB Physiotherapy College, Surat. Participants were selected for study based on inclusion and exclusion criteria. All participants were asked to give & sign consent form prior to participate in the study (Appendix I). All the participants were assessed for demographics, anthropometric, type and details of mobile use, finklestein's test, VAS, Pinch Strength

Data Analysis

Data analysis for the present study was carried out by using SPSS 15.0 version. Mean, Standard Deviation and percentages were calculated for all the demographics, anthropometric variables, VAS and all three (Tip, Palmer, Key) pinch strengths. Unpaired t test was done to analyze the effect of

DQT on Pinch strength between affected and non affected participants.

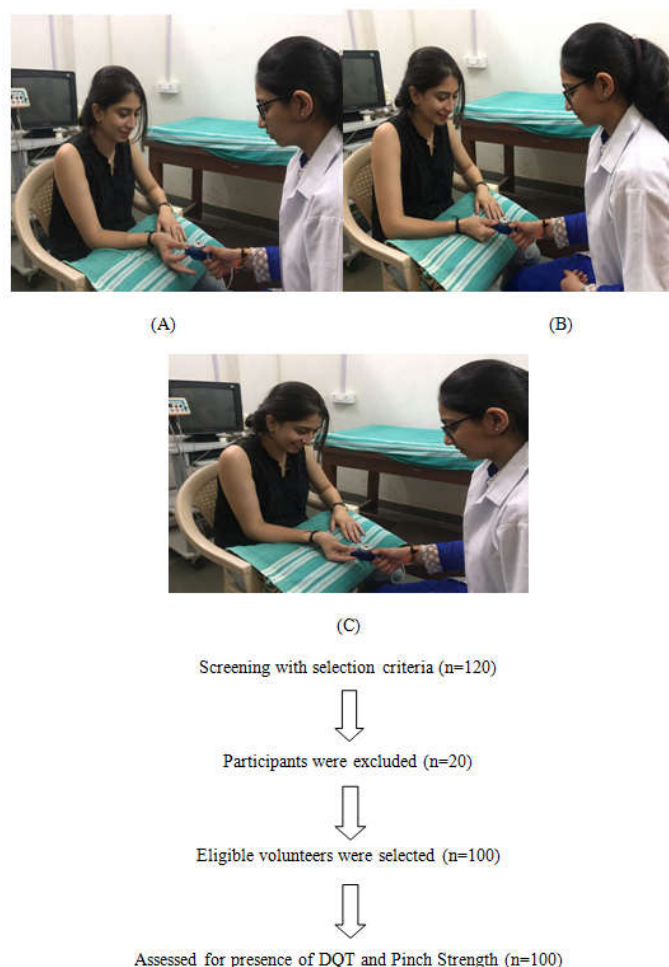


Figure 1 Measurement of (A) Tip Pinch (B) Key Pinch (C) Palmer Pinch

RESULT

Out of the total number of SPB Physiotherapy students who participated in the study, 80 (80%) were females and remaining 20 (20%) were males with a male to female ratio of 1:4 respectively. Mean Age and BMI of participants were 19.77 ± 1.61 and 20.89 ± 3.71 respectively. Majority were the students studying in first, second, third and final year bachelor courses of physical therapy and few of them are studying in master courses of physical therapy. Regarding the use of cell phones, majority 100 (100%) were using touch screen. The detail of mobile phone use frequency, purpose and its effect on thumb movement and function is given in table 1. Most of the participants 91(91%) were right handed and remaining 9 (9%) were left handed. Almost half of the students 71 (71%) were frequently using cell phones for texting, out of them 16 (16%) texted less than 50 messages per day. Another 35 (35%) did texting between 50-100 texts, 26 (26%) between 100-200 and another 22 (22%) more than 200. Nineteen students (19%) were using internet frequently on their mobile phones while 4 (4%) used their mobile for playing games and remaining 6 (6%) were using cell phones to click photos. Out of 100 students who filled the questionnaire 28 (28%) right handed and 18 (18%) left handed students were experiencing pain in the thumb/wrist while another 54 (54%) students were pain free

in which none of the students gave the history of any previous injury. The mean VAS for them was 3.82. Finkelstein test when done on students almost near to half (n=46) showed positive results. The details of Pinch strength is given in table 2. Mean tip, palmar and key pinch strength in affected population are 3.90, 3.48, 4.19 respectively and non affected population are 3.69, 4.48 and 4.89 respectively.

Table 1 The detail of mobile phone use frequency, purpose and its effect on thumb movement and function

Questionnaire		N	%
1)For What do you use your mobile?	a. Internet surfing	19	19
	b. Playing games	4	4
	c. (Textmessaging,SMS, Facebook, WhatsApp)	71	71
	d. Camera	6	6
2)How often you use mobile phone in a day?	a. <1 hour	10	10
	b. 1-3 hours	37	37
	c. 3-5 hours	41	41
	d. >5 hours	12	12
3)Number of text messages per day?	a. <50	16	16
	b. 50-100	35	35
	c. 100-200	26	26
	d. >200	22	22
4)Do you have any Restriction with thumb movement?	a. No difficulty	92	92
	b. Mild difficulty	8	8
	c. ModerarteDifficulty	0	0
	d. Severe difficulty	0	0
5)Do you have difficulty in twisting keys in past two weeks?	a. No difficulty	95	95
	b. Mild difficulty	5	5
	c. Moderarte difficulty	0	0
	d. Severe difficulty	0	0
6)Do you have any difficulty in opening the doors in past two weeks?	a. No difficulty	100	100
	b. Mild difficulty	0	0
	c. Moderarte difficulty	0	0
	d. Severe difficulty	0	0
7)Do you have any difficulty in buttoning the shirt in past two weeks?	a. No difficulty	98	98
	b. Mild difficulty	2	2
	c. Moderarte difficulty	0	0
	d. Severe difficulty	0	0
8)Do you have any difficulty in pinching in past two weeks?	a. No difficulty	95	95
	b. Mild difficulty	5	5
	c. Moderarte difficulty	0	0
	d. Severe difficulty	0	0
9)Do you have any difficulty in unscrewing the jar lid in past two weeks?	a. No difficulty	94	94
	b. Mild difficulty	5	5
	c. Moderarte difficulty	1	1
	d. Severe difficulty	0	0
10) Do you have any difficulty in gripping in past two weeks?	a. No difficulty	92	92
	b. Mild difficulty	8	8
	c. Moderarte difficulty	0	0
	d. Severe difficulty	0	0
11)Do you have any difficulty in typing on keyboard in past two weeks?	a. No difficulty	90	90
	b. Mild difficulty	10	10
	c. Moderarte difficulty	0	0
	d. Severe difficulty	0	0

Table 2 The Detail of Mean±S.D pinch strength

Test	TIP		PALMAR		KEY	
	Rt	Lt	Rt	Lt	Rt	Lt
Positive	3.88±1.52	3.95±1.21	4.65±1.71	4.95±1.30	5.22±1.49	5.36±1.43
Negative	3.83±1.25	3.52±1.17	4.64±1.58	4.21±1.54	5.10±1.59	4.69±1.40
P value	0.87	0.95	0.88	0.97	0.92	0.97

DISCUSSION

Younger peer group access and exposure to different types of information and communication equipment such as computers and mobile phones has intensely increased over recent years⁽¹⁰⁾. During the past decade in Sweden only, 15-24-year-age group have 100% access to mobile phones and 93% on average utilize it for sending text messages (SMS)⁽¹¹⁾. Use of mobile phones

has increased in USA in teens for text messaging from 38% in 2008 to 54% in 2009⁽¹²⁾. When considering students related to healthcare profession most common reasons related to SMS texting include academic related activities⁽¹³⁾.

De Quervain’s tenosynovitis most commonly arises due to the overuse of the thumb musculature which is characterized by pain that spread over the surface of radial aspect of the wrist and intensified by ulnar deviation of the hand⁽¹⁴⁾. The prevalence of this condition upturns with new occupational demands such as extended work at computer, an athlete especially who follows a high resistance training that includes lifting weight and using hands for support and maximal exertion⁽¹⁴⁾. In 2010, a case report of bilateral De Quervain’s tenosynovitis revealed that the diagnosis linked the patient’s condition with excessive routine of the text messaging feature on a cellular telephone⁽¹⁴⁾. An extensive community based study performed in United Kingdom displayed that prevalence of deQuervain’s tenosynovitis was 0.5% in males compared to 1.3% in females⁽¹⁶⁾. In 2007, The Newzealand Medical Journal published an article on texting tenosynovitis where they figured two previous reports of texting tenosynovitis⁽¹⁷⁾.

Our survey although scarcely performed in our part of the world had few limitations. First the male to female ratio was unequal with a preponderance of females. Studies have pointed that prevalence of DeQuervain’s tenosynovitis remains higher in females. A variety of mobile phones were used by participants differing in size and weight that may have produced varied results. Also posture while texting was never noted. Studies have stated difference of results for those messaging while standing compared to sitting as it creates a different impact on the muscles of upper limb, with more exertion on muscles while standing during messaging⁽¹⁸⁾. Confounders like playing games on mobiles, typing on laptops were not taken into detail that may have biased the results⁽¹⁹⁾. As this was a cross sectional study differences and impacts of texting techniques could not be assessed which according to previous literature causes effect on the occurrence of the disorder and is different for symptomatic *versus* asymptomatic patients⁽²⁰⁾. However, our strengths cannot be overlooked. Unfortunately there is no gold standard diagnostic confirmatory test for De Quervain’s tenosynovitis²⁵. Results of the Finkelstein test are deemed pathognomic for De Quervain’s tenosynovitis^(21,22,23). To minimize inter observer variation every participant was examined twice by the primary investigators themselves. According to studies a positive Finkelstein’s test has an intra observer repeatability (k) of 0.79⁽²⁴⁾. Universal Pain Assessment Tool was utilized for assessing the severity of pain.

In the 21st century mobile phones have become more of a necessity than a luxury⁽²⁵⁾. With the dawn of smartphones and advance versions expected in future it is inevitable that diseases related to extensive use of cell phones will increase in numbers specifically musculoskeletal problems. The main brunt will be faced by the younger generation who are still in the phase of development and are prone to extensive use through short message service (SMS) messaging and gaming⁽²¹⁾. In order to inhibit the development of musculoskeletal disorders, a better understanding of the texting technique and connection to the muscle activity and the kinematics is needed. As De Quervain’s tenosynovitis is a serious issue leading to dysfunction of the

affected hand further insight would help researchers to get a background for physical guidelines for texting on mobile phones and recommend appropriate behavioral changes for averting this under recognized cause of tendinopathy.

Our study of 46% of prevalence is compared with previous study who found 50% of prevalence.⁽²⁶⁾ Another part of this study is effect of De Quervain's tenosynovitis on different grip (Tip, Palmar, Key), the result of our study is compared with previous study⁽²⁷⁾

CONCLUSION

The result of the present study concluded that the prevalence of De Quervain's tenosynovitis is 46% in mobile users and there is no effect of De Quervain's tenosynovitis on pinch strength in this population.

Advise: The research will advise mobile phone users to text with both hands, take frequent breaks, not type too fast and to give proper support to their forearms and back while texting

References

1. SMS Thumb. Available from http://www.fysio.tera.pivakten.no/documents/sms_thumb.html
2. Foye PM, Cianca JC, Prather H. 3. Cumulative trauma disorders of the upper limb in computer users. Archives of physical medicine and rehabilitation. 2002; 83:S12-S15.
3. Davis RV. Management of de Quervain's Disease. Chiroweb Archives. 1992.
4. Foye P, Stitik T. De Quervain Tenosynovitis. eMedicine [database online] Omaha (NE): eMedicine com, Inc. 2008;13.
5. Avci S, Yilmaz C, Sayli U. Comparison of nonsurgical treatment measures for de Quervain's disease of pregnancy and lactation. *The Journal of hand surgery*. 2002;27(2):322-324.
6. Berkow R, Fletcher AJ, Bondy PK. The Merck manual of diagnosis and therapy. 1992.
7. Souza TA. Differential diagnosis for the chiropractor: protocols and algorithms: Aspen Publishers. 1997.
8. Moore K. Clinically Oriented Anatomy (ed 3) Williams and Wilkins. Baltimore, MD. 1992;342-343.
9. Magee DJ. Forearm, wrist and hand. Orthopedic physical assessment. 5th edition St Louis, MO: Saunders Elsevier. 2008;396-470.
10. Mezei G, Benyi M, Muller A. Mobile phone ownership and use among school children in three Hungarian cities. *sBioelectromagnetics*. 2007;28(4):309-315.
11. Gustafsson E, Johnson PW, Lindegard A, Hagberg M. Technique, muscle activity and kinematic differences in young adults texting on mobile phones. *Ergonomics*. 2011; 54(5):477-487.
12. Lenhart A, Purcell K, Smith A, Zickuhr K. Social media & mobile internet use among teens and young adults: Pew internet & american life project Washington, DC; 2010.
13. Jones M, Marsden G. "Please turn ON your mobile phone"—First Impressions of Text-messaging in Lectures: Springer. 2004.
14. Ashurst JV, Turco DA, Lieb BE. Tenosynovitis caused by texting: an emerging disease. *JAOA: Journal of the American Osteopathic Association*. 2010; 110(5):294-296.
15. Pagonis T, Ditsios K, Toli P, Givissis P, Christodoulou A. Improved corticosteroid treatment of recalcitrant de Quervain tenosynovitis with a novel 4-point injection technique. *The American Journal of Sports Medicine*. 2011; 39(2):398-403.
16. Walker - Bone K, Palmer KT, Reading I, Coggon D, Cooper C. Prevalence and impact of musculoskeletal disorders of the upper limb in the general population. *Arthritis Care & Research*. 2004;51(4):642-651.
17. Yoong J. Mobile phones can be a pain-text messaging tenosynovitis. Hospital medicine (London, England: 1998). 2005;66(6):370.
18. Mork PJ, Westgaard RH. The influence of body posture, arm movement, and work stress on trapezius activity during computer work. *European journal of applied physiology*. 2007; 101(4):445-456.
19. Anderson SE, Steinbach LS, De Monaco D, Bonel HM, Hurtienne Y, Voegelin E. "Baby wrist": MRI of an overuse syndrome in mothers. *American Journal of Roentgenology*. 2004;182(3):719-724.
20. Gustafsson E, Johnson PW, Hagberg M. Thumb postures and physical loads during mobile phone use—A comparison of young adults with and without musculoskeletal symptoms. *Journal of Electromyography and Kinesiology*. 2010;20(1):127-135.
21. Bruckschwaiger O. Atypical De Quervain's Disease. *Canadian Medical Association Journal*. 1954; 71(3):277.
22. Keon-Cohen B. De Quervain's disease. *J Bone Joint Surg Br*. 1951; 33:96-99.
23. Kamel M, Moghazy K, Eid H, Mansour R. Ultrasonographic diagnosis of de Quervain's tenosynovitis. *Annals of the rheumatic diseases*. 2002; 61(11):1034-1035.
24. Palmer K, Walker-Bone K, Linaker C, Reading I, Kellingray S, Coggon D, et al. The Southampton examination schedule for the diagnosis of musculoskeletal disorders of the upper limb. *Annals of the rheumatic diseases*. 2000;59(1):5-11.
25. Gordon S. Beware the 'Blackberry Thumb'. The Washington Post. 2008.
26. Maryam Ali et al "Frequency of De Quervain's tenosynovitis and its association with SMS texting". *Muscles, Ligaments and Tendons Journal* 2014; 4 (1): 74-78.
27. Dhvani Dakoria et al "Association of Excessive Smartphone Usage And Grip Strength Among Young Adults – A Preliminary Study". 55th Annual Conference of Indian Association of on grip strength 2016.
