

Prevalence of De Quervain's Tenosynovitis among young adult E- gamers

Sabiha Arshad ¹, Munim Zahra ², Fatima Amjad ³, Arooj Saif ⁴

¹Department of Rehabilitation and Allied Health Sciences, Riphah International University, QIE campus, Lahore, Pakistan

^{2,3,4} Bashir Medical and Kidney Center, Lahore, Pakistan

ABSTRACT:

Background:

De Quervain's tenosynovitis is a highly frequent condition that affects people of all ages. It is an inflammation of the tendons that run along the thumb side of the wrist and attach to the base of the thumb. Overusing electrical devices including phones, computers, laptops, and tablets can increase the risk of contracting this illness.

Objective of study:

Objective of the study was to find out the prevalence of De Quervain's Tenosynovitis among young adult e-gamers.

Material and Method:

This cross-sectional survey used a non-probability convenient sampling technique and was completed in six months. Data on 730 young adults (18 to 25 years old) was gathered through a self-made questionnaire and Finklestein test, from various play stations and institutions, including Riphah International University in Lahore. Visual analog scale was used to quantify pain severity. SPSS 21 was used for data analysis.

Results:

Out of 730 participants, 471 (64.5%) had a positive Finklestein test result, while 259 (35.5%) did not. The majority of individuals on the visual analogue scale reported moderate levels of pain. According to additional findings, participants with the right-hand dominance had 419 (64.66%) positive results and 229 (35.33%) negative results on the Finklestein test, whereas people with the left hand dominance had 52 (63.41%) positive results and 30 (36.58%) negative results.

Conclusion:

This cross-sectional study concluded that young adult E-gamers had a significant prevalence of De Quervain's tenosynovitis.

Keywords:

De Quervain Tenosynovitis, E-gamers, Finkelstein's test, Musculoskeletal, Visual Analog Scale

INTRODUCTION:

De Quervain's disease, which is caused by myxomatous degeneration of the tendon sheath, causes wrist pain in the radial first extensor compartment and inflammation of the abductor pollicis longus and extensor pollicis brevis tendon. About 0.5% of males and 1.3% of females develop DQT, making females more frequently affected than males. (1, 2) After Tillaux who was the first to suggest and describe the "first dorsal compartment tenosynovitis in charwoman in 1892. (3, 4)

Repetitive thumb movement is not only a key illness-causing factor but De Quervain's disease is also brought on by rheumatoid arthritis. (5) De Quervain's disease may be brought on by trigger fingers since they can affect the whole hand, including the fingers. This behavioral addiction also relates to causes like gambling, online gambling, and an increase in mobile usage, all of which subsequently lead to De Quervain's disease. (6, 7)

The stenosis of the abductor pollicis longus and four extensor pollicis brevis of the first extensor compartment of the wrist constitutes tenosynovitis. The thumb's extension and abduction, which include opposition, are assisted by these muscles. (8, 9)

Stenosing tendon inflammation is known as tenosynovitis. It takes place where the abductor pollicis longus and extensor pollicis brevis muscle bellies cross over with the extensor carpi radialis longus and Extensor Carpi Radialis Brevis muscle bellies. This inflammatory condition, which can be caused by playing video games, is described as a disorder of overworking the muscles. (10, 11)

Electronic gaming, also known as "e-gaming," is a type of professional or competitive video gaming that has gained popularity and become a staple of today's digital youth culture. (12)

Mobile gaming, X-Boxes, and Play stations have become extremely popular over the past century due to their convenience, pleasure, and ease of use. Additionally, the full-touch phone has mostly replaced the conventional keypad phone in the population. According to a survey by the China Internet Network Information Center, there were 724 million mobile users and 422 million mobile gamers in China as of June 2017. According to a recent study professional gamers in China typically spend 42 hours per week playing mobile games, compared to novices who typically spend 12 to 16.5 hours. Teenagers who played dragged mobile games frequently tended to misuse their thumbs, and some of them reported experiencing wrist pain. (3, 13)

The Finkelstein's test, which requires patients to flex their thumb and enclose it in a closed fist, is the diagnostic procedure for DQT. The therapist maintains this particular hand posture while the patient actively or passively performs ulnar deviation of the wrist. A positive sign of DQT is pain felt on the radial side of the wrist, close to the radial styloid process. (3, 14)

Rest, anti-inflammatory medicine, application of heat and cold, massage, and exercises, and orthotic intervention are examples of conservative therapy for mild and acute cases. A study found that a combination of orthotic intervention and oral non-steroidal anti-inflammatory drug use totally relieved the symptoms of mild DQT in 15 out of 17 participants. (15)

Corticosteroid injections may be suggested for people who have mild to moderate wrist pain. According to a study, injections of triamcinolone using an ultrasound-guided approach are safe and successful for 91% of patients. When other therapies have failed to provide relief, surgery may be recommended. (16) Ta, et al. reported that 91% of the patients in their study had no problems following surgery. Prior research has primarily focused on treatment. (17) Ashraf et al. carried out a comprehensive review and meta-analysis to compare the effectiveness of orthotic intervention to steroid injection as a treatment in adult. (18)

The tendon may continue to glide by a fibro osseous tunnel located at the level of the radial styloid as a result of repeated movements of the wrist in the first extensor compartment of the wrist. (19) The pain increased steadily in intensity as it eventually extended. Although it can also spread to the thumb's dorsal area and the radial area of the forearm, this pain is typically felt in the area above the radial styloid process. The area of pain seems to have swelled and thickened. This excruciating condition can persist for months or years. (20)

Avoiding repetitive motions, icing, NSAIDs, corticosteroid injections into the tendon sheath, and physical remedies are other therapy possibilities. Surgery is a good option for treating conditions that don't respond to conservative measures. The thenar eminence muscles can be stretched to help the tight muscles loosen up. Strengthening can also produce fruitful outcomes. (15)

The aim of this study was to determine the prevalence of De Quervain's Tenosynovitis among young adult E-gamers in order to gain knowledge of the condition and provide affected participants with guidance on the best preventative measures and treatment options to reduce the occurrence and prognosis of this disease.

MATERIALS AND METHODS

The study design was a cross sectional survey. Non probability convenient sampling technique was used. The study was conducted in young adult e-gamers community in Lahore. The study duration was 4 months after the approval from the research board. The estimated sample size for the current study was 730, as calculated by the Raosoft sample size calculator with a 5% margin of error, a 99% confidence level, a population size of 1000000, and a 50% response distribution. Inclusion criteria for recruitments was participants must be E-gamers (both male and females) with age group from 18 to 25 years (12), gaming time per day atleast 2 hours or more and gamers playing games from more than 6 months. Participants with a history of any hand surgery, those who had already been given an inflammatory arthritis diagnosis, and those who had any recent accident, trauma, or fracture history were all excluded from the study. The participants with DQT were diagnosed using Finkelstein's test (21), Numeric VAS (Visual Analogue Scale) (18) was utilized to quantify their pain intensity and a self-made questionnaire was used to get participant demographic information. Data was gathered from individuals who fit the requirements and were willing to participate in the study with their written consent at various play stations and institutes in Lahore. Then, to evaluate if the e-gamers had positive or negative De Quervain's Tenosynovitis, Finkelstein's test, which involves bending the thumb across the palm of the hand, the fingers down to the thumb, and the wrist to an ulnar deviation, was carried out on both hands. Any pain they felt throughout the examination was considered a positive result. Additionally, a numerical Visual Analogue Scale (VAS) was used to quantify the pain intensity in all positive DQT E-gamers. SPSS 21 statistical software was used to conduct all statistical analyses. Percentage distribution was used in the data tabulation.

RESULT:

In this cross sectional survey 730 individuals both males (614) and females (116) were included. Data was collected according to inclusion and exclusion criteria. Finkelstein's test was performed on participants to identify De Quervain's Tenosynovitis and then visual analog scale was used for intensity of pain measurement of positive Finklestein's test participants. Results showed that out of 730 participants 471 (64.5%) had positive and 259 (35.5%) had negative Finklestein's test. On visual Analog scale maximum number of participants had moderate level of pain intensity. Further,

result showed that participants with the right hand dominance 419 (64.66%) had positive and 229(35.33%) had negative finklestein's test while in participants with the left hand dominance 52 (63.41%) had positive and 30 (36.58%) had negative finklestein's test.

Table 1: Gender and Age

		Frequency (n)	Percentage (%)	Valid Percentage (%)	Cumulative Percentage (%)
Gender	Male	614	84.1%	84.1%	84.1%
	Female	116	15.9%	15.9%	100.0%
	Total	730	100.0%	100.0%	100.0%
Age (in Years)	18-21	339	46.4%	46.4%	46.4%
	22-25	391	53.6%	53.6%	100.0%
	Total	730	100.0%	100.0%	100.0%

Table no 1 showed frequency of gender. Among 730 participants, 614 (84.1%) were males and 116 (15.9%) were females. And young adults were divided in two age groups; 1st group (18-21 years) included 339 (46.4%) and 2nd group (22-25 years) included 391 (53.6%) participants.

Table 2 : Finklestein's Test

Finklestein's Test		Frequency (n)	Percentage (%)	Dominant hand	
				Right	Left
Valid (n)	Positive	471	64.5%	419 (57.39%)	52 (7.12%)
	Negative	259	35.5%	229 (31.36%)	30 (4.10 %)
	Total	730	100.0%		

Table no 2 showed that out of 730 participants 471 (64.5%) had positive and 259 (35.5%) had negative Finklestein's test. Participants with the right hand dominance 419 (57.39%) had positive and 229 (31.36%) had negative finklestein's test while in participants with the left hand dominance, 52 (7.12%) had positive and 30 (4.10%) had negative finklestein's test.

Table 3 (A): Total estimated time duration of playing games of E-gamers

Total estimated time duration (in years)		Frequency (n)	Percentage (%)	Valid Percentage (%)	Cumulative Percentage (%)
Valid (n)	0.5-1.5	85	11.6%	11.6%	11.6%
	1.5-2.5	195	26.7%	26.7%	38.4%
	2.5-3.5	168	23.0%	23.0%	61.4%
	3.5-4.5	120	16.4%	16.4%	77.8%
	4.5-5.5	78	10.7%	10.7%	88.5%

	5.5-6.5	23	3.2%	3.2%	91.6%
	6.5-7.5	13	1.8%	1.8%	93.4%
	7.5-8.5	26	3.6%	3.6%	97.0%
	8.5-9.5	7	1.0%	1.0%	97.9%
	9.5-10.5	15	2.1%	2.1%	100.0%
	Total	730	100.0%	100.0%	100.0%

Table 3 (A) showed that minimum data collected for estimated time of playing games was 0.5 years that was also inclusion criteria of this study and maximum was less than 10.5 years. The total estimated time of playing games from 0.5-1.5 years there were total 85 (11.6%) participants, from 1.5-2.5 years there were 195 (26.7%) participants, from 2.5-3.5 years there were 168 (23.0%), from 3.5-4.5 years there were 120 (16.4%), from 4.5-5.5 year there were 78 (10.7%), from 5.5-6.5 years there were 23 (3.2%), from 6.5-7.5 years there were 13 (1.8%), from 7.5-8.5 years there were 26 (3.6%), from 8.5-9.5 years there were 7 (1.0%) and from 9.5-10.5 years there were 15 (2.1%).

Table 3 (B): Level of pain intensity

Level of pain intensity	Frequency (n)	Percentage (%)	Valid percentage (%)	Cumulative Percentage (%)
Valid (n)	0.00	259	35.5%	35.5%
	1.00	3	0.4%	35.9%
	2.00	17	2.3%	38.2%
	3.00	34	4.7%	42.9%
	4.00	91	12.5%	55.3%
	5.00	126	17.3%	72.6%
	6.00	106	14.5%	87.1%
	7.00	54	7.4%	94.5%
	8.00	24	3.3%	97.8%
	9.00	16	2.2%	100.0%
	10.00	0.00	0.00%	0.00%
Total	730	100.0%	100.0%	

Table 3 (B) showed that level of intensity of pain was 0.0 in 259 (35.5%) participants, 1.0 in 3 (0.4%), 2.0 in 17 (2.3%), 3.0 in 34 (4.7%), 4.0 in 91 (12.5%), 5.0 in 126 (17.3%), 6.0 in 106 (14.5%), 7.0 in 54 (7.4%), 8.0 in 24 (3.3%), 9.0 in 16 (2.2%) and 10.0 in 0 (0.00%) participants.

Table 4: Relationship among Dominant hand and Finklestein's test

Dominant hand	Finklestein's test		Total n (%)
	Positive n (%)	Negative n (%)	
Right	419 (57.39%)	229 (31.36%)	648 (64.52%)

Left	52 (7.12%)	30 (4.10 %)	82 (11.2%)
Total	471 (64.52%)	259 (35.47%)	730 (100.0%)

Table 4 showed that participants with the right hand dominance 419 (57.39%) had positive and 229 (31.36%) had negative Finklestein's test while in participants with the left hand dominance, 52 (7.12%) had positive and 30 (4.10%) had negative Finklestein's test.

DISCUSSION:

In 2020, Pratibha Maurya, et al. conducted a study on the prevalence of De Quervain tenosynovitis among tailors. According to this study, tailors were more likely to develop De Quervain illness due to their unique working pattern of repetitive thumb movements and like E-gamers. While the current study investigated the frequency of De Quervain's disease among young adult E-gamers, it was found that DQT was strongly prevalent among this group due to the repetitive usage of the thumb in an irregular manner. (22)

A study was carried out in 2019 by Tianxiao Ma et al. According to the study, 49.0% of school pupils had De Quervain, and playing mobile games for an extended period of time enhanced the risk. According to this study, mobile gaming should be limited to 2.25 hours per day in order to prevent De Quervain disease. While the current study found that E-gamers with an acute case of De Quervain's illness reported intense discomfort from inflammation in the wrist and thumb brought on by repetitive motion. DQT therefore had a high frequency among young adult online gamers. (3)

A study by KV Kale et al. in 2021 revealed that 43% of buffalo milkers with the age of 30 to 50 years old had De Quervain tenosynovitis. De Quervain tenosynovitis was more prevalent in females than in males. The age group of 41 to 45 years had a higher pain distribution. While in the current cross-sectional study, the age range was different (18–25 years), as only young adults who played video games were included, because thumb repetition hurt participants' thumbs and wrists frequently, it was confirmed that in E-gaming, thumb repetition causes DQT. (23)

Naseem Ahmad, Et al. in 2019, conducted research on the relationship between texting and de Quervain pain. Gender-based research was done on Karachi's general populace. According to the results, which included 32.2% (226) males and 66.8% (468) females, pain is far more common in females than in males (1:2). In contrast, the current study was done on adult E-gamers but was not gender biased. So consequently, 84.1% (614) of the participants in this study were males, and 15.9% (116) were females. In contrast to females, most of the gamers in our target population were males. Our findings thus confirmed that E-gaming played a major role in developing DQT due to repetitive thumb movements in Lahore. (24)

This study was constrained by the fact that it primarily focused on young adult E-gamers, which limited the data. And just Lahore was chosen for the research.

CONCLUSION:

This cross-sectional study concluded that there was a high prevalence of De Quervain's tenosynovitis among young adult E-gamers.

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REFERENCES

1. Kazmers NH, Liu TC, Gordon JA, Bozentka DJ, Steinberg DR, Gray BL. Patient-and disease-specific factors associated with operative management of de Quervain tendinopathy. *The Journal of Hand Surgery*. 2017;42(11):931. e1-. e7.
2. Ilyas N, Hanif F, Panjwani RK, Rahim SK, Qadeer AA, Hameed A. COMPARISON OF EFFICACY OF INJECTABLE STEROIDS VERSUS CONSERVATIVE MANAGEMENT FOR DE QUERVAIN'S TENOSYNOVITIS. *Journal of University Medical & Dental College*. 2021;12(3):217-21.
3. Ma T, Song L, Ning S, Wang H, Zhang G, Wu Z. Relationship between the incidence of de Quervain's disease among teenagers and mobile gaming. *International Orthopaedics*. 2019;43(11):2587-92.
4. Milani C, Lin C. Proximal linear extension of skin hypopigmentation after ultrasound-guided corticosteroid injection for de quervain tenosynovitis: a case presentation. *PM&R*. 2018;10(8):873-6.
5. Baabdullah A, Bokhary D, Kabli Y, Saggaf O, Daiwali M, Hamdi A. The association between smartphone addiction and thumb/wrist pain: A cross-sectional study. *Medicine*. 2020;99(10).
6. Reada B, Alshaebi N, Almaghrabi K, Alshuaibi A, Abulnaja A, Alzahrani K. Prevalence and Awareness Evaluation of De Quervain's Tenosynovitis among Students in the Kingdom of Saudi Arabia. 2020.
7. Makuku R, Werthel J-D, Zanjani LO, Nabian MH, Tantuoyir MM. New frontiers of tendon augmentation technology in tissue engineering and regenerative medicine: a concise literature review. *Journal of International Medical Research*. 2022;50(8):03000605221117212.
8. Awan WA, Babur MN, Masood T. Effectiveness of therapeutic ultrasound with or without thumb spica splint in the management of De Quervain's disease. *Journal of back and musculoskeletal rehabilitation*. 2017;30(4):691-7.
9. Allam AE-S, Al-Ashkar DS, Negm AA, Eltawab BA, Wu W-T, Chang K-V. Ultrasound-guided methotrexate injection for De Quervain disease of the wrist: what lies beyond the horizon? *Journal of Pain Research*. 2017;10:2299.
10. Kim SK, Ahmed MA, Avins AL, Ioannidis JP. A genetic marker associated with de Quervain's tenosynovitis. *International Journal of Sports Medicine*. 2017;38(12):942-8.
11. Tahir M, Ahmad A. Frequency of De Quervain's Syndrome among Smartphone Users in Different Universities of Lahore, Pakistan. *Pakistan Journal of Physical Therapy (PJPT)*. 2018:10-4.
12. Leong YZ, Clements JB. Association of Musculoskeletal Pain with Poor Quality of Sleep Among E-Gamers in a Private University in Malaysia. *INTI JOURNAL*. 2022;2022(02):1-8.
13. Abi-Rafeh J, Kazan R, Safran T, Thibaudeau S. Conservative management of de Quervain stenosing tenosynovitis: review and presentation of treatment algorithm. *Plastic and reconstructive surgery*. 2020;146(1):105-26.
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;10(02):116-8.
15. Shin YH, Choi SW, Kim JK. Prospective randomized comparison of ultrasonography-guided and blind corticosteroid injection for de Quervain's disease. *Orthopaedics & Traumatology: Surgery & Research*. 2020;106(2):301-6.
16. Mezian K, Ricci V, Jacisko J, Sobotová K, Angerová Y, Nanka O, et al. Ultrasound imaging and guidance in common wrist/hand pathologies. *American Journal of Physical Medicine & Rehabilitation*. 2021;100(6):599-609.
17. Iqbal S, Khattak HG, Aman S, Anwar K, Ali B, Malakandi HB. Frequency of De-Quervain Syndrome in Mobile Users Among Undergraduate Students of Allied Health Sciences Peshawar. *Foundation University Journal of Rehabilitation Sciences*. 2021;1(1):15-8.

18. Morgan SD, Sivakumar BS, An VG, Sevaio J, Graham DJ. A review of De Quervain's stenosing tenosynovitis in the context of smartphone use. *The Journal of Hand Surgery (Asian-Pacific Volume)*. 2020;25(02):133-6.
19. Karpe J, Kale RA. DE QUERVAIN'S TENOSYNOVITIS: A CASE REVIEW OF THE REHABILITATIVE OPTIONS WSR TO AGNIKARMA. 2020.
20. Jerome JTJ. *Clinical Evaluation: History Taking and Arriving at a Clinical Diagnosis*. Clinical Examination of the Hand: CRC Press; 2022. p. 30-70.
21. Mandiroglu S, Alemdaroglu E. Idiopathic carpal tunnel syndrome and de Quervain's tenosynovitis: is there an association? *Somatosensory & Motor Research*. 2021;38(4):353-6.
22. Maurya P, Priyanka G, Palkar A. Prevalence of De-Quervain's tenosynovitis in tailors. *International Journal of Health Sciences and Research*. 2020;10(2):2249-957.
23. Kale KV, Salunkhe P. Prevalence of De Quervain's tenosynovitis in buffalo milkers. *people*. 2021;7:8.
24. Ahmed N, Iftikhar HY, Javed R, Warda T, Samad S. Occurrence of De Quervain's Tenosynovitis and its association with Short Message Service Texting Habit: A cross-sectional Study in the General Population of Karachi, Pakistan. *International Archives of BioMedical And Clinical Research*. 2019;5(1):7-11.

Authors Detail

First Author: Sabiha Arshad

Senior Lecturer / Physiotherapist, Department of Rehabilitation and Allied Health Sciences, Riphah International University, QIE campus, Lahore, Pakistan

Second Author: Munim Zahra

Intern in Physical Therapy Department, Bashir Medical and Kidney Center, Lahore, Pakistan

Third Author: Fatima Amjad

Intern in Physical Therapy Department, Bashir Medical and Kidney Center, Lahore, Pakistan

Fourth Author: Arooj Saif

Intern in Physical Therapy Department, Bashir Medical and Kidney Center, Lahore, Pakistan

Corresponding author: Sabiha Arshad