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Original research

Prevalence of De Quervain's Tenosynovitis Syndrome among Egyptian Medical Students with Smartphone Addiction

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Abstract

Background: De Quervain's Tenosynovitis Syndrome (DQT), characterized by inflammation of the thumb and wrist tendons, which is increasingly linked to repetitive smartphone use, particularly among university students. Its impact on functional hand strength and quality of life remains a critical concern. **Purpose:** Investigate the prevalence of De Quervain's syndrome among Egyptian medical students with smartphone addiction and assess its association with usage patterns and demographic factors. old with smartphone addiction. **Methods:** A Descriptive cross-sectional study was made on medical collages of Cairo University. One hundred and eighty Egyptian medical students aged from 18 to 24 years were assessed using the Finkelstein test for De Quervain's syndrome diagnosis, pinch dynamometer (lateral, two-point, three-point grip), and grip dynamometer. Smartphone addiction was evaluated via the Smartphone Addiction Scale-Short Version (SAS-SV). Data on demographics, hand dominance, and smartphone usage patterns were collected. **Results:** The prevalence of DQT was 35.6% in the dominant hand and 16.7% in the non-dominant hand. Participants with De Quervain's syndrome exhibited significant reductions in grip strength and pinch strength compared to healthy peers. A significant association was found between De Quervain's syndrome and social media usage with no statistical differences were observed by age, gender, or college. **Conclusion:** De quervain`s syndrome is prevalent among medical students with smartphone addiction, particularly in the dominant hand, and correlates with reduced hand strength. Preventive strategies, including ergonomic education and activity modification, are crucial to mitigate musculoskeletal risks.

Keywords: De Quervain's tenosynovitis, Finkelstein test, Grip strength, Medical students, Pinch strength, Smartphone addiction.

INTRODUCTION:

De Quervain's Tenosynovitis Syndrome (DQT) is a musculoskeletal disorder marked by inflammation of the tendons in the wrist's first dorsal compartment, specifically affecting the abductor pollicis longus (APL) and extensor pollicis brevis (EPB)[1]. This condition, linked to repetitive thumb and wrist motions, causes pain, diminished grip strength, and functional impairments[2]. The global researches on smartphone use, particularly among young adults engaged in texting, gaming, and scrolling, has heightened DQT's prevalence[1,3]. Clinically, DQT presents as radial styloid tenderness and swelling, aggravated by thumb abduction or wrist ulnar deviation[4]. Studies report prevalence

rates of 32%–52% in university populations, correlating strongly with smartphone addiction and usage exceeding 5 hours daily[5,6]. Egypt alone recorded 105.1 million mobile connections by October 2024, with university students constituting 70% of internet users[7,8]. Globally, students average 5–8 hours of daily smartphone use[9,10,] and 79% of individuals aged 18–44 report constant device proximity[3,5]. Research among university students reveals DQT prevalence rates of 32%–52%, with studies in Karachi and China reporting 50% and 52% rates, respectively, among high-frequency users[5,6,11]. A linear relationship between texting habits and DQT onset has been consistently documented[12].

Smartphone addiction is a type of technological dependency, where users feel compelled to continue using their smartphones even in the absence of immediate necessity[13]. University students, who are accustomed to social settings and engage in excessive daily smartphone use, are at a higher risk of experiencing musculoskeletal injuries[14]. Systematic reviews highlight that prolonged smartphone use induces clinical and subclinical musculoskeletal changes in the neck, shoulders, wrists, and thumbs, with DQT being a prominent diagnosis[2.15]. Despite this global evidence, no prior studies have investigated DQT prevalence among Egyptian medical students, a population with high smartphone dependency for academic and clinical tasks[16,17] This study addressed this gap by evaluating DQT prevalence among smartphone-addicted medical students at Cairo University. In addition to the Finkelstein test, the study employs dynamometric assessments (pinch and grip strength measurements) to enhance diagnostic accuracy[18,19,20]. Findings aim to help in the preventive strategies, ergonomic education, and policies to mitigate technology-related health risks in academic settings.

METHODS

This cross-sectional study aimed to investigate the prevalence of De Quervain's Tenosynovitis Syndrome (DQT) and its association with smartphone addiction among Egyptian medical students. The investigation was conducted, involving 180 medical students at Cairo University.

Sample size

The G*Power software (version 3.0.10) was used to calculate the sample size. Based on a pilot study by Akça et al. (2023) reporting pinch strength differences between healthy participants and those with De Quervain's Tenosynovitis (DQT), an effect size of 0.06 was applied. With $\alpha = 0.05$, power = 90%, and a two-tails using linear multiple regression. The required sample size was 180 participants.

The researcher, make an assessment for the DQT. The research trial's flow chart is shown in **Fig (1)**.

Out of 224 students were screened, 44 were excluded; 31 did not meet inclusion criteria; 13 rejected to participate. The final sample comprised 180 participants. The study flow summarized in **Fig (1)**.

Participants

This cross-sectional study used a convenience non-probability sampling to allocate the participants. This study involved 180 participants of both sexes, ranging in age from 18 – 24 years old. Recruited from Cairo University's medical colleges from October 2024 to January 2025. A unique ethical number was assigned by Cairo University, Faculty of Physical Therapy, Research Ethics Committee (P.T.REC/012/005462) to this study. An additional unique figure comes from the Clinical Trials Registry, or the Registry for short ID: NCT06731634.

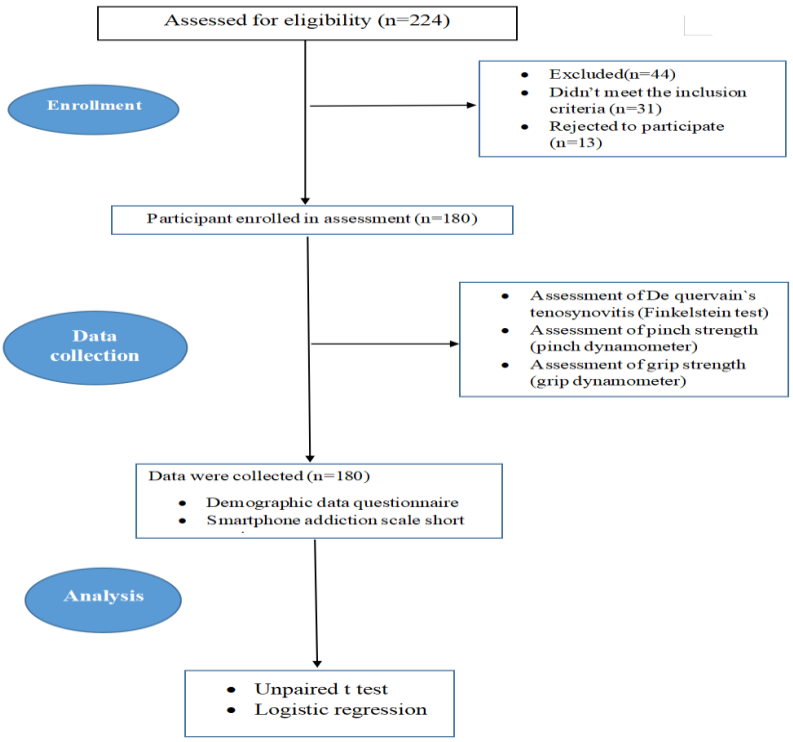

Fig (1): consort flow chart for this research

Participants in this study were limited to those who satisfied the inclusion criteria[21.22.23]:

- Asymptomatic students with normal healthy state
- Any student in all the academic years with age 18-24
- Addictive smart phone users with score over 31 for male and 33 for female students in smart phone addiction scale.
- Who own or use mobile.
- Both genders: male and female.
- Willing to participate.
- Egyptian students.

Participants who were rejected from the study if they were under the exclusion criteria[21,23]:

- Those who don't have mobile phone.
- Any previous injury or trauma or surgery and a history of rheumatoid arthritis, osteoarthritis, and deformities and changes in the shape of the finger joints.
- Those who are not willing to participate.
- Non-Egyptian students.

Assessment

All participants received identical assessments, with the same parameters consistently recorded throughout the study. The score of smartphone addiction was measured using Smartphone Addiction Scale-Short Version (SAS-SV). It`s a validated 10-item questionnaire [22]. The De Quervain`s tenosynovitis syndrome was assessed by using Finkelstein test a valid and reliable easy to apply clinical diagnostic tool[24] involves three stages[25]. The pinch strength was assessed using the pinch strength dynamometer which is a valid standardized device for measuring pinch strength[19]. The assessment of grip strength was done by the use of grip strength dynamometer which is a valid tool used for assessing grip strength[27].

Procedures

Participants completed a 10-item questionnaire to assess smartphone addiction (SAS-SV). The total score was calculated and compared to a cutoff value of values of ≥31 (males) and ≥33 (females) to determine addiction risk[22].

The Finkelstein test for De Quervain's Tenosynovitis three-stages was performed on

both hands to improve diagnostic accuracy. Stage 1 (active ulnar deviation) Position: Wrist extended over a table edge, ulnar side down. Patient actively moved wrist inward. Sharp pain at the thumb-side wrist (radial styloid) indicated a positive test result [25]. Stage 2 (passive ulnar deviation) If no pain in stage 1, examiner gently stretched the wrist inward. Increased pain at the radial styloid indicated a positive test result [25]. Stage 3 (original Finkelstein test – chronic cases) If stages 1 & 2 were negative, the thumb was tucked into the palm and wrist bent inward. Pain at the radial styloid indicated a positive test result [25].

Pinch strength dynamometer tests three types of pinch strength were measured (3 trials each) [26], those trails were were calculated to get an average for both hands. Lateral Pinch (Key-Pinch) Position: participant was seated and his elbow bent at 90°, forearm neutral. The participant pinched the gauge between thumb and side of index finger[26]. Verbal instructions to squeeze maximally (verbal encouragement was given) [26]. Two-Point Pinch (Tip-Pinch) Position: participant was seated, his elbow was bent at 90°, palm facing down. Participant pinched the gauge between thumb tip and index fingertip[26]. A verbal instruction to squeeze maximally was given[26.] Three-Point Pinch (Palmar-Pinch) Position: Participant was seated, his elbow was bent at 90°, palm facing down. Participant pinched the gauge between thumb, index, and middle fingertips[26]. A verb

al instruction to squeeze maximally was given[26.]

Grip strength dynamometer was used to measure grip strength with three trials per hand, then those trails were calculated to get an average for both hands [27]. A 60-second rest between trials was taken to prevent fatigue[26]. Position: participant was seated, elbow bent 90°, and forearm neutral. Verbal instructions to squeeze maximally the dynamometer smoothly with no jerking. The wrist movement was allowed with a slight extension during the grip[27].

Statistical analysis

Descriptive statistics of mean, standard deviation, frequencies and percentages were utilized in presenting the subjects demographic and measured data. Quantitative variables were summarized using mean and standard deviation while categorical variables were summarized using frequencies and percentage. Unpaired t test was conducted for comparison of grip strength between participants with De Quervain's tenosynovitis syndrome and healthy participants. Chi-square statistics and logistic regression were utilized to examine associations between De Quervain's tenosynovitis syndrome and subject characteristics. The level of significance for all statistical tests was set at $p < 0.05$. All statistical analysis was conducted through the statistical package for social sciences (SPSS) version 25 for windows (IBM SPSS, Chicago, IL, USA).

RESULTS

Subject's characteristics

This study involved 180 Egyptian medical students with smartphone addiction. The mean age of participants was 20.31 years. On average, participants used their phones for 5.01 hours daily. The majority of participants were aged 20-24 years (59.4%), while the rest were aged 18-19 years (40.6%). Gender distribution was nearly equal with 50.6% females and 49.4% males. 90.0% of participants were right-handed, and 10.0% were left-handed. In terms of smoking habits, 17.8% were smokers, while 82.2% were nonsmokers. The participants were equally distributed (16.7%) across six colleges, Dentistry, Medicine, Nursing, Pharmacy, Physical Therapy, and Veterinary Medicine Phone usage varied, with 19.4% classified as low users, 29.4% as moderate users, 28.9% as severe users, and 22.2% as extreme users. Primary phone usage activities included gaming (28.9%), reading (23.3%), social media (13.9%), and studying (33.9%). (Table 1). Regarding physical activity, 11.1% of participants were active, 38.3% reported no activity, and 50.6% were sedentary. The frequency of activity days ranged from 0 to 4 days per week, with 38.3% reporting zero days and 11.1% having four days of activity. Types of activities included physical activities (28.3%), creative activities (25.0%), writing (8.3%), and no activity (38.3%). (Table 2).

Table 1. Participants' characteristics

	SD ± mean	Minimum	Maximum
Age (years)	1.8720.31 ±	18	24
Phone daily usage hours	1.71 ± 5.01	2	8
	N	**%**	
Age classes			
18-19 years	73	40.6	
20-24 years	107	59.4	
Sex distribution			
Females	91	50.6	
Males	89	49.4	
Dominant hand			
Right	162	90.0	
Left	18	10.0	
Smoking			
Smokers	32	17.8	
Nonsmokers	148	82.2	
College			
Dentistry	30	16.7	
Medicine	30	16.7	
Nursing	30	16.7	
Pharmacy	30	16.7	
Physical Therapy	30	16.7	
Veterinary Medicine	30	16.7	
Phone usage classes			
Low (1-2) hours	35	19.4	
Moderate (3-4) hours	53	29.4	
Severe (5-6) hours	52	28.9	
Extreme ≥ 7 hours	40	22.2	
Primary phone usage activities			
Gaming	52	28.9	
Reading	42	23.3	
Social media	25	13.9	
Studying	61	33.9	

SD: Standard deviation

Table 2. Activity characteristics of the subjects.

	N	%
Activities days		
0	69	38.3
1	24	13.3
2	30	16.7
3	37	20.6
4	20	11.1
Type of activities		
Physical Activities (Gym, Paddle, Tennis)	51	28.3
Creative Activities (Drawing, Music, Sewing)	45	25
Writing	15	8.3
No Activity	69	38.3

Prevalence of De Quervain's tenosynovitis syndrome among Egyptian medical students with smart phone addiction: The prevalence of De Quervain's tenosynovitis syndrome among Egyptian medical students with smart phone addiction was 35.6% in the dominant hand and 16.7% in the non-dominant hand.

Comparison of grip strength between participants with De Quervain's tenosynovitis syndrome of dominant hand and healthy participants:

There was a significant decrease in lateral pinch, two points and three points pinch and grip strength in the participants with De Quervain's tenosynovitis syndrome compared with that of healthy participant ($p < 0.01$). (Table 3)

Table 3. Comparison of grip strength between participants with De Quervain's tenosynovitis syndrome of dominant hand and healthy participants.

Strength (kg)	Participants with De Quervain's tenosynovitis syndrome	Healthy participant	MD	t- value	p-value
	mean ± SD	mean ± SD			
Lateral Pinch	6.71 ± 1.38	7.50 ± 1.31	-0.79	-3.80	0.001
Two Point Pinch	3.79 ± 0.24	5.22 ± 0.51	-1.43	-25.57	0.001
Three Point Pinch	6.82 ± 1.50	7.51 ± 1.36	-0.69	-3.04	0.003
Grip Strength	27.28 ± 1.81	34.40 ± 4.24	-7.12	-15.67	0.001

SD, Standard deviation; MD: Mean difference; p value: Probability value

Association of De Quervain's tenosynovitis syndrome and subject characteristics:

There was no significant association of De Quervain's tenosynovitis syndrome with age ($p = 0.76$), sex ($p = 0.08$), hand dominance ($p = 0.17$), smoking ($p = 0.58$), college ($p = 0.15$), phone usage ($p = 0.84$), activity days ($p = 0.74$), or type of activities ($p = 0.50$). However, there was a significant association with individuals who primarily use their phones for social media ($p = 0.04$). (Table 4-5)

Table 4. The frequency of De Quervain's tenosynovitis syndrome among participants and association with subject characteristics.

	Prevalence of De Quervain's tenosynovitis syndrome		χ^2 value	p -value
	Positive	Negative		
Age classes				
18-19 years	25 (34.2%)	48 (65.8%)	0.09	0.76
20-24 years	39 (36.4%)	68 (63.6%)		
Sex				
Females	38 (41.8%)	53 (58.2%)	3.09	0.08
Males	26 (29.2%)	63 (70.8%)		
Hand dominance				
Right	55 (34%)	107 (66%)	1.82	0.17
Left	9 (50%)	9 (50%)		
Smoking				
Smokers	10 (31.2%)	22 (68.2%)	0.32	0.58
Nonsmokers	54 (36.5%)	94 (63.5%)		
College				
Dentistry	15 (50.0%)	15 (50.0%)	8.05	0.15
Medicine	14 (46.7%)	16 (53.3%)		
Nursing	6 (20.0%)	24 (80.0%)		
Pharmacy	10 (33.3%)	20 (66.7%)		
Physical Therapy	9 (30.0%)	21 (70.0%)		
Veterinary Medicine	10 (33.3%)	20 (66.7%)		
Phone usage hours				
Low (1-2) hours	11 (31.4%)	24 (68.6%)	0.85	0.84
Moderate (3-4) hours	18 (34.0%)	35 (66.0%)		
Severe (5-6) hours	21 (40.4%)	31 (59.6%)		
Extreme ≥ 7 hours	14 (35.0%)	26 (65.0%)		
Primary phone usage activities				
Gaming	14 (26.9%)	38 (73.1%)	8.34	0.04
Reading	14 (33.3%)	28 (66.7%)		
Social media	15 (60.0%)	10 (40.0%).		
Studying	21 (34.4%)	40 (65.6%)		

χ^2, Chi-squared test; p value, Probability value

Table 5. The frequency of De Quervain's tenosynovitis syndrome among participants and association with physical activity.

	Prevalence of De Quervain's tenosynovitis syndrome		χ^2 value	p -value
	Positive	Negative		
Physical activity				
Active (4-7) days	5 (25.0%)	15 (75.0%)	1.82	0.40
Sedentary (1-3) days	31 (34.1%)	60 (65.9%)		
No activity (0) days	28 (40.6%)	41 (59.4%)		
Activities days				
0	28 (40.6%)	41 (59.4%)		
1	9 (37.5%)	15 (62.5%)		
2	10 (33.3%)	20 (66.7%)	1.99	0.74
3	12 (32.4%)	25 (67.6%)		
4	5 (25.0%)	15 (75.0%)		
Type of activities				
Physical Activities	14 (27.5%)	37 (72.5%)		
Creative Activities	16 (35.6%)	29 (64.4%)		
Writing	6 (40.0%)	9 (60.0%)	2.35	0.50
No Activity	28 (40.6%)	41 (59.4%)		

χ^2, Chi-squared test; p value, Probability value

Predictors for Quervain's tenosynovitis syndrome:

A binary logistic regression was conducted to identify predictors of De Quervain's tenosynovitis syndrome among the participants. The univariate analysis showed a significant association between the primary use of phones for social media and the syndrome. Individuals who primarily used their phones for social media were 4.07 times more likely to develop De Quervain's tenosynovitis syndrome compared to those who primarily used their phones for gaming (Odds Ratio = 4.07, 95% CI 1.49-11.15, p = 0.006). (Table 6)

Table 6. Predictors of De Quervain's tenosynovitis syndrome among participants

	B	Wald	*p-value*	*Odds ratio*	*95% CI*	
					Lower	Upper
Gaming	Reference					
Reading	0.305	0.46	0.500	1.36	0.56	3.30
Social media	1.404	7.46	0.006	4.07	1.49	11.15
Studying	0.354	0.74	0.391	1.42	0.63	3.20

CI: Confidence interval,

DISCUSSION

This study aimed to investigate the prevalence and characteristics of De Quervain's Tenosynovitis Syndrome (DQT) among Egyptian medical students with smartphone addiction. The results indicated that the prevalence of DQT in the dominant hand was 35.6%, while it was 16.7% in the non-dominant hand. These finding is high like previous studies as a study reported a prevalence 50% of physiotherapy students experienced DQT[5,6] and another one reported a 52% prevalence of

DQT among college students[6]. Those findings suggest a strong link between excessive smartphone usage and the development of DQT[5,6]. The increase in the dominant hand, because it often used with greater frequency and force, it is more prone to wear and tear, which can accelerate tendon degeneration[28]. The study found a statistically significant decrease in grip and pinch strength (lateral, two-point, and three-point). The grip strength result aligns with previous studies that have highlighted the adverse impact of De quervain`s tenosynovitis on hand function, particularly in activities that demand strong gripping or grasping[29,30]. Also, the pinch strength findings align with existing literature that found the DQT cause a decrease in lateral, two-point, and three-point pinch strength due to pain[18,19]. Interestingly, no significant associations were found between De quervain`s tenosynovitis prevalence and demographic factors such as age and sex which is matched with previous studies[6,31,32]. While hand dominance, smoking habits, and levels of physical activity have no significant associations too, there are a lack of studies about their association with De quervain`s tenosynovitis. On the other hand, a significant association was observed between social media usage and the occurrence of De quervain`s tenosynovitis. Participants who primarily used their smartphones for social media were found to be more likely to develop De quervain`s tenosynovitis compared to those who used their phones for other purposes, such as studying or gaming. This finding is consistent with research that has identified social media usage as a major contributor to musculoskeletal disorders due to the repetitive thumb movements involved in scrolling and interacting with content while using social media[6]. Also, our study found that with social media users being over four times more likely to develop the condition compared to those using their phones for gaming.

Limitations

Despite the significant findings, the study is subject to several limitations. The cross-sectional design prevents the establishment of causality between smartphone use and DQT. Furthermore, the study was limited to a single university, which may restrict the generalizability of the findings to a broader population. Additionally, reliance on self-reported data regarding smartphone usage patterns and hours may introduce recall bias

Conclusion

De Quervain's Tenosynovitis Syndrome (DQT) is a prevalent condition among Egyptian medical students with smartphone addiction, affecting approximately 35.6% of students in the dominant hand and 16.7% in the non-dominant hand. A significant proportion of students exhibited reduced grip and pinch strength and it's mostly associated with the use of smartphone for social media.

Recommendation

Future research should focus on larger, multi-center studies to validate these findings and explore other potential risk factors for De quervain`s tenosynovitis among different populations. Intervention strategies, such as ergonomic education and hand exercise programs, should be considered to mitigate the impact of excessive smartphone use on musculoskeletal health.

Abbreviations

DQT – De Quervain's Tenosynovitis Syndrome **APL** – Abductor Pollicis Longus
EPB – Extensor Pollicis Brevis
SAS-SV – Smartphone Addiction Scale-Short Version
Kg- Kilogram

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Declarations Ethics clearance and participation consent

The Research Ethics Committee of Cairo University's Faculty of Physical Therapy approved the study and assigned it a special ethical number: P.T.REC/012/005462. The Clinical Trials Registry, which is identified by the Registry ID: NCT06731634, provides an additional distinct number.

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Conflicting interests

The authors claim they don't have any conflict of interest.

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