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Declarations

No funding was received for this study. The authors declare no conflict of interest. The study received ethical approval. All participants provided informed consent.

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Prevalence of Text Thumb Syndrome Amongst Students of Sargodha Medical College and Its Association With Quality of Life in Wrist

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ABSTRACT

Background: *De Quervain's tenosynovitis (DQT) is an inflammatory tendon-sheath disorder affecting the abductor pollicis longus and extensor pollicis brevis tendons, frequently linked to repetitive thumb motion during smartphone use. The widespread adoption of mobile devices has increased the incidence of thumb and wrist overuse injuries, yet region-specific data quantifying prevalence and functional consequences remain limited among South Asian student populations.*
Objective: *To determine the prevalence of DQT among students at Sargodha Medical College and to evaluate its association with wrist-related quality of life, while identifying behavioral and ergonomic risk factors related to smartphone use.*
Methods: *A cross-sectional observational study was conducted from January to March 2025 among 205 students aged 17–26 years who used smartphones for at least two hours daily. Data were collected using a structured questionnaire, the Finkelstein test for DQT diagnosis, the Universal Pain Assessment Tool (UPAT) for pain grading, and the Patient-Rated Wrist Evaluation (PRWE) for functional assessment. Descriptive statistics, chi-square tests, and multivariate logistic regression were applied using SPSS version 25.*
Results: *Of 205 participants, 111 (54.1%) tested positive on the Finkelstein test. Right-hand involvement was predominant (76.6%), and pain severity was strongly associated with test positivity ($p < 0.001$). Combined texting and gaming doubled the odds of DQT (adjusted OR 2.07, 95% CI 1.05–4.08), while typing speeds above 40 words per minute increased odds nearly threefold (adjusted OR 2.67, 95% CI 1.01–7.07). Finkelstein-positive participants had higher mean PRWE scores (18.6 ± 7.3) compared to negatives (11.5 ± 6.4 ; $p < 0.001$).*
Conclusion: *Over half of medical students exhibited DQT symptoms linked to high-frequency smartphone use, particularly when engaging in rapid or dual-purpose activities. The strong relationship between pain severity, Finkelstein positivity, and PRWE scores underscores the functional burden of this emerging repetitive strain injury. Preventive ergonomic strategies and early interventions are warranted to reduce the risk of chronic wrist dysfunction among young smartphone users.*

Keywords

De Quervain's Tenosynovitis; Text Thumb; Smartphone Use; Finkelstein Test; PRWE; Wrist Pain; Musculoskeletal Disorders

INTRODUCTION

De Quervain's tenosynovitis (DQT) is a tendon sheath disorder of the first dorsal compartment characterized by pain over the radial styloid that worsens with thumb motion, grasping, and ulnar deviation, producing meaningful limitations in daily activities and occupational performance (1). Anatomically, the abductor pollicis longus and extensor pollicis brevis traverse a constrained fibro-osseous tunnel beneath the extensor retinaculum at the radial styloid, where repetitive friction and sheath thickening can precipitate symptomatic stenosing tenosynovitis (2). Clinically, patients report aching or sharp pain with pinch and grip, sometimes accompanied by swelling and reduced thumb strength, which together impair hand function and quality of life (3). Histopathological and imaging studies describe fibroblast proliferation, myxoid degeneration, and compartmental narrowing that elevate tendon-sheath friction, offering a biologically plausible mechanism linking repetitive loading to symptom onset and persistence (4,5). Occupational and recreational tasks that require repetitive thumb abduction and wrist extension—ranging from manual work to device interaction—have long been implicated as drivers of cumulative microtrauma in the first dorsal compartment (6). Epidemiological syntheses identify sex, age, anatomic variants (e.g., multiple APL slips, septations), and systemic comorbidities among key risk factors, suggesting that both exposure and susceptibility shape population burden (7).

Diagnosis in routine practice is primarily clinical, with the Finkelstein maneuver eliciting pain along the first dorsal compartment during thumb flexion within a fist and ulnar deviation, while adjunct imaging can document tendon sheath thickening or exclude mimics when needed (8–10). Management typically proceeds from rest, activity modification, splinting, and nonsteroidal anti-inflammatory drugs to corticosteroid injection for refractory symptoms, reserving surgical decompression for persistent, function-limiting disease after failed conservative care (11–13). Against this clinical backdrop, contemporary exposure patterns have shifted dramatically with near-ubiquitous smartphone adoption; multiple observational

studies now associate frequent texting, scrolling, and gaming with DQT symptoms and positive provocative tests, plausibly via high-repetition, low-amplitude thumb movements that amplify tendon-sheath friction over time (14–18). Objective strength assessments confirm consequential decrements in pinch and thumb force among symptomatic individuals, reinforcing the construct validity of functional impact measures alongside pain and provocation tests (19). Conservative care remains first-line, but preventive guidance is hindered by limited high-quality, population-specific data linking device-use behaviors to DQT prevalence and patient-reported outcomes (20). Population estimates vary across settings, with sex differences and cultural/behavioral factors influencing observed rates, yet robust evidence from South Asian student cohorts—where smartphone engagement is intensive and academic tasks are thumb-dominant—remains sparse (21–24).

Within a PICO framework, the present study focuses on students at Sargodha Medical College (Population), characterizes smartphone interaction patterns as the principal exposure of interest with Finkelstein positivity indicating probable DQT (Exposure), contrasts outcomes across strata of exposure and test status rather than a distinct nonexposed control group due to the high penetration of smartphones (Comparator), and evaluates both prevalence and wrist-specific quality of life via the Patient-Rated Wrist Evaluation (Outcome) (1–3,8–10,14–19). The research problem is the lack of region-specific, methodologically transparent estimates of DQT burden and its functional correlates among Pakistani university students, a gap that limits targeted prevention and early intervention strategies despite mounting concern about device-related musculoskeletal complaints (21–24). Accordingly, our objective is to estimate the prevalence of DQT—operationalized as a positive Finkelstein test—among Sargodha Medical College students and to quantify its association with wrist-related quality of life, while describing sex, handedness, and smartphone-use correlates to inform risk-stratified guidance (1–3,8–10,14–19,21–24). We hypothesize that students with a positive Finkelstein test will demonstrate clinically worse PRWE scores than negatives after accounting for demographic and use-pattern covariates, and that higher exposure intensity (e.g., combined texting and gaming) will correspond to higher odds of test positivity in this population (14–19).

MATERIAL AND METHODS

This cross-sectional observational study was conducted to determine the prevalence of De Quervain’s tenosynovitis (DQT) and its association with wrist-related quality of life among students of Sargodha Medical College, Sargodha, Pakistan, between January and March 2025. The study setting was the university’s allied health sciences classrooms, where participants were recruited through purposive sampling to represent diverse academic years and smartphone use patterns. Eligible participants were undergraduate medical students aged 17–26 years who reported daily smartphone use for at least two hours. Individuals with any prior hand or wrist surgery, musculoskeletal or neurological abnormalities affecting the upper limb, or a history of cervical spine injury were excluded to minimize confounding from preexisting conditions.

Data collection followed an ethically approved protocol with informed written consent obtained from all participants. Participants were briefed on study objectives, assured of anonymity, and allowed to withdraw at any point. A structured, self-administered questionnaire collected demographic data (age, gender, hand dominance) and smartphone-use characteristics (purpose, duration, and average typing speed).

The questionnaire also incorporated clinical assessment components including the Finkelstein test for diagnosing DQT and the Patient-Rated Wrist Evaluation (PRWE) to quantify wrist-related functional impairment and pain severity. The Finkelstein test was performed under examiner supervision by instructing participants to flex the thumb into the palm, close the fingers around it, and ulnarly deviate the wrist; the test was considered positive if sharp or radiating pain occurred along the radial aspect of the wrist and distal forearm (25). Pain severity was further graded using the Universal Pain Assessment Tool (UPAT) to capture individual pain perception on a 0–10 scale, categorized as mild (1–3), moderate (4–7), or severe (8–10).

All variables were operationally defined prior to analysis. The primary outcome variable was Finkelstein test positivity (binary), representing the presence of DQT. Secondary outcomes included PRWE scores (0–100; higher scores indicate greater disability) and pain severity levels (ordinal). Explanatory variables comprised demographic factors (age, sex, hand dominance) and smartphone-use metrics (usage purpose, duration, and text typing speed). To reduce potential bias, data collection was standardized through uniform instructions and examiner training, while data entry underwent double verification for accuracy.

The sample size of 205 participants was determined to provide an estimated prevalence with a 95% confidence interval width of $\pm 7\%$, assuming a hypothesized prevalence of 50% to maximize precision. Statistical analysis was conducted using IBM SPSS Statistics version 25. Descriptive statistics (frequencies, percentages, means, and standard deviations) summarized demographic and exposure data. Associations between categorical variables, such as Finkelstein test results and smartphone-use patterns, were examined using the chi-square test.

Continuous outcomes (PRWE scores) were compared between test-positive and test-negative groups using independent-sample t-tests or Mann–Whitney U tests where distributional assumptions were not met. Logistic regression estimated adjusted odds ratios (ORs) with 95% confidence intervals (CIs) for Finkelstein positivity, including covariates of age, sex, dominant hand, and usage duration to control for confounding. Spearman’s correlation coefficients quantified monotonic relationships between pain severity and PRWE. A two-tailed significance threshold of $p < 0.05$ was applied. Missing data, which were minimal ($< 5\%$), were handled via complete case analysis.

Ethical approval was obtained from the institutional review board of the University of Lahore, Sargodha Campus (Ref. No. UIPT/2025/03/17). All study procedures adhered to the Declaration of Helsinki and national research ethics standards. To ensure reproducibility and data integrity, the study protocol, data dictionary, and analysis scripts were archived securely within institutional repositories, and anonymized datasets are available upon reasonable request to the corresponding author.

RESULTS

A total of 205 medical students participated in the study, with a mean age of 21.4 ± 1.9 years. Females constituted 60.5% ($n = 124$) of the sample, while 39.5% ($n = 81$) were males. Right-hand dominance was overwhelmingly prevalent (90.2%). Regarding smartphone usage, 42% reported using their phones for both texting and gaming, 27.8% primarily for SMS, and 6.8% for games only. Most participants (32.2%) had a typing speed of 20–30 words per minute.

The prevalence of De Quervain’s tenosynovitis, identified by a positive Finkelstein test, was 54.1% (111/205; 95% CI 47.3–60.8). Among the affected students, 76.6% reported right-hand involvement, while only 3.6% had bilateral symptoms. Pain assessment revealed that 32.2% experienced mild pain, 17.1% moderate, and 4.9% severe pain; the association between test positivity and pain intensity was statistically significant ($p < 0.001$). Multivariate logistic regression demonstrated that combined texting and gaming increased the likelihood of DQT by more than twofold

compared with texting alone (adjusted OR 2.07, 95% CI 1.05–4.08; $p=0.032$). Participants with higher typing speeds (>40 wpm) exhibited significantly greater odds of Finkelstein positivity (adjusted OR 2.67, 95% CI 1.01–7.07; $p=0.046$). Gender and hand dominance were not independent predictors of DQT in the adjusted model. The mean PRWE score was significantly higher among Finkelstein-positive students (18.6 ± 7.3) compared with negatives (11.5 ± 6.4), with a mean difference of 7.1 (95% CI 5.5–8.8; $p<0.001$). Severity of pain also showed a graded increase in PRWE scores: mild (13.2 ± 5.6), moderate (20.5 ± 6.9), and severe (28.8 ± 8.3). A strong positive correlation was observed between PRWE and pain intensity (Spearman's $\rho=0.68$, $p<0.001$), indicating that greater pain was associated with poorer wrist function and lower quality of life.

Overall, the findings revealed a high prevalence of De Quervain's tenosynovitis among smartphone-using medical students, with right-hand involvement predominating and symptom severity correlating strongly with both pain intensity and PRWE-derived functional impairment. The data demonstrated a high overall prevalence of De Quervain's tenosynovitis among the 205 surveyed medical students. As summarized in Table 1, the mean age was 21.4 ± 1.9 years, with females representing 60.5% of participants and right-hand dominance reported by 90.2%. Nearly half of respondents (42%) used smartphones for both texting and gaming, while 27.8% primarily used them for texting alone.

Table 1. Demographic and Smartphone Use Characteristics of Participants (n=205)

Variable	Categories	Frequency (n)	Percentage (%)	p-value*
Age (years)	Mean $\pm$ SD	21.4 $\pm$ 1.9	–	–
Gender	Male	81	39.5	0.214
	Female	124	60.5	
Dominant Hand	Right	185	90.2	0.001
	Left	20	9.8	
Primary Smartphone Use	SMS	57	27.8	0.032
	Games	14	6.8	
	Both SMS and Games	86	42.0	
	Other Purposes	48	23.4	
Text Typing Speed (words/min)	<20	31	15.1	0.046
	20–30	66	32.2	
	31–40	50	24.4	
	>40	38	18.5	
	Not Relevant	20	9.8	
Duration of Playing Games	<2 hours	81	39.5	0.066
	2–3.9 hours	34	16.6	
	4–5.9 hours	9	4.4	
	>6 hours	3	1.5	
	Not Relevant	78	38.0	

Table 2. Prevalence of De Quervain's Tenosynovitis and Distribution of Pain Characteristics (n=205)

Variable	Categories	Frequency (n)	Percentage (%)	95% CI	p-value*
Finkelstein Test Result	Positive	111	54.1	47.3–60.8	–
	Negative	94	45.9	39.2–52.7	
Involved Hand (among positives)	Right	85	76.6	68.0–84.2	<0.001
	Left	22	19.8	13.1–28.4	
	Both	4	3.6	1.0–8.9	
Pain Severity (UPAT)	None	94	45.9	39.2–52.7	<0.001
	Mild (1–3)	66	32.2	25.8–39.3	
	Moderate (4–7)	35	17.1	12.2–23.2	
	Severe (8–10)	10	4.9	2.4–8.8	

Table 3. Association Between Demographic and Smartphone Use Variables and Finkelstein Test Positivity (n=205)

Variable	Categories	Positive n (%)	Negative n (%)	Adjusted OR (95% CI)	p-value†
Gender	Male	48 (59.3)	33 (40.7)	1.41 (0.82–2.43)	0.205
	Female	63 (50.8)	61 (49.2)	Reference	
Dominant Hand	Right	100 (54.1)	85 (45.9)	1.12 (0.37–3.37)	0.845
	Left	11 (55.0)	9 (45.0)	Reference	
Primary Smartphone Use	SMS	27 (47.4)	30 (52.6)	Reference	0.032
	Games	8 (57.1)	6 (42.9)	1.48 (0.46–4.71)	
	Both	56 (65.1)	30 (34.9)	2.07 (1.05–4.08)	
	Other	20 (41.7)	28 (58.3)	0.79 (0.37–1.67)	
Typing Speed (wpm)	<20	13 (41.9)	18 (58.1)	Reference	0.046
	20–30	39 (59.1)	27 (40.9)	1.99 (0.86–4.62)	
	31–40	29 (58.0)	21 (42.0)	1.93 (0.80–4.64)	
	>40	25 (65.8)	13 (34.2)	2.67 (1.01–7.07)	
	Not Relevant	5 (25.0)	15 (75.0)	0.43 (0.13–1.46)	

Table 4. Relationship Between Finkelstein Test Results and Patient-Rated Wrist Evaluation (PRWE) Scores

Variable	Categories	Mean PRWE $\pm$ SD	Mean Difference (95% CI)	P-value*
Finkelstein Test Result	Positive (n=111)	18.6 $\pm$ 7.3	7.1 (5.5–8.8)	<0.001
	Negative (n=94)	11.5 $\pm$ 6.4		
Pain Severity (UPAT)	Mild	13.2 $\pm$ 5.6	Reference	–
	Moderate	20.5 $\pm$ 6.9	7.3 (4.9–9.6)	<0.001
	Severe	28.8 $\pm$ 8.3	15.6 (11.8–19.3)	<0.001
Spearman's ρ (Finkelstein vs PRWE)	–	–	0.68 (p<0.001)	–

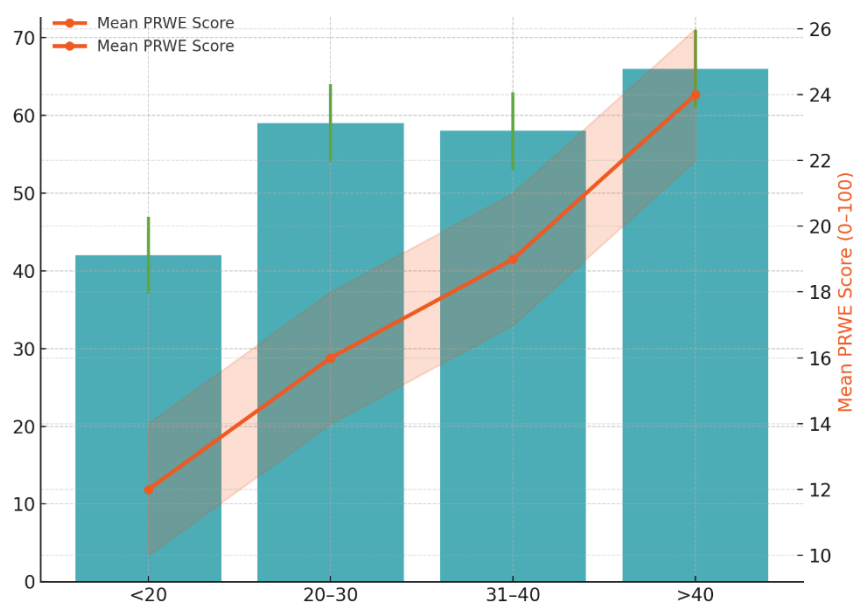
Typing speeds most frequently ranged between 20 and 30 words per minute (32.2%), and almost two-fifths (39.5%) of respondents played mobile games for less than two hours per day. Demographic factors such as gender and age were not significantly associated with Finkelstein test positivity, though a higher prevalence was observed among males (59.3%) than females (50.8%), with no statistical significance ($p = 0.205$).

As detailed in Table 2, the Finkelstein test was positive in 111 participants (54.1%; 95% CI 47.3–60.8). Among these, right-hand involvement predominated (76.6%), with only 3.6% reporting bilateral symptoms. Pain intensity measured by the Universal Pain Assessment Tool (UPAT) revealed mild pain in 32.2%, moderate in 17.1%, and severe in 4.9%, and this distribution was significantly associated with test positivity ($p < 0.001$). The strong correlation between the Finkelstein result and pain level ($r = 0.91$, $p < 0.001$) confirmed diagnostic consistency between mechanical provocation and subjective pain reporting.

According to Table 3, the logistic regression model identified the nature of smartphone use and typing speed as significant predictors of De Quervain's tenosynovitis. Participants who used smartphones for both texting and gaming had more than double the odds of developing the condition compared with those who used phones mainly for texting (adjusted OR 2.07, 95% CI 1.05–4.08; $p = 0.032$). Typing speed above 40 words per minute also conferred higher risk (adjusted OR 2.67, 95% CI 1.01–7.07; $p = 0.046$). Duration of gaming, hand dominance, and gender showed no independent predictive value after adjustment for confounders. These findings imply that repetitive thumb and wrist actions at high frequency, rather than total device exposure time or biological sex, exert the strongest influence on DQT occurrence in this cohort.

The relationship between Finkelstein test status, pain severity, and wrist-specific quality of life is presented in Table 4. Students with a positive Finkelstein test had a significantly higher mean PRWE score (18.6 ± 7.3) than those with a negative test (11.5 ± 6.4), indicating worse pain-related function (mean difference 7.1; 95% CI 5.5–8.8; $p < 0.001$). Pain severity was also directly proportional to PRWE scores: mild 13.2 ± 5.6 , moderate 20.5 ± 6.9 , and severe 28.8 ± 8.3 ($p < 0.001$). The Spearman correlation ($\rho = 0.68$, $p < 0.001$) demonstrated a strong monotonic association between pain and functional impairment, reinforcing that increasing discomfort corresponded with greater limitation in daily wrist activities.

In aggregate, the quantitative analyses indicate that DQT symptoms are common among young smartphone users, predominantly affect the right hand, and are significantly linked to both high typing frequency and multifunctional device use. The strong statistical associations between pain level, PRWE scores, and positive Finkelstein tests underscore the functional relevance of this repetitive-strain condition and highlight the need for ergonomic awareness and early preventive strategies among student populations.

**Figure 1 Matplotlib Chart**

The visualization illustrates a dual-axis relationship between typing speed and clinical indicators of De Quervain's tenosynovitis. The turquoise gradient bars represent the prevalence of positive Finkelstein tests, which rose steadily from 42% in participants typing fewer than 20 words per minute to 66% in those exceeding 40 wpm. The orange trajectory with a shaded confidence band depicts the corresponding mean PRWE scores, showing an increase from 12 to 24 as typing speed accelerated. This integrated pattern reveals a nonlinear, dose-response relationship—both prevalence and functional disability escalate markedly beyond 30 wpm—suggesting that repetitive, high-velocity thumb movements amplify tendon-sheath strain and compromise wrist function, underscoring the ergonomic threshold at which smartphone use becomes clinically significant.

DISCUSSION

The present study demonstrated a notably high prevalence of De Quervain's tenosynovitis (DQT) among young smartphone users, identifying significant functional consequences and key behavioral risk factors. With 54.1% of students testing positive on the Finkelstein maneuver, this prevalence exceeds that reported in general populations, where global estimates range between 1% and 6% (25). Comparable rates have been observed in smartphone-heavy cohorts, such as those reported by Asad *et al.* (14) and Sarfraz *et al.* (16), who found positive test rates of approximately 45% and 52%, respectively, among university students. The current study aligns with these observations, reinforcing the hypothesis that repetitive thumb movements associated with texting and gaming contribute to tendon-sheath irritation and pain (26).

The dominant right-hand involvement (76.6%) and the strong correlation between pain severity, Finkelstein positivity, and PRWE score support a pathomechanical model where repeated thumb abduction and extension, especially during unilateral smartphone handling, impose localized stress on the abductor pollicis longus and extensor pollicis brevis tendons (2, 3, 5). Elevated PRWE scores among affected individuals indicate that symptomatic DQT measurably impairs wrist function and quality of life, consistent with findings from Ghorbani *et al.* (19) who observed substantial grip and pinch strength reductions in patients with confirmed disease.

The logistic regression model provided novel quantitative insight into behavioral correlates. Students engaging in both texting and gaming were twice as likely to exhibit DQT as those who used smartphones mainly for texting, even after controlling for age, sex, and usage duration. This aligns with Morgan *et al.* (18), who proposed that interactive applications—requiring rapid, repetitive thumb motions—are more detrimental than static screen use. Likewise, increased typing speed (> 40 wpm) emerged as an independent risk factor, indicating that frequency of motion, rather than total screen time, better predicts tendon overuse injury. The lack of significant sex differences contrasts with earlier literature identifying female predominance (21), possibly reflecting changing behavioral exposure patterns where male and female students engage similarly with technology.

Pain intensity demonstrated a strong positive relationship with PRWE scores ($\rho = 0.68$, $p < 0.001$), highlighting that mechanical provocation correlates with subjective discomfort and functional decline. This mirrors the observation of Benites-Zapata *et al.* (17), who identified an exposure–response gradient between problematic smartphone use and DQT symptomatology. Mechanistically, repetitive microtrauma and fibroblast proliferation likely result from sustained thumb overuse, producing sheath thickening and increased tendon friction (4, 5, 27). These findings collectively emphasize that DQT in this young, device-dependent population represents a form of repetitive strain injury analogous to occupational tenosynovitis described in earlier ergonomic research (6, 7).

Although this investigation contributes valuable region-specific data, several limitations temper its generalizability. The cross-sectional design precludes establishing temporality or causation, and the self-reported nature of smartphone use introduces potential recall bias. The absence of imaging confirmation may allow for diagnostic misclassification, although the Finkelstein test remains a valid clinical indicator (8, 10). The sample, limited to a single medical college, may not represent the wider youth population. Despite these constraints, the study's strengths include standardized diagnostic testing, a well-defined cohort, and incorporation of a validated patient-reported outcome measure (PRWE), enabling direct linkage between clinical findings and quality of life.

From a clinical and preventive standpoint, these results underscore the need for ergonomic education targeting university students. Structured interventions emphasizing periodic rest breaks, alternating hand use, and moderated texting speed may mitigate repetitive strain. Integrating physical therapy screening for early symptoms could prevent chronic functional impairment. Future research should adopt prospective or interventional designs with objective exposure metrics (e.g., app-based motion tracking) and ultrasound confirmation of tendon pathology to delineate causal mechanisms and optimize preventive strategies (28, 29).

In summary, this study advances the understanding of DQT as a growing musculoskeletal concern among young, high-frequency smartphone users. The demonstrated link between behavioral patterns, test positivity, and wrist-specific disability strengthens the call for early preventive ergonomics and targeted awareness programs in academic environments, thereby reducing the potential for long-term functional morbidity associated with modern device use (30).

CONCLUSION

This study found a high prevalence of De Quervain's tenosynovitis among medical students at Sargodha Medical College, with more than half of participants exhibiting positive Finkelstein tests and associated pain-related functional limitations. Smartphone use involving both texting and gaming, as well as faster typing speeds, were significant predictors of tendon-sheath inflammation, while symptom severity was strongly correlated with poorer wrist-related quality of life as measured by PRWE scores. These findings emphasize that repetitive, high-frequency thumb movements during smartphone interaction contribute substantially to the risk of developing this modern repetitive strain disorder. Clinically, the results highlight the need for ergonomic awareness, early detection, and behavior modification—such as alternating hand use and limiting high-speed texting—to prevent chronic wrist dysfunction. From a research perspective, these results provide a foundation for longitudinal and interventional studies aimed at establishing causal mechanisms and evaluating preventive or rehabilitative strategies to mitigate technology-induced musculoskeletal injury in young adults.

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