Prevalence of De-Quervain’s Tenosynovitis among Smartphone Gamers among University Students of Multan

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Abstract:
Background: De Quervain's tenosynovitis is an inflammatory condition of wrist joint resulting in pain, swelling and tenderness on the side of thumb. Repeated thumb movements and overuse of wrist joint contribute to the severity of symptoms. Objectives: To measure the prevalence of De Quervain’s tenosynovitis in cell phone gamers and its relationship to the frequency of cell phone usage/number of hours among gamers. Methods: A cross sectional survey was conducted using self-made questionnaire and a valid and reliable Finkelstein’s test was used. The study population was young students of Multan and the data of 300 students was taken. The data was collected from both male and female students using purposive sampling technique. Results: There were 13% gamers having De Quervain’s tenosynovitis. 31% were females and 69% were male students. De Quervain’s tenosynovitis was associated with game playing hours as the statistical analysis showed strong association between tenosynovitis and game playing hours having P-value=0.000. Moreover 87 students felt stressed during playing games and students reported that they felt difficulty during gripping of the objects, twisting the keys and typing on keyboard. Conclusion: Study concluded that De Quervain’s tenosynovitis is prevalent among phone gamers in both male and female and game playing hours was associated with De Quervain’s tenosynovitis. Increase in game playing ours increased the incidence of DQT.

Keywords: De Quervain’s tenosynovitis, Cell phone, Young adult, Finkelstein test, Repetitive movements, Wrist pain.

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Introduction:

De Quervain’s tenosynovitis is known as entrapment tendinitis of the tendons of abductor muscles of thumb at the styloid process of the radius which induces pain on movement. Repeated
movements of thumb and wrist joint are responsible for the pain (Tamura, Shikino, Uchida, & Ikusaka, 2020). Smartphone overuse has become an increasing cause of De Quervain’s tenosynovitis among the youth, who make up a substantial number of smart phone users, as it includes repeated thumb movements (Ahmed, Iftikhar, Javed, Warda, & Samad, 2019). Utilizing electronic devices or other equipment that require frequent usage and movement of the thumb results in increased thumb load and, as a result, a higher frequency of musculoskeletal problems (Baabdullah et al., 2020). Patients may feel dysesthesias, which include numbness, tingling, burning and cramping in addition to pain (Sehar, Ashraf, Rasool, & Raza, 2018). This disease is getting common like arthritis (Anwar, Sarwar, Anjum, & Bashir).

Finkelstein's test, often known as Finkelstein's sign, was first described by an American surgeon. It has been a classic test for the diagnosis of De Quervain’s tenosynovitis. Patient may experience considerable soreness and have sensitivity to pain when they flex thumb on the radial side of the wrist towards the palmar aspect and passively deviate it at ulnar side (Som, Wermuth, & Singh, 2020). Mobile phones have become an integral part of the daily lives of today's youth. Overuse syndrome might develop as a result of the constant use of hand-held gadgets, resulting in De Quervain’s tenosynovitis (Shah & Sheth, 2018).

The prevalence of a subcompartment within the extensor compartment housing extensor pollicis brevis tendon varied greatly in the literature, notably in terms of rates of incidence across genders and between people with and without De Quervain’s. They anticipated that the prevalence of a septated compartment was significantly higher than previously reported, particularly in patients with DQT, based on direct intra-operative observation (Beutel, Doscher, & Melone Jr, 2020). De Quervain’s tenosynovitis affected approximately 1.3% of women and 0.5% of men of young age with peaks in the 40s and 50s, respectively. It was thought to be caused by over activity, vigorous, stressful working terms of ergonomics, hormonal imbalance, pregnancy, inflammatory diseases, anatomical variations, injury and drugs like fluoroquinolones (Stahl et al., 2015). De Quervain’s tenosynovitis was found in 28% in the left hand and 72 % of the positive results in the right hand. As a result, it was determined that tailors have a high frequency of De Quervain’s tenosynovitis (Maurya, Priyanka, & Palkar, 2020).

De Quervain’s tenosynovitis also known as overuse tenosynovitis was characterised by the extensor retinaculum thickening, which covered the first dorsal compartment. This condition was
triggered by repetitive activities, such as wringing out clothes, hammering, skiing and knitting with thumb and wrist joint (Goel & Abzug, 2015).

**Materials and methods:**

This cross sectional study was conducted at the Universities of Multan. The targeted population was students who used Smartphones for hours to play games, sample size of 300 was taken and the study tenure was of 16 weeks. Inclusion criteria was female and male students of age between 18 to 30 years, Minimum playing hours must be 2 hours, Playing games which use both thumbs. Students with previous wrist injury, prior wrist surgery or any orthopedic disease were excluded from study.

A self-made questionnaire consisting for 12 questions was used to find out the frequency of De Quervain’s tenosynovitis. Permission was taken from a higher authority to conduct the survey in the Universities and Institutes. A consent form was signed by students indicating that they agreed to fill out the questionnaire. All the collected data was analyzed by the SPSS version 22 software. Finkelstein's test was performed that helped in confirmation of DQT.

![Finkelstein's Test](image.png)

**Fig. 1:** Finkelstein’s Test (Wu, Rajpura, & Sandher, 2018)

**Results:**

Demographics of the participants are showed in the table
Table 1: Demographics of participants

<table>
<thead>
<tr>
<th>Demographics of Participants</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male 69%</td>
<td>Female 31%</td>
</tr>
<tr>
<td>Age</td>
<td>Mean 21.75</td>
<td>SD 2.14</td>
</tr>
<tr>
<td>Weight</td>
<td>Mean 61.4</td>
<td>SD 10.4</td>
</tr>
</tbody>
</table>

Prevalence of De-Quervain’s tenosynovitis is shown in a pie chart below that shows tenosynovitis was positive among 13% of the students who were playing games on smartphones. Prevalence was estimated on the positivity of the Finkelstein’s test.

![Prevalence of De-Quervain's Tenosynovitis](image)

**Fig. 2:** Prevalence of De-Quervain’s Tenosynovitis

Table 02: Cross Tabulation Game playing hours and DQT

<table>
<thead>
<tr>
<th>Game Playing hours</th>
<th>De Quervain’s tenosynovitis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>2-4 hours</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>5-6 hours</td>
<td>9</td>
<td>75</td>
</tr>
<tr>
<td>7-8 hours</td>
<td>24</td>
<td>120</td>
</tr>
<tr>
<td>&gt;8 hours</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>261</td>
</tr>
</tbody>
</table>
Table 02 showed game playing hours and presence or absence of de Quervain’s tenosynovitis. Pearson Chi-square p=0.000 showed there is statistical association between DQT and game playing hours on mobile phone.

**Discussion:**

The prevalence was evaluated using the Finkelstein’s test and Eichhoff test. The test revealed that out of 100% of the students, 13% gamers were having De Quervain’s tenosynovitis and 87% were not suffering from De Quervain’s tenosynovitis. Findings of current study were supported by Zirek, et al the study showed that 8.2% to 89.9% of mobile phone users reported experiencing MSK problems and the most common symptom was wrist pain (Zirek, Mustafaoglu, Yasaci, & Griffiths, 2020). Furthermore a study analyzed 53% of the population were tested positive for the Finkelstein test and that was related to the use of the smartphones. Additionally, it was reported that there was a higher prevalence of DQT symptoms associated with daily smartphone usage hours (Benites-Zapata, Jiménez-Torres, & Ayala-Roldán, 2021). Another survey conducted among smartphone users showed that 246 participants (49%) scored favorably on Finkelstein’s test. The statistical analysis revealed a substantial correlation between the frequency of game playing hours and de Quervain’s disease (Ma et al., 2019).

Current research measured the association between De Quervain’s tenosynovitis and game playing hours, Chi-Square showed that there was statistical significance or association (p<0.005) between tenosynovitis and game playing hours. Above results are similar to a study that observed increased positive Finkelstein’s test results as the frequency of mobile phone usage increased which indicates both cell phone usage and DQT were statistically significant (p value 0.000) (Ali et al., 2014). Whereas, on the contrary another research suggested that the specific association between mobile phone usage and wrist disorder were unknown. the evidence on MSK complaints among mobile phone users was fairly restricted (Zirek et al., 2020).

**Conclusion:**

The study concluded that few participants were suffering from De Quervain’s tenosynovitis and all of them had positive Finkelstein’s test, out of which more participants test was positive on right side and less participants test was positive on left side. From the above study and results, it was concluded that increase number of game playing hours increases the prevalence of De Quervain’s tenosynovitis and there is association between these two.
In future further study must be conducted using larger sample size and must be involving all age groups.

References


Anwar, M., Sarwar, S., Anjum, M., & Bashir, M. JOURNAL OF CONTEMPORARY PHARMACY.


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