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ESPAÇO PARA A SAÚDE

RESEARCH

RISK OF DEVELOPING DE QUERVAIN'S TENOSYNOVITIS IN MEDICAL STUDENTS: A CROSS-SECTIONAL STUDY

Risco de desenvolvimento de tenossinovite de De Quervain em acadêmicos de medicina: um estudo transversal

Riesgo de desarrollo de tenosinovitis de De Quervain en estudiantes de medicina: un estudio transversal

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ABSTRACT

This study aimed to investigate the prevalence of De Quervain's tenosynovitis among medical students and identify associated risk factors, using Finkelstein's test as a diagnostic tool. A cross-sectional observational study was conducted with 73 students from the University of Rio Verde, who completed a questionnaire regarding personal data and daily habits, followed by a clinical test. Statistical analysis was performed using Chi-square, Mann-Whitney, and Spearman correlation tests. Among the participants, 61.64% tested positive. No significant associations were found with sex, medication use, physical activity, or study time. Excessive *smartphone use* was not significantly associated with positive findings. In conclusion, the results suggest a relevant link between De Quervain's tenosynovitis and symptoms such as stiffness, previous reports of pain, and orthosis use.

Keywords: De Quervain Disease. Students, Medical. Smartphone.

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RESUMO

O estudo teve como objetivo investigar a prevalência da Tenossinovite de De Quervain em acadêmicos de medicina e identificar fatores de risco associados, utilizando o teste de Finkelstein como ferramenta diagnóstica. Trata-se de um estudo transversal observacional realizado com 73 estudantes da Universidade de Rio Verde, que responderam a um questionário sobre dados pessoais e hábitos de vida, além de serem submetidos ao teste clínico. A análise estatística envolveu testes Qui-quadrado, Mann-Whitney e correlação de Spearman. Dos participantes, 61,64% apresentaram resultado positivo. Não foram observadas associações significativas com sexo, uso de medicamentos, prática de atividade física ou tempo de estudo. O uso excessivo de *smartphones* não demonstrou associação significativa. Conclui-se que os resultados sugerem uma ligação considerável entre a tenossinovite e sintomas como rigidez, relatos prévios de dor e uso de órtese.

Palavras-chave: Doença de De Quervain. Estudantes de Medicina. *Smartphone*.

RESUMEN

El estudio tuvo como objetivo investigar la prevalencia de la tenosinovitis de De Quervain en estudiantes de medicina e identificar factores de riesgo asociados, utilizando la prueba de Finkelstein como herramienta diagnóstica. Se realizó un estudio observacional transversal con 73 estudiantes de la Universidad de Rio Verde, quienes respondieron un cuestionario sobre datos personales y hábitos de vida, además de ser sometidos a la prueba clínica. El análisis estadístico incluyó pruebas de Chi-cuadrado, Mann-Whitney y correlación de Spearman. Del total de participantes, el 61,64% presentó resultado positivo. No se encontraron asociaciones significativas con sexo, uso de medicamentos, práctica de actividad física ni tiempo de estudio. El uso excesivo de *smartphones* no mostró asociación significativa. En conclusión, los hallazgos sugieren un vínculo considerable entre la tenosinovitis y síntomas como rigidez, dolor previo y uso de órtesis.

Palabras clave: Enfermedad de De Quervain. Estudiantes de Medicina. *Smartphone*.

INTRODUCTION

Contemporary life is characterized by an accelerated pace, in which individuals are constantly compelled to prioritize social demands, often at the expense of their own well-being and health. In this context, the frequent association of medical students with this frenetic rhythm of modern life is noticeable.

Excessive workload, great responsibilities, many subjects to be learned and reviewed[1]. With a variety of justifications, medicine is a particularly risky area for the development of tendinitis, since its demanding characteristics and exhausting study hours require numerous repetitive wrist activities, such as: typing for hours on a computer to record important information; spending long periods using *smartphones*; or even, as a refuge from these stressors, seeking leisure activities such as playing video games, playing sports, going to the gym, among others. In this context, nowadays, regarding students of this course, there is a growing possibility of developing tendinitis, especially tendinitis De Quervain's tenosynovitis (DQT) can consequently hinder these students in their daily routine.

From this perspective, it is worth noting that DQT is characterized by pain covering the radial region of the wrist and aggravated by ulnar deviation of the hand. The most common causal link is overuse of the thumb muscles[2].

In this context, bringing to the center of discussions the perspective that factors intrinsic to the lives of medical school students may cause this tenosynovitis can be fundamental steps to directly and advantageously impact the quality of life of these individuals. Therefore, discussing this condition among medical students has high theoretical value, considering its effect on academic decision-making. From this perspective, society, faculty, students, educational institutions, and healthcare professionals can all benefit from discussing this topic.

This study is also justified by the need to fill existing gaps in literature. Baabdullah *et al.*[3], when investigating the prevalence and severity of pain associated with DQT in medical students, pointed out relevant methodological

limitations, such as the lack of information on smartphone usage time, posture during use, general habits, hobbies, use of other devices, physical activity practices, and high-intensity training. Thus, a new investigation in a similar population, with methodological improvements and the inclusion of these variables, constitutes a significant contribution to the scientific field.

Given this, this study aims to measure the occurrence of De Quervain's tenosynovitis among medical students, through the application of questionnaires designed to assess risk factors, comparing the results between individuals with a positive and negative Finkelstein test.

METHOD

This is a cross-sectional observational study, with a quantitative and qualitative approach, structured around questionnaires and a specific clinical examination to detect sensitivity related to the disease under investigation.

The project was approved by the Research Ethics Committee of the University of Rio Verde (UniRV), according to Resolution No. 466/2012, registered under CAAE 68211523.4.0000.5077 and opinion No. 5.994.187. Data collection took place at the Faculty of Medicine of UniRV, Rio Verde campus (GO), between August 14, 2023 and March 23, 2024.

Medical students of both sexes, over 18 years of age, from the 1st to the 8th semester, without a known diagnosis of dysregulation disorder (DQT), and who signed the Informed Consent Form were included. Participants who provided unsolicited information in the questionnaire or who were unable to perform the Finkelstein test were excluded.

The sample size calculation adopted the criterion of a minimum inclusion of 10% of the total student population (approximately 480), estimating at least 48 participants. The design followed the recommendations of the STROBE checklist*4*.

The data collection took place in two stages. In the first stage, a structured questionnaire was administered containing:

1. Demographic data (age, sex and period);

2. Information about habits and routines potentially related to the development of DQT;

3. The short version of the *Smartphone Addiction Scale* (SAS-SV), validated in Brazil, consists of a 6-point[5] *Likert scale*.

Subsequently, after completing the survey, the Finkelstein test was performed, an examination widely used in medical practice to diagnose stenosing tenosynovitis of the first dorsal compartment (abductor pollicis longus and extensor pollicis brevis - radial limit of the anatomical snuffbox). Passive and forced ulnar deviation of the wrist is performed, and if the test is positive, the patient reports pain in the region of the radial styloid process[6].

The researchers were previously trained in the standardized application of the questionnaire and test. The risk factors investigated included a history of wrist injuries, diabetes, prior use of orthoses (regardless of material and duration of use), physical activity, *smartphone usage patterns*, musical and writing practice, presence of wrist stiffness or pain, daily study time, and frequency of breaks during repetitive activities.

The analyses were conducted using Jamovi 2.4.14 software[7]. For the univariate analysis of categorical variables, absolute and relative frequencies were calculated. For ordinal variables derived from the *Likert scale*, the data were described by medians and interquartile ranges.

The comparison between participants with a positive and negative Finkelstein test was performed using the chi-square test for nominal qualitative variables (such as sex and previous diagnoses) and the Mann-Whitney

test for ordinal qualitative variables. In cases where there was no appropriate grouping measure, Spearman's correlation coefficient was used. Normality verification for quantitative variables was performed using the Shapiro-Wilk test, followed, when pertinent, by additional correlations with Spearman.

RESULTS

The total number of participants in this study was 73, with a response rate of 63.01% for females (n=46) and 36.99% for males (n=27). Both age (W= 0.771; p <0.001) and total study time (W= 0.886; p <0.001) were the only quantitative variables that, when subjected to the Shapiro-Wilk test, showed an abnormal distribution (p <0.05). The median age was 22 years and the median study time was 4 hours. All questionnaires were completed, with no missing data for each variable of interest.

As a confounding variable, none of the medical students who participated in this study had a history of diabetes. Regarding previous wrist injuries, such as sprains, fractures, or dislocations, 17.80% had experienced such conditions (n=13), but only 6, approximately half of this group, required an orthosis.

This study did not identify significant associations between the Finkelstein test and nominal qualitative variables, such as sex, continuous medication use, and previous diagnoses. Although not the objective of this research, an interesting finding emerged during the Chi-square test, revealing a p-value of 0.012 when associating continuous medication use and sex. This suggests that women are 3.82 times more likely to use medication continuously than men [OR= 3.82 (95% CI; 1.30-11.20)]. A limitation of this finding is that the medications in use were not investigated. At another point, applying Spearman's coefficient, a weak inversely proportional correlation was found between the frequency of writing and physical and sporting activities (Spearman's Rho (71) = -0.240; p = 0.041).

The Finkelstein test was an essential tool for stratifying patients according to the level of pain reported during the examination. The state of absence of pain was classified as "1", while the state of "maximum pain" was designated as "5". Of the participants, 28 indicated absence of pain during the examination, in contrast to 45 individuals who reported experiencing at least one painful state. See Table 1 for the overall prevalence of a positive Finkelstein test.

Table 1 - Overall prevalence of a positive Finkelstein test

Characterization of pain in the Finkelstein test	Counts	% of total	cumulative %
Absence of pain	28	38.4%	38.4%
Mild pain	25	34.2%	72.6%
Moderate pain	16	21.9%	94.5%
Intense pain	3	4.1%	98.6%
Maximum pain	1	1.4%	100.0%

SOURCE: Author's own work, 2024.

When the SAS-SV was applied, it was observed that the sentences from the tool showed a positive correlation with each other according to Spearman's coefficient, with a p-value <0.05. However, no statistical test applied in this research was sufficiently able to relate cell phone use to DQT.

A finding regarding the applicability of the SAS-SV indicates that approximately 86.30% of participants agreed, to some degree, that they use their cell phones for longer than they intended (n=63). However, 61 disagreed that people around them accuse them of excessive cell phone use, and 49 denied that they would never stop using the device, even if it causes problems or negative effects in their lives. An overview of the absolute results found regarding *smartphone use* is presented in Table 2, along with information about each p-value of the SAS-SV statements in association with the Positive results from the Finkelstein test, performed using the Mann-Whitney test.

Table 2 - Comparison between the SAS-SV results and the Finkelstein test.

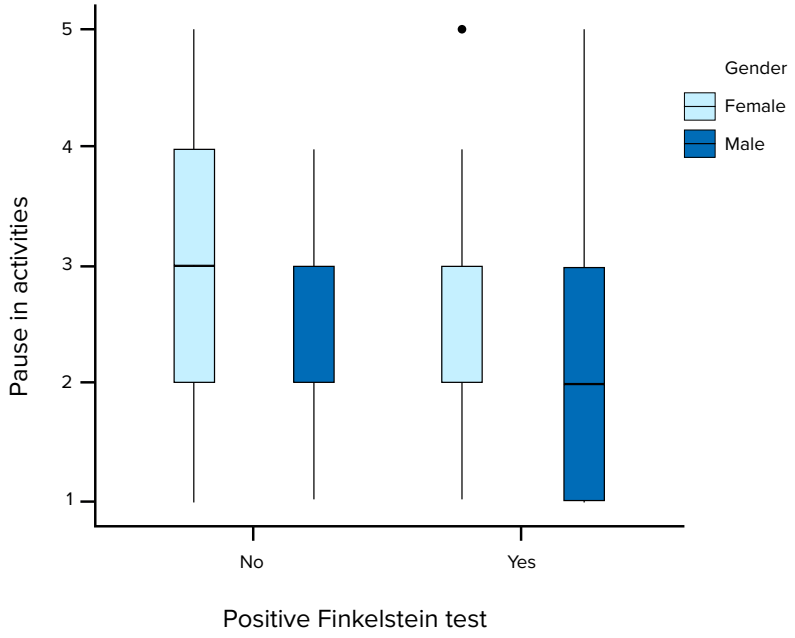
Sentences	Alternatives						Statistic	p-value*
	I strongly disagree	I disagree	I strongly disagree	I weakly agree	Accepted	I completely agree		
Stop doing tasks because of cell phone use.	11	17	12	10	14	9	573	0.504
Difficulty concentrating due to cell phone use.	7	15	11	20	12	8	568	0.478
Pain in the wrists or neck when using a cell phone.	17	18	6	9	14	9	590	0.648
Difficulty being without my cell phone.	18	26	10	10	3	6	549	0.352
He gets impatient and irritable without his cell phone.	20	18	9	11	7	8	562	0.425
He thinks about his cell phone when he's not using it.	20	23	5	10	8	7	599	0.717
I will never stop using my cell phone, even if it causes problems or negative effects in my life.	22	22	5	5	9	10	500	0.133
Constantly check your phone to avoid missing posts on social media (WhatsApp, Twitter, Facebook, Instagram, for example).	11	17	10	10	10	15	558	0.404
Uses the cell phone for longer than intended.	1	4	5	13	22	28	508	0.153
People are warning about the excessive use of cell phones.	26	23	12	7	1	4	587	0.620

*p-value correlating the sentence variables with the Finkelstein test positive to the Mann-Whitney U test.

SOURCE: Author's own work, 2024.

When creating a box plot to visualize the frequency of pauses during activities requiring the use of the muscles of the first dorsal compartment and a positive Finkelstein test, it was observed that male individuals who reported pain on ulnar deviation presented greater variability and a lower median of pauses when compared to females. On the other hand, for those who tested negative on the dynamic examination, it was demonstrated that women had greater variability. See Figure 1 for more details.

Figure 1 - Variation in the frequency of pauses during muscle activity in the first dorsal compartment in relation to the Finkelstein Test.



SOURCE: Author's own work, 2024.

In this cross-sectional study, it was not possible to identify an association between a history of sprains, fractures, dislocations, diabetes; regular medication use; sports activities and physical exercise; cell phone or musical instrument use; writing; and pauses during activities with a positive result on the Finkelstein Test, so, De Quervain's tenosynovitis in medical students. The only significant findings obtained by the non-parametric Mann-Whitney U test were that students who presented with wrist pain (n=57; p=0.008), had previously used hand orthoses (n=6; p=0.034), and had previously presented with stiffness in the first dorsal compartment (n=38; p=0.048), due to their daily activities, had a higher chance of being diagnosed with DQT.

DISCUSSION

The high prevalence of smartphone use has raised concerns about its potential impacts on human health, including possible musculoskeletal problems associated with its excessive use. A study conducted in Jeddah, Saudi Arabia, in 2020[3] found that 66.4% of medical students were classified as having some degree of *smartphone addiction*, while the remainder did not exhibit this behavior. Furthermore, approximately 20.4% of patients reported radial pain, of which only 19.1% tested positive on the Finkelstein test, with 29.72% being male and 70.28% female[3]. In the present study, some results showed a more significant prevalence compared to the previous article; for example, 61.64% of medical students tested positive on the Finkelstein test, although the distribution of these by sex was very close to the findings of previous study of Baabdullah *et al*.[3] found that 34.09% of the participants were male and 65.91% were female.

However, when observing the test positivity between each sex, a discrepancy is not so significant. The results show that 57.70% of men and 63.83% of women tested positive in the physical examination. This corroborates the conclusion that there is no relationship between sex and the positivity of the Finkelstein test, a finding similar to the study by Nie *et al*.[8]. It is believed that the discrepancy found previously is due to the fact that 63.01% of the individuals who participated in this research were female (n=46) - This occurred due to the demographic distribution of the course itself at the university and a greater interest or availability of the female public to participate in the research. It is believed that women have a greater awareness of the importance of health-related studies; this discrepancy is due to a more active search for information for self-care and a more proactive approach to health management when compared to men[9].

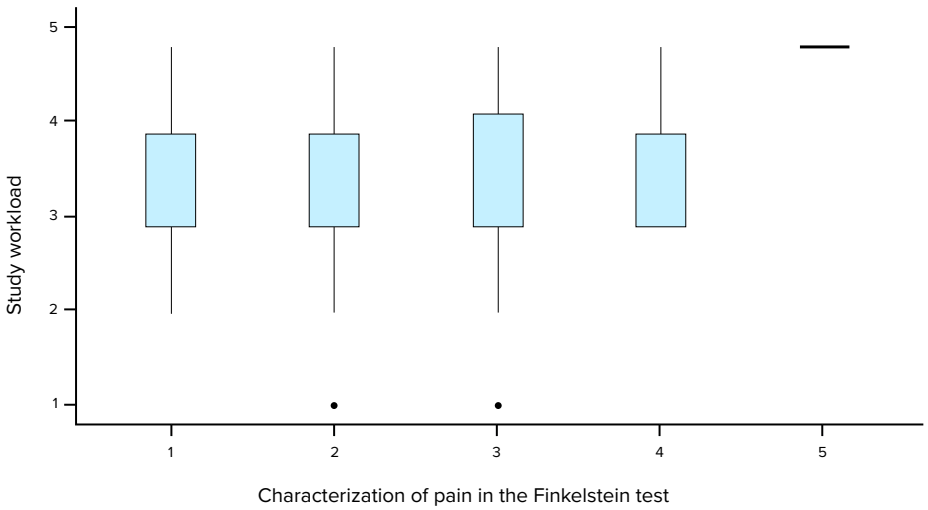
Furthermore, in the study by Baabdullah *et al.*[3], the Chi-square test of independence, performed to compare the positivity of the Finkelstein test between those who excessively use *smartphones and those who do not, did not show* a significant p-value (χ^2 (1) = 3.028, p = 0.082). In contrast, another study has shown an association between the number of daily hours of use of the electronic device and a higher prevalence of symptoms of De Quervain's disease[10]. Applying this comparison to the context of this article, no significant association was found with any of the SAS-SV sentences that could indicate dependence on cell phone use. These results suggest that *smartphone addiction* may not be directly related to the occurrence of De Quervain's tenosynovitis among medical students. Table 2, mentioned earlier, provides information about each p-value of the SAS-SV sentences, performed using the Mann-Whitney test.

Although some authors argue that prolonged cell phone use, due to repeated wrist flexion and extension, can cause thumb pain, reduced pinch strength, increased pressure in the carpal tunnel, median nerve impingement, and other damage to the first dorsal compartment, possibly leading to De Quervain's tenosynovitis[11,12], the results of this study indicate that this association may not be directly applicable to medical students. For now, the most appropriate justification for this lack of association may be related to more strenuous use and fatigue of the neck and shoulder muscles, such as the trapezius muscle, rather than the muscles of the first dorsal compartment[13].

However, the investigation cannot be limited solely to cell phone use as a potential contributor to tenosynovitis, since this condition is multifaceted and can have complex and varied causes. Therefore, it is important to also analyze occupational measures and repetitive manual activities as possible contributing factors to this disease[3,14]. Thus, it is valid to consider the perception that injuries to the wrist area at some point in life may contribute to the development of De Quervain's tenosynovitis. The scientific literature has increasingly reported cases of this tendinitis in patients who have suffered trauma, especially to the radial styloid process[15-17]. It is understood that during the inflammatory state caused by trauma, the release of inflammatory mediators can contribute to tissue damage, generating the production of reactive oxygen species and activation of metalloproteinases[18,19], which may contribute to the development of DQT. These mechanisms help to understand why variables such as muscle stiffness, previous wrist pain, and use of a hand orthosis were significant among participants with a positive Finkelstein test. In all these cases, the presence of a pre-existing inflammatory state can be presumed, whether due to repetitive microtrauma, old structural lesions, or mechanical overload, which favors tissue changes and, consequently, greater susceptibility to the development of tenosynovitis.

Furthermore, Figure 2 shows that the distribution of study hours does not differ significantly between participants who reported pain in the Finkelstein test and those who did not report discomfort. This finding suggests that the daily study load may not be a relevant risk factor for DQT, although a single participant with a complaint of extreme pain reported dedicating ≥5 hours daily to studying.

Figure 2 - Correlation between daily study hours and pain in the Finkelstein test.



SOURCE: Author's own work, 2024.

Consequently, while other studies encompass a general population, this one is restricted to the academic sphere, more precisely among medical students, which limits the research area and sample. Therefore, despite the measures taken to avoid bias and the identification of a significant association between the variables analyzed, it is necessary to consider the results before generalizing them to the general population.

CONCLUSIONS

Therefore, the evaluation of De Quervain's tenosynovitis cases in medical students, using the Finkelstein test, suggests a considerable association between tenosynovitis and stiffness, previous reports of pain, and the use of orthotics. This reinforces the need for attention to these risk factors in the academic environment for the prevention and proper management of the condition.

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