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Prevalence of Gamer's Mark on the wrists of dental students in Mumbai: A multicentric study

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ABSTRACT

Introduction: Repeated friction between the wrist and the mouse pad leads to the development of a lesion on the wrist of the operator known as the 'Gamer's mark'. In the context of the rapid development of digital technology and increased dependence of dental students and professionals on the same, the present study aimed to analyze the prevalence of Gamer's mark among dental students in the city of Mumbai.

Materials and Methods: The present cross-sectional study was on 1412 dental students in four different institutions in Mumbai using a five-point questionnaire comprising questions relevant to the characteristics of gaming history and the presence of the lesion on the wrist. The responses were recorded in an Excel sheet and subjected to data analysis.

Results: The prevalence of the lesion across the full cohort was found to be 0.5%. Of the 103 participants reporting a history of gaming, 66.99% (n=69) had the lesion on either of their hands which comprised 50 males and 19 females. There was a statistically significant difference noted ($p<0.05$) wherein a higher number of males ($p=0.02$) as well as females ($p=0.04$) had the lesion as compared to those that did not ($p<0.05$)

Conclusion: The correlation between the duration of the Gamer's Mark lesion and the intensity of gaming underscores the need for awareness and preventive strategies in the dental community. As dentistry continues to embrace digitalization, it is imperative to address the potential health implications associated with prolonged computer usage.

1. Introduction

Over the years, every branch of dentistry has witnessed a drastic improvement in the efficiency, accuracy, and overall quality of the workflow due to digitalization. Some examples of these digitalized modalities include digital radiography, intraoral scanners, 3D printing, Cephalometry, CAD CAM, and slide scanning.[1,2] The recent advent of AI has further improved the efficiency and ease of work, particularly that related to academics and research.[3]

However, this has led to a concomitant increase in the time spent on operating the computer by dental students and professionals.[4] The increase in screen time has certain deleterious effects on the health of the users such as the development of vision-related and posture-related

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problems.[5–7] One such consequence is the development of a lesion on the wrist of the operator owing to repeated friction between their wrist and the mouse pad which is known, in layman's language, as the 'Gamer's mark'.[8] Although numerous case reports have provided different terminologies for the lesion, there is yet no standardized name for the lesion.[9,10]

Furthermore, none of the published literature has a dental student/professional as the center of their study, as a result of which not much context is available to describe the effects such a lesion can have on a dentist's professional life. Even so, given the fact that dentists have to work in a refined manner by primarily using their hands and wrists, such a lesion on the wrist could drastically affect their efficiency to work if associated with any symptoms, and consequently the quality of care provided to the patients.

In the context of the rapid development of digital technology and increased dependence of dental students and professionals on the same, the present study aimed to analyze the prevalence of Gamer's mark among dental students in the city of Mumbai. The study is first of its kind with respect to the lesion as well as the population in question.

2. Materials and Methods

The present cross-sectional study was on dental students in four different institutions in Mumbai. A self-constructed five-point questionnaire comprising questions relevant to the characteristics of gaming history and the presence of a gamer's mark on the wrist (Figure 1). The number of years of the gaming habit and the number of hours of gaming per day were recorded for each participant. The questionnaire was validated initially by performing a pilot on 20 students. A Cronbach's alpha value of 0.83 revealed good internal reliability and face validity of the questions. Some requisite modifications in the language and framing of the questions were implemented as discerned from the pilot study.

The final questionnaire was implemented in Google Forms and was propagated to the students of Target institutions through their respective social media groups. The survey received responses from 1412 dental students thereby giving the survey a response rate of 78.2%. Of these, only 103 were reported to have a history of gaming at present or in the past, thereby the prevalence of gaming habit across the full study cohort was 7.29%. These responses were considered eligible for the final statistical analysis.

Statistical analysis: The data were recorded in an MS Excel Sheet and subjected to statistical analysis. Descriptive statistics of the study population and their responses were obtained in the form of frequency and percentage. Unpaired t-test was used to compare the mean number of years of gaming habit and frequency of daily gaming across individuals with and without the lesion. Pearson's correlation test was employed to ascertain the correlation between the duration of the condition and the number of years of gaming or frequency of gaming. A chi-square test was performed to analyze the significance of the difference in the frequency of responses across subjects of different genders.

3. Results

The study population (n=103) comprised 76 males and 27 females with ages ranging from 12 to 56 years (mean = 24.04 + 7.38 years). The participants reported to have a history of gaming ranging from 1 to 20 years with a mean of 3.89 + 2.49 years. The duration of gaming or using a computer per day ranged from 1 to 12 hours with a mean of 4.32 + 2.45 hours. The characteristics of the study population regarding their gaming habits is summarized in Table 1.

Of the 103 participants, 66.99% (n=69) had the lesion on either of their hands. When considering the respective genders, 65.79% (n=50) of Males and 70.37% (n=19) of females had the lesion. There was a statistically significant difference noted ($p<0.05$) wherein a higher number of males ($p=0.02$) as well as females ($p=0.04$) had the lesion as compared to those that did not ($p<0.05$) and also a significantly higher number ($p<0.05$) of males did not have the lesion as compared to the females ($p=0.03$).

Furthermore, a significantly higher number of males as well as females had lesions on the right hand as compared to the left hand ($p<0.001$). No statistical difference ($p>0.05$) was noted in the males and females having lesions on either hand respectively. The duration of these lesions in respective genders is tabularized in Table 2.

No significant difference between the mean age of individuals with and without the lesion ($p>0.05$). An independent t-test (Table 3) revealed a statistically significant difference between the mean age of individuals with and without the lesion with a higher mean number of years of gaming for individuals without the lesion ($p<0.05$) No significant difference between the mean number of hours of gaming in the individuals with and without the lesion ($p>0.05$)

Pearson's correlation test (Table 4) revealed a statistically significant correlation ($p<0.0001$) between the duration of the condition and the number of years of gaming. A highly significant correlation ($p<0.0001$) was also noted between the duration of the condition and the number of hours of gaming per day.

4. Discussion

The present study aimed to investigate the prevalence of Gamer's Mark among students in dental colleges in Mumbai, considering the rapid development of digital technology and the escalating dependence of dental professionals on these tools.[11] The study revealed a

Table 1: Characteristics of the individuals with lesions (n=103)

	Age	How many years of gaming	Number of Hours of gaming/ using PC per day
Mean	23.68	3.56	4.38
S.D.	6.58	1.52	2.48
Max	56	7	12
Min	12	1	1

Table 2: Duration of the lesion in the study population (n=103)

	Overall	Male	Female
Mean	18.41	13.85	30.63
S.D.	20.48	20.86	13.13
Max	84	84	60
Min	0.25	0.25	1

Table 3: t-test for difference in the means of the number of years of gaming

	Mean Age	Mean number of years of gaming	Mean hours of gaming
Difference	1.080	2.060	-0.350
Standard error	1.540	0.626	0.507
95% CI	-1.9759 to 4.1359	0.8181 to 3.3019	-1.3557 to 0.6557
t-statistic	0.701	3.290	-0.690
DF	101	101	101
Significance level	P = 0.4849	P = 0.0014	P = 0.4916

Table 4: Pearson's correlation test between duration of condition and gaming habits

		If yes, how long has the condition existed for	How many Years of gaming
If yes, how long has the condition existed for	Pearson Correlation	1	.568**
	Sig. (2-tailed)		.000
	N	74	72
How many Years of gaming	Pearson Correlation	.568**	1
	Sig. (2-tailed)	.000	
	N	72	84
Number of Hours of gaming/ using PC per day	Pearson Correlation	.517**	1
	Sig. (2-tailed)	.000	
	N	74	88

**. Correlation is significant at the 0.01 level (2-tailed).

notable prevalence of the lesion among dental students, with 66.99% of participants reporting the presence of the lesion. Interestingly, a statistically significant difference was observed in the occurrence of the lesion between males and females, indicating that both genders are susceptible to this condition. Furthermore, the higher prevalence on the right hand compared to the left hand emphasizes the influence of hand dominance or specific hand movements during computer use.

Analysis of gaming patterns demonstrated a statistically significant correlation between the duration of the Gamer's Mark condition and both the number of years of gaming and the number of hours spent gaming per day. This suggests that the risk of developing the lesion is influenced by cumulative exposure to gaming over time and the intensity of daily gaming sessions.[12] The association was more pronounced in females, highlighting the importance of gender-specific considerations in understanding the etiology of Gamer's Mark. Contrary to expectations, no significant difference in age was found between individuals with and without the Gamer's Mark. However, a noteworthy finding was the longer duration of the lesion in females compared to males. This could be attributed to variations in gaming habits, hand movements, or individual susceptibility factors between genders.

The Gamer's Mark is characterized by localized erythema and pressure-induced hyperpigmentation, particularly on the palms and fingers.[2,13] Microtrauma resulting from prolonged and repetitive pressure during gaming triggers an inflammatory response, leading to

Figure 1: Presence of gamer's mark on the wrist of a participant

well-demarcated areas of discoloration.[14] Clinically, affected individuals present with well-demarcated areas of discoloration, ranging from pinkish hues to deep brown, indicative of underlying vascular changes and melanin deposition.[15]

Histopathologically, this phenomenon is characterized by epidermal hyperplasia, focal spongiosis, and a prominent inflammatory infiltrate, primarily consisting of lymphocytes and histiocytes.[16] Microscopic examination reveals subtle changes in dermal vasculature, indicative of chronic repetitive trauma. Clinically, the corresponding manifestation is marked by localized erythema and hyperpigmentation, reflecting the underlying histological alterations.[16,17] In line with these facts, some of the individuals also reported that the pathology at times became so severe that there was evident abrasion of the skin along with pin-point bleeding areas within the lesion.

Notably, the frequency of the Gamer's mark correlates with the intensity and duration of gaming sessions, with a higher prevalence among avid gamers who engage in extended play. The observed pattern of occurrence predominantly follows the distribution of pressure points on the hands, underscoring the role of mechanical stress in its pathogenesis. Understanding and recognizing the clinical implications of Gamer's mark is essential for dermatologists to provide tailored interventions and preventive strategies for this growing demographic.

It is essential to acknowledge the limitations of this study, including its cross-sectional design and reliance on self-reported data. Future research could employ longitudinal approaches and objective measures to further explore the association between gaming habits and the development of Gamer's Mark. Additionally, investigating potential preventive measures and interventions for individuals at risk could contribute to the holistic well-being of dental professionals immersed in the digital age.

Since the present study was conducted across dental institutes exclusively in the city of Mumbai, the study population belonged to a metropolitan landscape. Assessing the gaming behaviors of dental students in other geographical locations and their association with the prevalence of the Gamer's mark needs to be further explored. Future studies can also look into comparing the histopathological findings in an attempt to assign a grade to the lesion for prognostication.

5. Conclusion

The present multicentric study highlights the prevalent yet underexplored phenomenon of Gamer's Mark and on a larger scale, the consequences of increased screen time in the digital era. The correlation between the duration of Gamer's Mark and the intensity of gaming underscores the need for awareness and preventive strategies in the dental community. As dentistry continues to embrace digitalization, it is imperative to address the potential health implications associated with prolonged computer usage. The findings of the present research contribute to the evolving discourse on the intersection of technology and health in dental education and practice, urging proactive measures to safeguard the well-being of dental professionals in the digital age. Ergonomic improvements or changes in computer-usage habits before they cause any problems is crucial at this time.

6. Source of Funding

None.

7. Conflict of Interest

None.

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