

## Frequency Of Dental Erosion Among Undergraduate Dental Students Of Pakistan

Research Article

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### Abstract

**Background:** Dental erosion is a form of tooth wear which occurs as a result of dissolution of dental hard tissues caused by acids of non-bacterial origin. Erosion can occur due to intrinsic acids (within the body) or extrinsic acids (dietary intake). Erosive lesion due dietary or gastric acids forms smooth lesions which typically appear as cupped occlusal/ incisal and concave buccal/facial surfaces

**Objective:** The objective of this study was to evaluate the prevalence of dental erosion among undergraduate dental students in various dental colleges of Pakistan.

**Material and Method:** This study was conducted at Institute of Dentistry, Combined Military Hospital Lahore Medical College, Fatima Memorial Hospital College of Dentistry, Lahore and Sardar Begum Dental College, Peshawar. Sample size calculated was 330 and data was collected over a period of two years. Signs for erosive lesion were observed during clinical examination. Lesions graded according to Basic erosive wear examination (B.E.W.E.) index and reported.

**Results:** A sample of 330 dental students is taken with the mean age  $21.62 \pm 1.17$  years. There were 107 (32.4%) male and 223 (67.6%) female students in the sample. Prevalence of the erosion in the dental students was 14.8% (49/330).

**Conclusion:** 107 (32.4%) male and 223 (67.6%) female undergraduate dental students were examined for dental erosion. The frequency of dental erosion among dental students was reported to be 14.8%.

**Keywords:** Tooth Erosion; Students; Dental; Tooth Attrition; Tooth Wea.

### Introduction

Tooth wear results in the loss of dental hard tissues from the tooth surfaces. Factors other than carious lesion, dental trauma, and developmental disorders can lead to this condition [1, 2]. It is an irreversible, non-cariogenic origin process resulting in destruction and functional loss of dental hard tissue. It can manifest as abrasion, attrition, abfraction and erosion or a combination of these processes [3].

Dental erosion is one of the main causes of tooth surface loss of tooth due to exposure of tooth to extrinsic or intrinsic acids which are not produced by bacteria. Severity of erosion can lead to compromised esthetics and decreased vertical dimension of occlusion [4]. The intrinsic acids are mostly originated as a result of gastric reflux (GERD), vomiting along with anorexia, bulimia nervosa, and rumination [5]. Extrinsic acids can act through carbonated beverages, citrus fruit, and food pickled with vinegar. Medications like vitamin C, iron preparations, inhalers used by asthmatic patients and aspirin can also contribute to be a source of extrinsic acid leading to dental erosion [6].

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Dental erosion can manifest as sensitivity, pain, inefficient mastication, accidental biting of soft tissues (cheek biting), fractured teeth, increased chances of tooth decay, loss of vertical dimensions of occlusion [7]. Early detection of dental erosion can help to reduce and manage the lesion more efficiently.

Different indices can be used to measure tooth wear. Eccles [8] classified tooth wear lesions as early, small and advanced, with no strict criteria definitions, thus allowing wide interpretation. Smith and Knight [9] developed a tooth wear index to measure and monitor multifactorial tooth wear. Xhonga and Valdmanis [10] divided erosion lesions into four levels by measurement with a periodontal probe but it did not address the problem of inter- or intra-examiner variability [11]. The index used to measure erosion in this study is BEWE (Basic Erosive Wear Examination) index [12]. BEWE index is a simple tool to use in general practice, it records the most severely affected surface in each sextant. The lesion is graded according to four level score and the cumulative score classified and matched to risk levels which guide the management of the condition. The BEWE allows re-analysis and integration of results from existing studies [12].

In Pakistan, a study was conducted in Karachi about prevalence of dental erosion in school children [13]. No significant studies have been conducted in Pakistan to measure the prevalence of dental erosion among undergraduate dental students, therefore, it is the need of the day such study be conducted to evaluate the extent of dental erosion in undergraduate dental students of Pakistan. It will also impart awareness among young dental students to diagnose and prevent erosion, its causative factors and methods of reducing dental erosion. This study evaluates the prevalence of dental erosion among undergraduate dental students in various dental colleges of Pakistan and highlight the possible etiological factors leading to dental erosion.

**Methodology**

This study was conducted at three dental institutes of Pakistan including, Institute of Dentistry, Combined Military Hospital Lahore Medical College, Fatima Memorial Hospital College of Dentistry, Lahore and Sardar Begum Dental College, Peshawar over a period of two years, starting from January 2019 till January 2021. Sample size was calculated using WHO software for sample size collection, which was 330. The margin of error was kept 5% and confidence interval was 95%. Observational study design was used and the subjects were selected on the basis of non-probability convenient sampling technique. Undergraduate dental students between the age of 19 to 25 years of age, with no systemic diseases were included. Dental students with developmental enamel defects, history of orthodontic treatment, having any dental malocclusion, students taking any medications leading to xeros-

tomia (e.g. anti-hypertensive, anti-depressants, anti-cholinergics, anti-psychotics, anti-histamines) and history of radiotherapy were not included.

Informed consent was taken verbally before examining the subject. The clinical examination of first year, second year, third year and final year undergraduate dental student was done using sterilized dental mirrors only. The following areas were examined in the mouth:

1. Palatal surfaces of maxillary anterior teeth
2. Lingual surface of mandibular anterior teeth in individuals suffering from GERD.
3. Occlusal surfaces of posterior teeth.

The teeth were marked using the Basic Erosive Wear Examination (BEWE) index. The BEWE scoring system records the most severely affected surface in a sextant. The four level score (Table 1) grades the appearance or severity of wear on teeth from no surface loss (0), initial loss of enamel surface texture (1), distinct defect, hard tissue loss (dentine) less than 50% of the surface area (2) or hard tissue loss more than 50% of the surface area (3) [12]. Erosion along with superimposed attrition was considered as erosive lesions while attrition was recorded separately.

**Results**

A sample of 330 dental students was taken with the mean age  $21.62 \pm 1.17$  years. There were 107 (32.4%) male and 223 (67.6%) female students in the sample (figure 1).

The frequency of dental erosion in the dental students was reported to be 14.8% (49/330). However, attrition was present in 12.4% (41/330) of the whole sample. The frequency and percentage for the presence of erosion and attrition is given in the Table-2.

When the dental students were evaluated for the erosion through BEWE index, 283 (85.8%) had no erosive tooth wear, 39 (11.8%) had initial loss of surface texture, and 8 (2.4%) had distinct defect that is hard tissue loss with less than 50% of surface area. It is worthy to note that in the whole sample, no student had hard tissue loss with more than 50% of surface area. The distribution of males and females falling in each category of BEWE index is displayed in figure 2. Out of 107 males, 93 (87%) had no erosion, 12 (11%) had initial loss, and 2 (2%) had distinct defect. Almost same percentages are observed for the females.

The Chi-square test of association was applied between gender and erosion that came out to be statistically non-significant. For the males, the prevalence of the erosion was observed to be 14%

**Table 1. Criteria for grading erosive wear.**

Score	
0	No erosive tooth wear
1	Initial loss of surface texture
2*	Distinct defect, hard tissue loss <50% of the surface area
3*	Hard tissue loss ≥50% of the surface area
*in scores 2 and 3 dentine often is involved	

Figure 1.

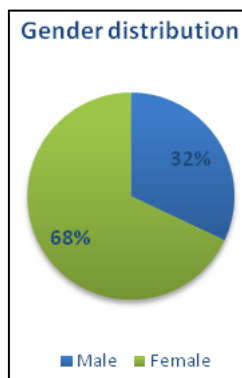


Figure 2.

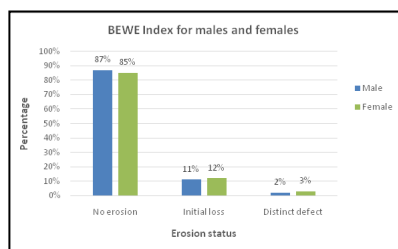


Table 2.

Variables	Absent	Present
Erosion	281 (85.2%)	49 (14.8%)
Attrition	289 (87.6%)	41 (12.4%)

Table 3.

Gender	Erosion		Total	Chi-square statistic	p-value
	Absent	Present			
Male	92 (86%)	15 (14%)	107	0.086	0.769
Female	189 (84.8%)	34 (15.2%)	223		
Total	281	49	330		

(15/107) while for females, it was 15.2% (34/223). So, no significant association was found between gender and status of erosion.

**Discussion**

The aim of this study was to evaluate the extent of dental erosion among undergraduate dental students and impart awareness about the diagnosis, prevention and management dental erosion.

Basic Erosive Wear Examination (BEWE) Index was used to assess the extent of dental erosion. It was found that 85.8% students had '0' BEWE index score. This referred to no active erosive lesion. 11.8% had initial tooth surface loss, while 2.4% had distinct defect with hard tissue loss accompanying less than 50% of surface area. However, it was noted that no subject had hard tissue loss with more than 50% of surface area, which can be due to good oral hygiene practices.

In our study the frequency of dental erosion among undergraduate dental students was found to be 14.8% which is far less than that found in a similar study conducted in China [14] on non-medical university students, which was found to be 44%. This dif-

ference in frequency can be subjected to better understanding of oral health among dental students leading to better dietary habits, restraining of acidic beverages, access to fluorinated water, improved oral hygiene practices including the use of a soft-bristled tooth brush with fluoridated toothpaste and avoid using abrasive toothpastes (some whitening toothpastes and charcoal-based toothpastes are more abrasive).

An additional finding of attrition was also found among 12.4% of dental students. In previous studies [15], it is reported to be 33.3% among adolescents between the age of 14 to 19 years old. In our study, the students between of 19 to 25 years have reduced stress levels which can contribute to low incidence of erosion. Stress can cause vomiting, rumination, anorexia and bulimia nervosa which can lead to dental erosion as well [16]. Decrease in stress level in this age group can be because of cultural values and lifestyle, the students mostly are dependent on their families and taken care by elders. They have financial responsibilities to fulfil. Decrease in incidence of dental attrition can also be due to increased awareness of oral health among dental students. Habits like bruxism are addressed earlier and intervened at earlier stages before it can cause any harm. Better oral hygiene practices are encouraged like the use of fluorinated toothpaste and soft tooth brushes. Students

from Khyber Pakhtunwan showed increased incidence of attrition which can be attributed to increase chewing of tobacco.

The study also showed that dental erosion does not show predilection towards gender bias. In the age group between 19 to 25 years of age the difference is not significant statistically, it is observed to be 14% in males while in females its 15.2%. In a study done in UK, it was found that females practice better oral hygiene and brush more frequently than males [17].

Although the results found in our study are not alarming, the prevalence of dental erosion among undergraduate dental students demands attention. Dentists should routinely assess the risk of dental erosion among young population for diagnosis and management. Preventive approach should be adopted among dental students to further decrease its incidence and increase awareness among dental students. Awareness among dental students can be increased via seminars, dental conferences, social media campaigns, brochure and poster competition etc. Measures like regular monitoring need to be practiced as part of minimal intervention dentistry. Once a preventive approach or any other form of treatment is implemented, follow-up assessments should be made to see if the measures undertaken are successful. Monitoring requires a complete reassessment where the history, special tests, color photographs and dental casts are repeated, to note either improvement or otherwise from the original assessment.

### Limitations

The limitation of this study is that dental erosion was checked among a specific age group 19 to 25 years of age. General population was not considered. The results could vary in different age groups.

### Recommendations

Dental erosion is multifactorial condition. As health providers it is our prime responsibility to identify the possible risk factors and make the community aware of the ways to prevent this condition. Dietary counseling should be done at an early stage in schools and universities, such as, limiting the acidic foods and drinks and their avoidance at night should be stressed. Habits such as frothing or swishing the drink around the mouth or drinking in small sips can be avoided. If a straw is used it can be wide bore and kept at the back of the mouth in order to reduce the contact area between the acid and the teeth. After consumption of an acidic food or drink if tooth brushing is done immediately it would lead to rapid loss of enamel surface.

### Conclusion

The frequency of dental erosion among undergraduate the dental

students was found to be 14.8%. However, attrition was present in 12.4% (41/330) of the whole sample. This study suggested percentage of students suffering from dental erosion can have severe adverse effects in future as the lesion progresses. However, no significant association was found between dental erosion and gender of patient. This study will encourage clinicians, students and general dental practitioners to pay more attention to erosive wear and hence will be beneficial for patient care.

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