

FREQUENCY OF DENTAL EROSION AND RISK FACTORS – A STUDY

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ABSTRACT

The objective of current study was to determine the frequency and risk factors of dental erosion and its grades at presentation and to find frequency of common risk factors i.e. acid regurgitation, vomiting, carbonated drinks and occupational acidic environment among patients presenting with highly suspected clinical features

This Cross-sectional descriptive study with sample size of 264 was conducted at Prosthodontic Department, Sardar Begum Dental College, University Town, Peshawar from 17th May 2012 to 17th December 2012. Patients with age 18 years or above of both gender presenting with highly suspected clinical features were subjected to detailed oral and dental examination. Nature of tooth surface loss (attrition, abrasion, erosion) was recorded in specially prepared proforma. Patients having dental erosion were graded according to Eccles and Jenkins Index and they were carefully scrutinized for risk factors. One tooth with highest grade of erosion was considered for assessment. Teeth with caries, fractured, with restorations and congenital anomalies were not considered for grading and were excluded.

Results showed mean age of the patients was 38.34 years, SD $\pm$ 10.968. The tooth wear due to dental erosion among study subjects was recorded 73.5% and due to abrasion and attrition was 26.5%. The most common risk factor was carbonated drinks which was 19.7%. Other risk factors were vomiting (13.3%), occupational erosion (7.6%), acid regurgitation (17%), carbonated drinks+acid regurgitation (7.6%), carbonated drinks+occupational erosion (8.3%). The grades of erosion according to Eccles and Jenkins Index was 29.2% in grade- 1 and 44.3% erosion was in grade-2 and no patient was observed with grade-3. Majority of patients were in age group 42-49 (25.4%). Patients in age group 18-25 were 13.3%.

It was concluded that risk factors i.e. carbonated drinks, vomiting, acid regurgitation, and occupational hazards may lead to dental erosion.

Key Words: Tooth erosion, carbonated beverages, vomiting, occupational exposure, Risk factors.

INTRODUCTION

Dental erosion or chemical wearing away of the tooth structure is a dental health problem of the modern world. If not detected early, may result in serious irreversible damage to dentition. An awareness of its clinical appearance, etiology, and risk factor is important to plan the preventive and curative management of such problem.¹

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Lifestyle changes and a rise in the consumption of acidic foods and beverages have led to an increase in the prevalence of dental erosion around the world in recent years. High prevalence numbers ranging from 30%⁷ to 68%⁸ have been reported, especially among children and adolescents.²

Tooth erosion and other tooth wears can be assessed from tooth wear indices (TWI) like Eccles index, Lussi index, Smith and Knight index, Simplified scoring criteria and Eccles and Jenkins index. Eccles and Jenkins erosion index classify the severity of dental erosion into four levels: Level 0; Normal surface, without enamel wear. Level 1; Surface with enamel wear but without

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dentin wear. Level 2; Surface with dentin wear less than 1/3 of the surface and the highest severity. Level 3; Surface with dentin wear more than 1/3 of the surface.^{3,4}

If dental erosion is not controlled and stabilized, the child may suffer from severe tooth surface loss, tooth sensitivity, irregular occlusal plane, dentoalveolar compensation, over closure, poor aesthetics, or even dental abscesses in the affected teeth.^{5,6} Epidemiologic surveys have investigated dental erosion in developed and developing countries. The prevalence of dental erosion varies considerably in different countries, geographic locations, and age groups as shown in Table 1.⁷ In Peshawar region published studies about frequency of dental erosion and its risk factors are rare. So the aim of current study was to find the severity of dental erosion and risk factors in this region and also to assess the reasons behind the difference between current results and international statistics.

METHODOLOGY

This cross-sectional descriptive study with sample size of 264 was conducted at Prosthodontic Department Sardar Begum Dental College University Town, Pe-

shawar. Patients of 18 years or above of both gender presenting with highly suspected clinical features i.e. (flattening or loss of incisal edges and cusps, loss of enamel which shows dentine, cupping of cusps and fissures, wear facets, v shaped lesion) were subjected to detailed oral and dental examination. Nature of tooth surface loss (attrition, abrasion, erosion) was recorded in specially prepared Proforma. Patients having dental erosion were graded according to Eccles and Jenkins index and they were carefully scrutinized for common factors leading to it i.e. acid regurgitation, vomiting, carbonated drinks and history of exposure to occupational environments. Most of the patients had dental erosion of different grades (severity) in multiple teeth. In those cases the highest grade was recorded and considered. Teeth with caries, fractured, with restorations and congenital anomalies were not considered for grading and were excluded. All information including name, age and gender were recorded in the proforma. The data were analyzed in statistical package for social sciences (SPSS) version 17. Mean + Standard Deviation were calculated for numerical variables like age, frequencies and percentages were calculated for categorical variables like gender, dental erosion, its grades (grade 1, 2, and 3) and risk factors.

TABLE 1: PREVALENCE OF DENTAL EROSION IN DIFFERENT COUNTRIES

Author	Year	Country	Age	Sample size	Present (%)	Exposed Dentine (%)	Teeth examined
Al-Dlaigan	2001	UK	14	418	100	52	All permanent teeth
Deery	2000	UK	11-13	125	37	0	Upper permanent incisors
Ganss	2001	German	11.4	1000	11.6	0.2	All permanent teeth
Peres	2005	Brazil	12	499	13.0	0.32	Upper permanent incisors
Caglar	2005	Turkey	11	153	28	0	All permanent teeth
EL Karim	2007	Sudan	12-14	157	66.9	0	Upper permanent incisors
Auad	2007	Brazil	13-14	458	34.1	0	All permanent teeth
Waterhouse	2008	Brazil	13-14	458	34.1	0	All permanent teeth
Talebi	2009	Iran	12	483	38.1	4.0	Upper permanent incisors
Correr	2009	Brazil	12	389	26	35	All permanent teeth

TABLE 2: AGE GROUP AND GENDER DISTRIBUTION

Age group of patient	Gender of patient		Total	Percentage
	Male	Female		
18-25	24	11	35	13.3
26-33	30	30	60	22.7
34-41	22	43	65	24.6
42-49	30	37	67	25.4
50 and above	19	18	37	14
Total	125	139	264	100

TABLE 3: DISTRIBUTION OF TOOTH WEAR WITH GENDER

Type of tooth wear	Gender of patient		Total	Percentage
	Male	Female		
Dental erosion	103	91	194	73.5
Other tooth wear (attrition, abrasion)	22	48	70	26.5
Total	125	139	264	100

TABLE 4: DISTRIBUTION OF GRADES OF EROSION OF DIFFERENT RISK FACTORS

Grade of erosion	Risk factors of dental erosion						Other tooth wears	Total
	Carbonated drinks	Acid regurgitation	Vomiting	Carbonated drinks+occupational erosion	Carbonated drinks + acid regurgitation	Carbonated drinks + acid regurgitation		
Grade 1	29	16	17	10	1	4		77
Grade 2	23	29	18	12	19	16		117
Total	52	45	35	22	20	20		194
Percent-age	19.7	17	13.3	8.3	7.6	7.6	26.5	100

TABLE 5: DISTRIBUTION OF GRADES OF EROSION WITH GENDER

Grade of erosion	Gender of patient		Total	Percentage
	Male	Female		
Grade 1	40	37	77	29.2
Grade 2	63	54	117	44.3
Other tooth wear (attrition, abrasion)	22	48	70	26.5
Total	125	139	264	100

RESULTS

The patient's age ranged from 18-66 years. The mean age was 38.34 years $\pm$ 10.968 (SD). Patients in age group 42-49 years were in the highest number (67) while patients in age group of 18-25 were in the lowest number (35). (Table 2).

Two hundred and sixty four patients formed the study group. One hundred and ninety four (73.5%) patients were found to be suffering from dental erosion and 70 patients (26.5%) were observed with other type of tooth wear like attrition and abrasion. (Table 3, Fig 1).

The most common risk factors causing dental erosion were found to be carbonated drinks i.e. 52 (19.7%) patients. The least common risk factor was occupational erosion i.e. is 20 (7.6%). Carbonated beverages were found to be the commonest risk factor in both genders (26 patients each). The least common risk factor in

females was occupational erosion (2 patients). The least common risk factor in males was vomiting (10 patients). (Table 4, Fig 2). In 194 patients of dental erosion, 77 (29.2%) patients had grade-1 dental erosion and 117 (44.3%) were found in grade-2. No patient was observed with grade-3 dental erosion.

Gender wise distribution of grade-1 dental erosion in male and females was 40 and 37 respectively. Gender wise distribution of grade-2 dental erosion in males and females 63 and 54 respectively, (Table 5).

DISCUSSION

Epidemiological studies have reported that dental erosion is common in adolescents. Dental erosion was found 37% in the UK and 41% in the US.⁸ Kazoullis S et al reported tooth erosion was 68%.⁹ McGuire J et al reported tooth erosion as 45.9%.¹⁰ In this study it was 73.48% which is much more than the above mentioned Studies. The difference between the statistics of the

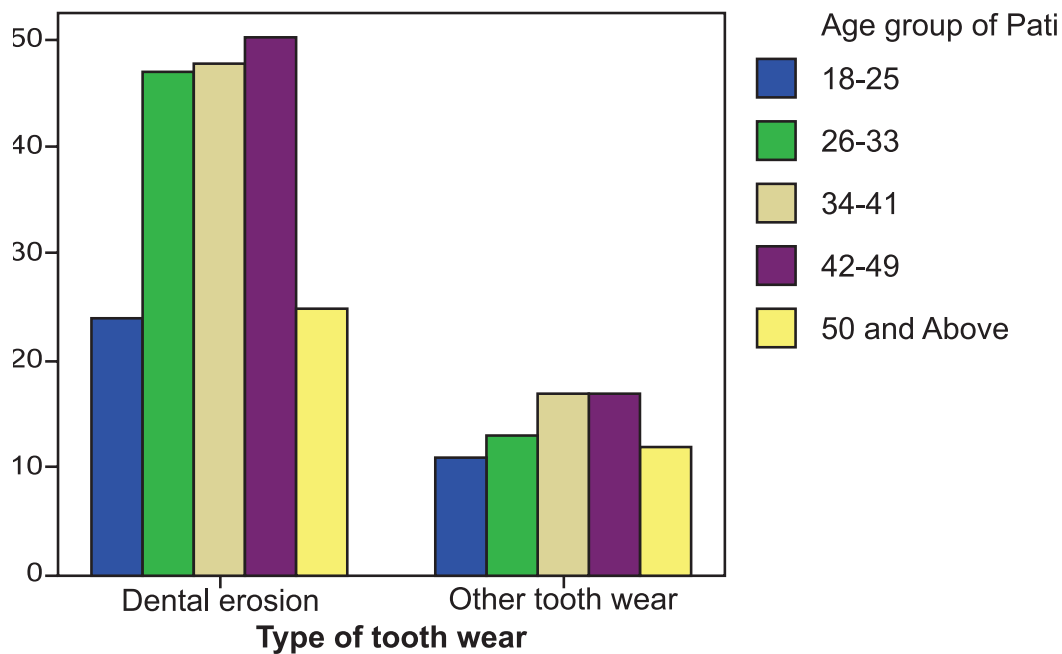


Fig 1: Distribution of tooth wear according to age groups

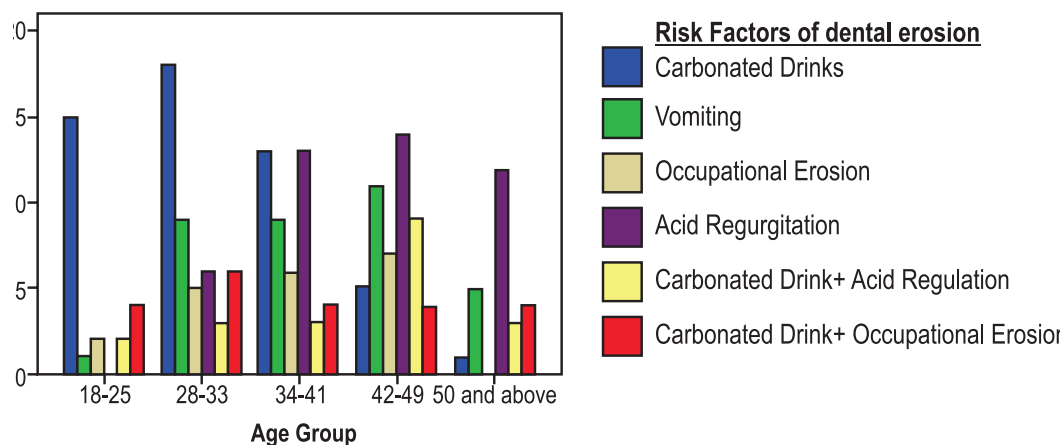


Fig 2: Distribution of risk factors within different age groups

present study and other studies was due to difference in the life style, decreased literacy rate, poverty, lack of awareness and lack of facilities available.

Above mentioned studies were community based but current study was done on patients who visited our college hospital.

Suyama Y et al observed 22.5% occupational erosion.¹¹ Tuominen M and Tuominen R observed occupational erosion 15%.¹² Kim and Douglass reported 5% occupational enamel erosion and 3% dentine erosion.¹³ In this study occupational erosion was 7.6%, perhaps due to less number of industries.

Acid regurgitation is another risk factor of tooth erosion. In this study erosion due to acid regurgitation was 17%. In study done by Munoz et al found dental erosion due to acid regurgitation was 47.5%.¹⁴ Schroeder

et al found tooth erosion in gastro-esophageal reflux disease patients as 40%.¹⁵ While in the study of Rado RE et al observed 20%.¹⁶ Our results of the present study about the acid regurgitation as a risk factor for dental erosion fall within the range of international studies. In western countries acid regurgitation are mostly due to alcohol drinking.^{17,18}

Wang P et al reported 30.7% of dental erosion due to carbonated drinks.⁷ Kannan A et al observed 17.65%¹⁹ and Hamasha AA et al reported 33.6%.²⁰ In the current study erosion due to carbonated beverages was 19.7%. Which is the most common risk factor found in tooth erosion in this study. The reason for being carbonated drinks as the commonest risk factor is that Pakistan has long summer season and people use excessive carbonated beverages due to thirst and fluid loss. There has been a sharp increase in the consumption

of carbonated drinks, fruit juices and squashes in the last few years since the multinational companies are involved in effective advertisement. But the dilemma in this part of the region is that many unregistered local companies are also manufacturing carbonated beverages.

12.5% tooth erosion due to vomiting was observed in the study done by wang p et al.⁷ In present study tooth erosion due to vomiting was 13.3%. Most youngsters especially females of our society are involved in eating disorders of psychosomatic origin such as nervous vomiting, bulimia nervosa which causes self induced vomiting.^{21,22} Other causes of chronic excessive vomiting in this society are GIT disorders like peptic ulcers or gastritis, drug side effects, diabetes or nervous system disorders.

The distribution of tooth erosion with any gender is not specific as it is different in different parts of the world. Wang P et al⁷ reported tooth erosion in male 25.7% and in female 29.9%. Nayak SS et al²³ reported tooth erosion in females 26.73% and in males 15.50%. Shah SA²⁴ reported tooth erosion in male 44.3% and in female 55.7%. In the current study the dental erosion in males and females was 47.3% and 52.7% respectively.

Tooth erosion in the present study was not specific to single age group. The same results have been reported in a study conducted by Shah SA.²⁴

CONCLUSION

Most common grade of erosion according to Eccles and Jenkins index in this society was grade-2 and least common was grade-3. Frequent dental erosion in this study was due to carbonated beverages and acid regurgitation.

Dental erosion was not associated with any particular age group as it was equally distributed among patients of all ages.

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