

## Original Research

# The Prevalence of Tooth Wear and its Associated Risk Factors in Indian South West Coastal Population: An Epidemiological Study

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ABSTRACT

**Background:** The aim of the study was to estimate the prevalence of tooth wear in South West Coastal population of India and to investigate the risk factors associated with it. **Materials and Methods:** This study was conducted in the Department of Conservative Dentistry and Endodontics, A. B. Shetty Memorial Institute of Dental Sciences, Mangalore, and the rural satellite centers during June 2016–August 2016. A total of 1000 patients were evaluated for the presence of attrition, abrasion, erosion, and abfraction followed by the questionnaire to evaluate risk factors associated with it. The data were statistically analyzed using SPSS version 22.0 software. Statistical analysis was carried out by applying Chi-square test for linear trend. **Results:** Total prevalence of tooth wear in the study population was 40.6% of which attrition (29%), abrasion (23.7%), erosion (4.6%), and abfraction (6.3%) were observed. The tooth wear was more prevalent in the age group of 40–60 years. Males and urban population showed higher tooth wear compared to females and rural population, respectively. Erosion lesions were higher in people consuming alcohol and soft drinks and with the gastric regurgitation compared to their counterparts. Attrition lesions were significantly higher among tobacco chewers and in patients with parafunctional habits such as bruxism compared to their counterparts. **Conclusions:** This study throws a light on the prevalence of tooth wear in South West Coastal population of India, and its associated risks, which can be utilized for patient education and increasing the awareness regarding tooth wear as timely intervention is vital for arresting irreversible disease process and the well-being of the patient.

**KEYWORDS:** *Abfraction, abrasion, attrition, erosion, tooth wear*

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## INTRODUCTION

With the increased life expectancy and increased awareness about retaining the natural teeth, consequently, there is higher prevalence of the tooth wear observed in natural permanent dentition with increasing age.<sup>[1]</sup> The changes in the lifestyle, dietary habits, and stress are additional contributory factors to tooth wear. The term tooth wear represents noncarious and nontraumatic dental hard-tissue loss due to various factors. The teeth wear has been traditionally divided under the subheadings; attrition, abrasion, and erosion.<sup>[2]</sup>

Attrition is defined as surface tooth structure loss resulting from the direct frictional forces between contacting teeth. Attrition is a continuous age-dependent process which is usually physiologic.<sup>[3]</sup> The abrasion is defined as surface loss of tooth structure resulting from direct frictional forces between teeth and external objects or from

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frictional forces between contacting teeth components in the presence of abrasive medium.<sup>[3]</sup> Erosion can be defined as the loss of tooth structure resulting from chemomechanical acts in the absence of specific microorganisms.<sup>[3]</sup> Erosion can be from dietary and or gastric sources.

The severely worn dentition can pose risk of disturbing functional occlusion and subsequently developing temporomandibular joint disorders, and also, it challenges the esthetic appearance. This can affect the quality of life, especially in elderly.<sup>[4]</sup>

If timely diagnosed and intervened, the clinician can arrest the progression of teeth wear and thus can reduce the risk of developing consequences.

The objective of the present study was to determine the prevalence and its associated risk factors among adults in Indian South West Coastal population during June 2016–August 2016. The findings of this study will be helpful in planning the preventive as well as treatment measures necessary for tooth wear.

## MATERIALS AND METHODS

The present study was a cross-sectional study conducted among 1000 participants in the duration of 3 months from June 2016 to August 2016, of which 622 participants were from the Outpatient Department of Conservative Dentistry and Endodontics and 378 from rural satellite centers of A. B. Shetty Memorial Institute of Dental Sciences, Deralakatte, Mangalore.

The presence of tooth wear and risk factors associated with it were assessed using a structured questionnaire based on the WHO oral health survey 2013. Ethical approval was obtained from the Institutional Ethics Committee. Written consent of the patient was obtained before examination.

Oral examination was done on the dental chair using sterile diagnostic instruments such as mouth mirror and straight probe.

Detailed history such as dietary habits, parafunctional habits, alcohol consumption, and tobacco chewing and relevant medical history were recorded through questionnaire. Intraoral examination proceeded in an orderly manner from one tooth to adjacent tooth starting from upper right quadrant to lower right quadrant in a clockwise direction. Each tooth was examined for the presence of attrition, erosion, abrasion, and abfraction as per their clinical appearance.

### Inclusion criteria

Participants in the age group of 15 to 66 years were included in the study.

### Exclusion criteria

Participants with edentulous arch and patients not willing to participate in the survey were excluded from the study.

## RESULTS

Data obtained were statistically analyzed using SPSS version 22.0 (IBM Corp., Armonk, NY). The results were subjected to statistical analysis using Pearson's Chi-square test to determine the *P* value of each criterion and *P* < 0.05 was considered to be statistically significant.

A total of 1000 patients were investigated out of which 406 (40.6%) patients showed signs of tooth wear. The mean age of the study participants was 39 (standard deviation [SD] ±7) years. About 63% of male and 37% of female patients were included in the study. 378 patients from rural centers and 622 from hospital outpatient department (urban) participated in survey.

Total prevalence of tooth wear in the study population was 40.6% of which attrition was 29%, abrasion 23.7%, erosion 4.6%, and abfraction 6.3%.

The mean age of study participants was 39 (SD ± 7) years. The overall prevalence of tooth wear was pronounced in the age group of 40–60 years (63.4%).

A significantly more tooth wear in males (45.06%) was observed compared to females (29.19%).

Tooth wear was significantly higher in urban population (44.83%) compared to rural (29.56%).

Regurgitation of intrinsic acid was found to be a major risk factor for erosion (15.1%) compared to the patients without intrinsic acid regurgitation (3.8%).

Erosion lesions were higher in people consuming alcohol (7.6%) and soft drinks (5.5%) compared to their counterparts (3.1% and 1.4%), respectively.

Attrition lesions were significantly higher among tobacco chewers (37.1%) and in patients with parafunctional habits such as bruxism (46.5%) compared to nontobacco chewers and nonbruxers.

## DISCUSSION

The present study was based on the results of clinical examination and questionnaire. The overall prevalence of tooth wear was found to be 40.6%, out of which the most commonly observed lesion was attrition (29%), followed by abrasion (23.7%), abfraction (6.3%), and erosion being the least observed (4.6%).

Attrition was found to be most prevalent in age group more than 60 years (63.4%), whereas abrasion (70.5%),

erosion (32.6%), and abfraction (60.3%) were seen to be highest in age group is 41-60 years old [Figure 1].

The findings are in accordance with the study conducted by Hegde *et al.* in 2014 where the prevalence of tooth wear in South West Coastal population was significantly higher in older generation (57.40%). Similar results were found in a study conducted in the United Kingdom by Bartlett *et al.* in 2011, Ahmed *et al.* in Pakistan 2009,<sup>[5-7]</sup> and Al-Zarea *et al.*<sup>[8]</sup> in northern Saudi Arabia in 2012 where the prevalence of tooth wear increases with age. The increase in tooth wear with age is due to the accumulation of etiological factors which results in increased severity and tooth surface loss overtime.

The tooth wear was significantly higher in males (45.06%) compared to females (21.09%) [Figure 2]. The similar results are found in the study conducted by Al-Zarea *et al.*, wherein the prevalence of tooth wear was found to be more in male than in female participants. This could be due to the use of heavy masticatory forces in males and also due to the fact that females are more conscious about their oral health, thus allowing early detection of the disease and restoring the lesions.<sup>[8]</sup>

Tooth wear was seen significantly higher in urban population (44.83%) compared to rural 29.56% [Figure 3]. This could be due to more stressful lifestyle in the urban population compared to the rural areas. This could also be explained by the difference in dietary habits of urban and rural population like more soft drink and alcohol consumption.

In the present study, alcohol consumption, soft drink consumption, and gastric regurgitation were also analyzed separately with erosion. Our study showed a significant association between gastric regurgitation (gastroesophageal reflux disorder) and soft drink consumption with erosion [Table 1]. Gastric regurgitation of acid was found to be a major risk factor for erosion (15.1%). Erosive lesions were higher in people consuming alcohol (7.6%) and soft drinks (5.5%) than the nonconsuming group (3.1% and 1.4%), respectively.

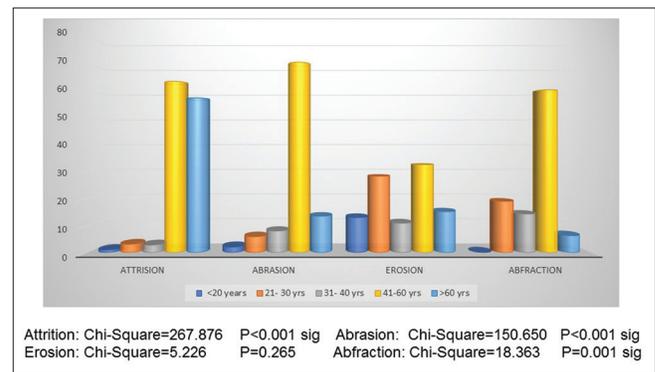
Furthermore, studies conducted by Robb and Smith,<sup>[4]</sup> Bartlett *et al.*,<sup>[6]</sup> and Al-Zarea *et al.*<sup>[8]</sup> showed that alcohol consumption and acidic food intake were associated with tooth wear.

**Table 1: Association of gastric regurgitation, alcohol consumption, soft drink consumption & erosion**

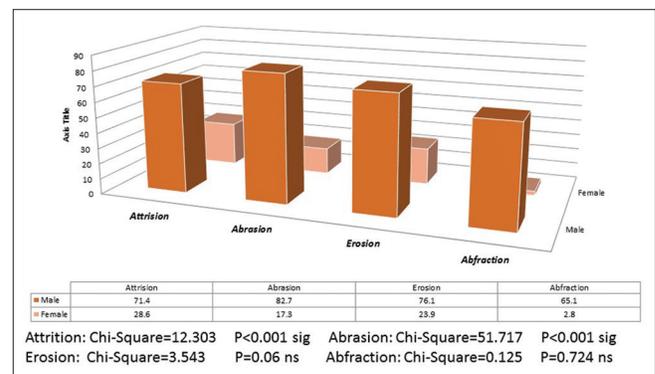
Risk factors	Erosion
Gastric regurgitation	15.1% ( $P<0.001$ sig)
Alcohol consumption	7.6% ( $P=0.001$ sig)
Soft drink consumption	5.5% ( $P<0.001$ sig)

The present study showed a significant correlation between the parafunctional habits such as bruxism and attrition [Table 2]. Out of 391 participants who reported the habit of bruxism, 46.5% had attrition, and among 609 participants who did not have bruxism habit, only 17.7% of them showed attrition. Habit of bruxism allows contact of the teeth for more time; also, the grinding force causes wearing of enamel surfaces leading to attrition of teeth.

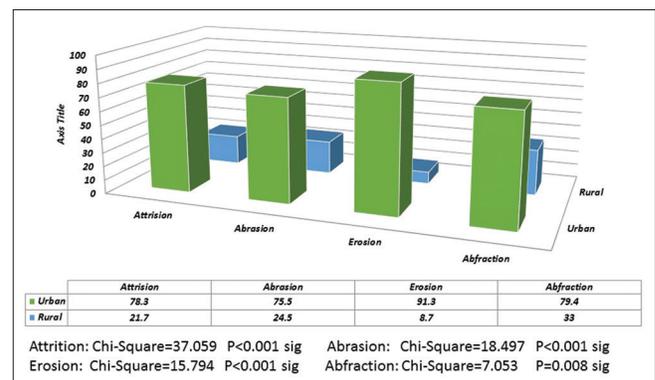
This study showed a significant association between attrition and tobacco chewing [Table 3]. Out of 290 participants who had a history of tobacco



**Figure 1: prevalence of tooth wear in different age groups**



**Figure 2: prevalence of tooth wear among different genders**



**Figure 3: prevalence of tooth wear among different geographic population**

**Table 2: Correlation between the attrition and the bruxism**

	Attrition		Total
	Yes	No	
<b>Bruxism</b>			
<b>Yes</b>			
Count	182	209	391
% within bruxism	46.5%	53.5%	100.0%
% within attrition	62.8%	29.4%	39.1%
% of total	18.2%	20.9%	39.1%
<b>No</b>			
Count	108	501	609
% within bruxism	17.7%	82.3%	100.0%
% within attrition	37.2%	70.6%	60.9%
% of total	10.8%	50.1%	60.9%
<b>Total</b>			
Count	290	710	1000
% within bruxism	29.0%	71.0%	100.0%
% within attrition	100.0%	100.0%	100.0%
% of total	29.0%	71.0%	100.0%

Chi-Square=96.012

**Table 3: Correlation between the tobacco chewing and the attrition**

	Attrition		Total
	Yes	No	
<b>Tobacco chewing</b>			
<b>Yes</b>			
Count	89	151	240
% within tobacco chewing	37.1%	62.9%	100.0%
% within attrition	30.7%	21.3%	24.0%
% of total	8.9%	15.1%	24.0%
<b>No</b>			
Count	201	559	760
% within tobacco chewing	26.4%	73.6%	100.0%
% within attrition	69.3%	78.7%	76.0%
% of total	20.1%	55.9%	76.0%
<b>Total</b>			
Count	290	710	1000
% within tobacco chewing	29.0%	71.0%	100.0%
% within attrition	100.0%	100.0%	100.0%
% of total	29.0%	71.0%	100.0%

Chi-Square=10.021  $P=0.002$  sig

chewing, 37.1% of them had attrition, and among the 760 patients with no history of tobacco chewing, only 26.4% of them had attrition. This was not in

accordance with the study conducted by Sadaf *et al.*<sup>[9]</sup> in the year 2009 in Karachi which found no significant difference between tooth wear and tobacco chewing. This could be due to the type of tobacco chewed in India which is raw and hard and causes loss of tooth surface.

## CONCLUSIONS

Although the etiology of tooth wear is considered to be multifactorial, the findings of this study indicate that the alcohol and soft drink consumption, gastric regurgitation of acids, parafunctional habits such as bruxism, and tobacco chewing are important contributors to the occurrence of tooth wear lesions. Efforts should be made by the dentists to increase the awareness about tooth wear and its associated risk factors as the tooth wear is an irreversible phenomenon, by establishing an early diagnosis, and preventive measures can further restrict the irreversible loss of tooth structure and will play a crucial role for the well-being of the patient.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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