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PREVALENCE OF TOOTH WEAR DUE TO DIETARY FACTORS IN POPULATION OF SOUTH KARNATAKA

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ABSTRACT
The aim of the present study was to assess the prevalence of tooth wear due to dietary factors in population of Dakshina Kannada. The study was conducted in the Department of Conservative Dentistry and Endodontics, A. B. Shetty Memorial Institute of Dental Sciences, Nitte (Deemed to be University), Deralakatte, Mangaluru and rural satellite centres. The prevalence of tooth wear that is abrasion, attrition and erosion was found to be 25.5%, 17.5% and 7.2% respectively. The most common age group affected were found to be more than 60 years for abrasion and attrition and 20-30yrs for erosion. Abrasion was found to be more in males (22.6%) than females (28.7%). Attrition was more in males (20.3%) than in females (14.5%). Erosion was also present more in males (10.1%) than in females (4%). Abrasion was relatively seen more in subjects consuming mixed diet (26.2%) than in those consuming vegetarian diet (22%). The consumption of alcohol, acidic food and other intrinsic factors were analyzed separately with erosion. There was no significant difference found. In the present study, it can be concluded that the prevalence of tooth wear is seen the most in males and in patients more than 60yrs old. The association of tooth wear with dietary habits, alcohol consumption and other intrinsic factors have also been analyzed. It can be concluded that tooth wear is seen in patients consuming mixed diet and alcohol consumption can be a cause for erosion.

KEYWORDS: Attrition, Abrasion, Erosion, acidic food, dietary factors.

INTRODUCTION
Mechanical wear and tear of tooth substance is a consequence of both physiological and pathological means therefore different adaptive strategies have evolved to tackle this situation. A disease state arises when there is disturbance in this balance resulting in early dissolution and loss of tooth substance with subsequent involvement of pulpal and periapical tissues.[1]

Tooth wear is an irreversible, non carious, destructive process, which results in a functional loss of tooth surface, mainly caused by acids in our diet, grinding of teeth, regurgitation of stomach acids and lifestyle factors. The loss of tooth enamel can eventually cause tooth sensitivity and affect the appearance and function of teeth.[2]

Grippo in the year1991 hypothesised the main causes of non carious lesion into four categories which are attrition, abrasion, erosion and abfraction. The wearing of tooth substance as a result of tooth to tooth contact during normal or para functional masticatory activity is attrition. Pathological wear of tooth substance through bio-mechanical frictional processes is known as abrasion. The loss of tooth substance by acid dissolution of either an intrinsic or extrinsic origin, e.g. gastric acid or dietary acids is called erosion. The pathologic loss of tooth substance caused by biomechanical loading forces (flexure of the tooth) at a location away from the point of loading is called abfraction.[3]

The etiology of wear of tooth is known to be multifactorial which include diet, bruxism, para functional habits, gastric regurgitation, medicaments, environment and occupation being the most common.[4]

Both clinical and experimental observations show that individual wear mechanisms rarely act alone but mostly interact with each other. The most important interaction is the potentiation of abrasion by erosive damage to the dental hard tissues.[5] Wear processes are implicated in the development of dentine hypersensitivity. Saliva confers the major protective function against wear due to its role in pellicle formation, buffering, acid clearance, and hard tissue remineralization.[6]

Diet is one of the etiology of tooth wear. The role of acidic foods and drinks is probably important for the progression of tooth wear. Since the critical pH of dental enamel is approximately 5.5, any solution with a lower pH value may cause loss of tooth structure, particularly if the attack is of longer duration and is repeated over time. The total acid level (titratable acid) of dietary substances is considered more important than their pH, because it will determine the actual H^+ available to interact with the tooth surface.[7] The cause of tooth wear being multifactorial it is difficult to pinpoint a major cause for a particular condition.[8]

MATERIALS AND METHODS

This study was a cross sectional study conducted among 1000 subjects in the out patient department and from 5 Rural Satellite Centres of A. B. Shetty Memorial Institute of Dental Sciences, Nitte (Deemed to be university), Deralakatte, Mangaluru. Tooth wear due to dietary factors was assessed using a structured questionnaire. The questionnaire was designed to evaluate the prevalence of tooth wear due to dietary habits. Written consent of the patient was obtained. Patients were examined to assess the prevalence of tooth wear. Clinical oral examination was done on the dental chair under good illumination using sterile diagnostic instruments- mouth mirror, straight probe and tweezers. Clear history of possible etiological factors such as dietary factors, habits, medical history was recorded. Each tooth was examined for the presence of abrasion, attrition and erosion according to their clinical appearance.

RESULTS

Among the 1000 subjects examined 523 were males and 477 were females which is 52.3% and 47.7% of the population respectively. The prevalence of tooth wear that is abrasion, attrition and erosion was found to be 25.5%, 17.5% and 7.2% respectively.

Table 1: Prevalence of tooth wear in Dakshina Kannada population.

Tooth wear	Frequency	Percentage
ABRASION	255	25.5%
ATTRITION	175	17.5%
EROSION	72	7.2%

The most common age group affected were found to be more than 60 yrs for abrasion and attrition and 20-30yrs for erosion.

Table 2: Prevalence of tooth wear in relation to age group.

Age group	Abrasion	Attrition	Erosion
< 20 yrs	24 (26.1%)	5 (5.4%)	4 (4.3%)
20-30yrs	72 (24.7%)	22 (7.6%)	33 (11.3%)
30-40yrs	61 (22.1%)	27 (9.8%)	10 (3.6%)
40-60yrs	74 (28.7%)	81 (31.4%)	18 (7.0%)
>60yrs	24 (28.9%)	40 (48.2%)	7 (8.4%)

Abrasion was found to be more in males (22.6%) than females (28.7%). Attrition was more in males (20.3%) than in females (14.5%). Erosion was also present more in males (10.1%) than in females (4%).

Table 3: Prevalence of tooth wear in relation to gender.

Gender	Abrasion	Attrition	Erosion
MALE	118 (22.6%)	106 (20.3%)	53 (10.1%)
FEMALE	137 (28.7%)	69 (14.5%)	19 (4.0%)

Abrasion was relatively seen more in subjects consuming mixed diet (26.2%) than in those consuming vegetarian diet (22%). Attrition was more in subjects having mixed diet (17.7%) with no statistical difference between the patients having vegetarian diet (16.8%). Erosion was high in patients having mixed diet (7.3%) than in those having vegetarian diet (6.9) with no difference statistically.

Table 4: Prevalence of tooth wear in relation to dietary habits.

Type of diet	Abrasion	Attrition	Erosion
VEGETARIAN	38 (22%)	29 (16.8%)	12 (6.9%)
MIXED DIET	217 (26.2%)	146 (17.7%)	60 (7.3%)

There was no significant difference in the presence of abrasion in subjects who had opposing prosthesis (25.8%). Maximum number of patients who had abrasion were using left hand for brushing (33.3%) but there was no significant difference between the hand used for brushing. It was more in subjects with para functional habits (28.2%). Attrition was significantly high in patients with para functional habits (18.1%) and with opposing prosthesis (39.4%). Association of erosion in subjects with para functional habits (10.3%) and opposing prosthesis (5.3%) were more but there was no statistical difference with the subjects without para functional habits and no opposing prosthesis.

Table 5: Prevalence of tooth wear in relation to para functional habits and opposing prosthesis.

	Abrasion	Attrition	Erosion
PARA FUNCTIONAL HABITS	11 (28.2%)	174 (18.1%)	4 (10.3%)
OPPOSING PROSTHESIS	34 (25.8%)	52 (39.4%)	7 (5.3%)

The consumption of alcohol, acidic food and other intrinsic factors were analyzed separately with erosion. There was no significant difference found.

Table 6: Prevalence of erosion in relation to reasons.

Reasons	Erosion
ALCOHOL	21 (12.7%)
ACIDIC FOOD (EVERY FORTNIGHT)	7 (23.3%)
INTRINSIC	7 (9.7%)

DISCUSSION

Tooth wear is a multifactorial process which usually involves the interaction of physical and chemical agents.[9] The present study was conducted on patients of different age groups with different dietary habits among the Dakshina Kannada population.

In the total population of 1000, 523 were males and 477 were females with the maximum number of patients in the age group of 20-30 years. Among these, 166 belonged to the urban area, 340 belonged to the peri urban area and 494 belonged to the rural areas.

Abrasion is seen more in females (28.7%) whereas attrition (20.3%) and erosion (10.1%) are more in males. The females of South Karnataka exhibited lesser erosive lesions as they are more health conscious and tend to avoid alcoholic and acidic drinks.[10]

The prevalence of abrasion and attrition was more in the patients more than 60yrs of age followed by the patients in the age group of 40-60 yrs. Erosion was found to be more in patients among the age group of 20-30yrs followed by those who belong to 40-60yrs age group. This result is in accordance with the studies done by Bartlett et al,[8] Hina ahmed et al[11] and Bader et al[4] which showed the prevalence of tooth wear to be more with increasing age. Bartlett et al concluded that the increase in prevalence of tooth wear with increasing age could be due to a cumulative effect duration of etiological factors overtime which resulted in increased severity and tooth surface loss.

The maximum number of patients with abrasion used left hand (33.3%) and medium bristled toothbrush (26.8%) for brushing. There is no significant difference between abrasion and frequency of brushing with prevalence of abrasion seen more in patients who brush twice daily (26.6%). So the abrasion lesions could be due to the combined effect of the type of bristles used, the frequency of brushing and the hand used for brushing. There was no significant association between attrition, erosion with the type of bristles used, frequency of brushing and the hand used for brushing.

This study showed increased prevalence of abrasion (26.2), attrition (17.7) and erosion (7.3%) in patients consuming mixed diet than those consuming vegetarian diet. This is in accordance with studies conducted by Bader et al. and Hegde et al.[12]

In this study, attrition was significantly high in patients with para functional habits (18.1%) and with opposing prosthesis (39.4%). The high occlusal forces mainly due to para functional habits and opposing prosthesis usually lead to occlusal tooth wear like attrition.[11]

The alcohol consumption, regularity of acidic food intake and intrinsic factors were associated with erosion of teeth. Though not a significant correlation, erosion was found to be present in patients consuming alcohol (12.7%). Consumption of acidic food every fortnight (23.3%) and intrinsic factors (26.9%) were significantly associated with erosion. This could be due to the acid regurgitation from the stomach which could cause the

erosive effect on the tooth surface. This association is in accordance with studies conducted by Bader k et al and Bartlett et al.

CONCLUSION

Tooth wear is an accumulative and continuous process which is associated with multiple factors. These are a frequent challenge in clinical dental practice, given the variety of options regarding their aetiology, diagnosis and management. In the present study it can be concluded that the prevalence of tooth wear is seen the most in males and in patients more than 60yrs old. The association of tooth wear with dietary habits, alcohol consumption and other intrinsic factors have also been analyzed. It can be concluded that tooth wear is seen in patients consuming mixed diet and alcohol consumption can be a cause for erosion. Recognizing the early signs of wear and erosion should stimulate the need for prevention in an endeavor to prolong the life of tooth.

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