

The Prevalence of Tooth Wear in Adult Population and its Impact on Quality of Life: A Cross-sectional Study

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ABSTRACT

Aim: The present study aims at exploring the prevalence of tooth wear and its impact on the quality of life (QoL) among adults in the Dakshina Kannada population.

Materials and methods: A total of 206 dentate adults who visited the outpatient department of a private dental college were included in the study. During clinical examination, an assessment of tooth wear was done using basic erosive tooth index. It was categorized as none, mild, moderate, and severe. The impact of tooth wear on QoL was assessed using the oral health impact profile (OHIP-14). The associations between tooth wear measures and OHIP-14 were analyzed.

Results: The basic erosive tooth index low score (range 3–8) was seen in 59 (22.85%). A medium score (range 9–13) was seen in 100 (71.3%), and a high score (14 and above) was seen in 47 (22.8%). Moderate and severe (high) tooth wear had an impact on QoL.

Conclusion: Moderate and high tooth wear were noticed in the study population. Tooth wear has an impact on QoL. Along with clinical findings, the impact of tooth wear on QoL needs consideration by the dental professional so that they will be able to provide preventive or restorative management accordingly.

Clinical significance: Early detection of tooth wear can be managed effectively and efficiently. This will be able to reduce discomfort, cost, and duration of the treatment needed. The impact on QoL also may be less.

Keywords: Attrition, Abrasion, Erosion, Quality of life, Tooth wear.

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INTRODUCTION

Among the various oral health problems, tooth wear has been listed as one of the main issues which is affecting a major part of the population.¹ Dentition gets affected throughout life as it is a progressive condition. It is an irreversible multifactorial, noncarious, physiologic-pathologic, or functional loss of dental hard tissues. It is of three types: attrition, erosion, and abrasion. The exact prevalence of tooth wear is difficult to establish as different authors have used different assessment criteria. As age advances, tooth wear also is seen to increase in proportion. Thus, tooth wear, to some extent, is considered age-related. Some amount of loss of tooth structure during life is accounted for as a consequence of wear and tear. Tooth loss is considered pathologic if loss of tooth structure exceeds what is perceived to be normal for a particular age group. Attrition is the physiological wearing of tooth structure and restorations due to tooth-to-tooth contact. Dental erosion is caused by biochemical wear of the tooth wherein a chemical agent weakens the outer layer of the tooth.² This enhances tooth susceptibility to external forces. Forceful or faulty tooth brushing leads to the formation of wedge-like defects in the cervical part of the teeth. This is termed abrasion.² Excessive tooth wear leads to exposure of the pulp. This may lead to various tooth problems like hypersensitivity, pulpitis, periodontitis, poor esthetics, and pulp necrosis. All age groups of people can be affected by tooth wear, but prevalence and severity are seen in adults and older populations.^{3–6} Numerous factors like pain, speech, esthetics, chewing, and many more day-to-day routine activities may affect the quality of life (QoL) of a person.⁷ A limited number of studies have been conducted with regard to wasting diseases and their effects on QoL. Various oral conditions

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or problems have different impacts on day-to-day life. Therefore, clinical status and psychological dimensions need to be addressed whenever dental needs are being evaluated.^{7–9} Thus, the present study aims for an evaluation of the prevalence of tooth wear in the population of Dakshina Kannada and its role in their QoL.

MATERIALS AND METHODS

The study was conducted from January 2021–2022 at Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education, Manipal, India. The study protocol was approved by the Institutional Ethics Committee and Review Board (Protocol no: 20043). A total of 206 participants who visited the Department

of Periodontology were recruited as study participants. Males and females with age above 18 years of age were included in the study with no previous history of medications for oral diseases. Participants with systemic diseases with an influence on tooth wear, such as paralysis, leukemia, epilepsy, depression, and other mental disorders, were excluded from the study. Also, the subjects undergoing treatment for wasting diseases were excluded. All the study participants were informed about the study and signed a written consent form prior to the commencement of the study. While the case selection and clinical examinations were done by the single investigator, the information pertaining to demographic details, oral hygiene practices and systemic history was collected by the other two investigators.

A prestructured, validated questionnaire regarding demographic details, oral hygiene practices, systemic health history, dental history, diet and aerated drink consumption, tooth wear and its effect on the QoL was asked to be filled out by each study participant. Wasting disease was recorded by clinical examination. The tooth wear was graded using the basic erosive tooth wear index (BEWE).¹⁰ When no tooth wear = 0, initial loss of surface tooth structure = 1, distinct defect, hard tissue loss <50% of the surface area = 2 and hard tissue loss ≥50% of the surface area. In scores 2 and 3, the involvement of dentine is present.

The scoring criteria were as mentioned in Table 1. Each study participant was asked to fill out a QoL [oral health impact profile (OHIP-14)] questionnaire.¹¹

The OHIP-14¹¹ consist of a questionnaire as a measure of the social impact of problems that may compromise oral health. Participants were requested to grade any of the troubles in the previous 12 months (using OHIP-14). The OHIP-14 scale scores ranged from 0 to 56, with higher scores indicating poorer QoL.

Statistical Analysis

The data was compiled and analyzed using Statistical Package for Social Sciences (SPSS), version 16.0 (SPSS Inc, Chicago, Illinois, United States of America). Descriptive statistics and frequencies were tabulated. A normality test will be applied to check the distribution of the data. Chi-squared and Mann–Whitney *U* tests will be applied to check the statistical association. Pearson correlation was done with the basic erosive tooth index and QoL. The level of significance was set at *p* < 0.05.

Table 1: Demographic details of the study participants

Variable	Frequency	In percentage (%)
Age	Lowest—37 years Highest—70 years = 53.41 ± 9.05 years	
Gender	Male—109 Female—88	55.4 44.6
Occupation		
Homemaker	69	33.5
Employment	62	30.1
Business	34	16.5
Professionals	41	19.9
Diet		
Vegetarians	48	23.3
Mixed diet	158	76.7
Consumption of aerated drink	206	100

RESULTS

Among 206 study participants, 109 (52.9%) were males, and 97 (47.1%) were female participants. The mean age of the participants was 53.41 ± 9.05 years.

In the study, participants 69 (33.5%), 62 (30.1%), 34 (16.5%), and 41 (19.9%) were homemakers, employed (of different grades), and business and professional workers, respectively.

Most of the study population had a mixed diet, whereas 48 (23.3%) of the participants were vegetarians. Aerated drink consumption was reported at 100% (Table 1). The frequency of aerated drinks was on a weekly basis.

Among the study participants, 95 (46.1%) were brushing horizontal strokes, and 111 (53.9%) were practicing mixed strokes. A total of 135 (65.5%) study participants brushed their teeth for <2 minutes twice daily. Whereas 71 (34.5%) brush their teeth for >2 minutes twice daily. A total of 39 (18.9%) participants only used interdental aids, along with tooth brushing. Dental floss was used by 45 (21.8%) of the study participants (Table 2).

In health status, 60 (29.1%) participants were healthy. Diabetes and hypertension were seen in 88 (42.7%) of the study population, and these participants were taking medication on a daily basis for the same. Around 10.7% of participants had diabetes associated with gastric issues or with hypertension and gastric issues (Table 2).

A total of 13 (6.3%) had no dental problems. Only 56 (27.1%) of the study participants had dental problems such as decay, gingivitis, periodontitis, sensitivity, and missing teeth. However, 115 (55.8%) participants had dental problems such as gingivitis, periodontitis, and bruxism. Around 22 (10.7%) of the 206 study participants had hopeless teeth or poor prognosis teeth. These teeth were referred for extraction as treating such poor-condition teeth is very challenging (Table 2).

The number of teeth present in the oral cavity varied from 25 to 31. Wasting diseases like attrition, abrasion, and erosion. Attrition was seen in 59 (28.6%) of the study participants. Erosion was seen less. Only abrasion was seen in 22 (10.7%). The source of information for wasting disease was from dentists, newspapers,

Table 2: Oral hygiene practice and systemic health among study participants

Variable	Number	In percentage (%)
Brushing frequency and duration		
Twice daily and >2 minutes	71	34.5
Twice daily and <2 minutes	135	65.5
Direction of strokes		
Horizontal	95	46.1
Mixed strokes	111	53.9
Use of dental floss	45	21.8
Dental history		
Decay+ gingivitis+ periodontitis+ sensitivity + Missing teeth	56	27.1
Gingivitis +periodontitis+ bruxism	115	55.8
Hopeless teeth	22	11.7
Medical history		
Healthy		
Diabetes	60	29.1
Diabetes+ gastric disease+ hypertension	23	11.2
Diabetes +hypertension	22	10.7
Gastric disease	88	42.7
	13	6.3



and magazines. Around 161 study participants complained about sensitivity to hot and cold foods. A total of 169 participants said they feel sensitivity because their teeth have become thin, short, and structurally compromised. Around half of the study participants had the habit of tooth grinding. The majority of participants had their last dentist visit one or two years ago. All the study participants brushed their teeth twice daily. The basic erosive tooth index low score (range 3–8) was seen in 59 (28.6%). A medium score (range 9–13) was seen in 100 (48.5%), and a high score (14 and above) was seen in 47 (22.8%) (Table 3). Study participants were asked to fill out a QoL questionnaire. A total of 117 (56.8%) participants faced difficulty in chewing food or food getting stuck most of the time, whereas 89 (43.2%) responded that they faced occasional difficulty in chewing food because of their teeth or dentures. When the question was asked regarding ill-fitting dentures, 89 (43.2%) of the study participants had no denture or prosthesis in their mouth. Around 117 (56.2%) participants were having some issues with their prostheses. 45 (21.8%) participants had no toothache or soreness in their mouth, whereas 89 (43.2%) had a painful ache in their mouth sometimes or occasionally (Table 4).

The Pearson correlation was done with the basic erosive tooth index and QoL. There was a positive correlation with an *r*-value of -0.787.

Inference of the Result

Out of 206 participants, various dental problems were recorded. Aerated drink consumption was reported at 100%. Wasting diseases like attrition, abrasion, and erosion. Most of the study participants complained about sensitivity to hot and cold foods, and this may be due to their teeth having become thin, short, and structurally compromised. The basic erosive tooth index; low, medium, and high was seen at 28.5, 71.3, and 22.8%, respectively. All these factors led to poor QoL, and they had difficulty carrying out day-to-day activities.

DISCUSSION

In the present study, the prevalence of tooth wear and its effect on QoL were assessed. The present study had 206 study samples. In the present study, responses were collected from both males and females ranging in age from 18 to 74 years. This is similar to an earlier study by Al-Omiri et al.⁷ Earlier studies have mentioned a few occupations as one reason for wasting disease.^{12,13} The etiologic factors can either be extrinsic or intrinsic for tooth wear. One of the major etiologic factors for dental erosion is exposure to environmental pollutants like silica, acids, and pharmaceuticals which, over a period, cause considerable tooth substance loss. The occupations like glass, quartz, battery and galvanizing

work, clothing factory, and granite work have been associated with various oral diseases, including tooth wear.¹² Occupation-related tooth wear may be one of the reasons for developing the wasting disease. Around two-thirds of the study, participants were involved in different grades of occupation. This needs to be further investigated. The type of diet also has an impact on tooth wear. A total of 76.7% of the study participants had a mixed diet, which included having acidic drinks and coarse and chewable food. This is similar to an earlier study by O’Toole.¹ Wasting disease was commonly seen in a considerable proportion of patients with hypertension and diabetes, which was like earlier.^{3,14} Around half of the study population had dental problems like gingivitis, periodontitis, decay, and other problems. The lack of maintenance of good oral hygiene may be due to the difficulties (sensitivity and pain) developed because of wasting diseases. A major portion of the study participants practiced horizontal and mixed strokes of brushing. This needs to be modified since it is a daily activity and a principal factor which contributes to wasting disease. Tooth brushing instruction is a vital part of any oral health promotion programme. It targets to improve people’s knowledge, attitudes, and behaviors towards oral health. It allows people to develop their self-care skills to control dental hygiene. During the instruction, it is important to provide enough time and repetition to master the skills. The study participants exhibited moderate and high scores in the basic erosive tooth index. In the study, tooth wear and its impact on QoL were assessed. It was seen that QoL was affected in patients with moderate to severe tooth wear. This was similar to an earlier study by Li and Bernabe.² In the study by Patel and Baker,¹⁵ tooth-wear was assessed using Smith and Knight criteria and the basic erosive wear index and classified as mild, moderate, and severe. Correlation analyses were conducted between OHIP-14 total scores and tooth wear type. There was a significant association

Table 4: Oral health impact profile (OHIP-14) questionnaire mean score among the study population

Domain	OHIP-14	Mean ± standard deviation
1. Functional limitation	Had trouble pronouncing any words The felt sense of taste is worsened	2.06 ± 1.13
2. Physical pain	Had painful aching Found uncomfortable eating any food	2.12 ± 1.18
3. Psychological discomfort	Been self-conscious Felt tensed	2.19 ± 1.15
4. Physical disability	Felt diet has been unsatisfactory Had to interrupt a meal	2.27 ± 1.10
5. Psychological disability	Found it a bit difficult to relax Been a bit embarrassed	2.22 ± 1.11
6. Social disability	Been a bit irritable Had difficulty in doing usual jobs	2.25 ± 1.13
7. Handicap	Felt life is less satisfying Been totally unable to function	2.21 ± 1.12
Overall OHIP-14 score		30.64 ± 14.93

Table 3: Wasting disease and BEWE score among study participants

Variable	Frequency	Percentage (%)
Attrition	59	28.6
Abrasion	22	10.7
Abrasion+ attrition	115	55.8
Erosion	10	4.9
BEWE index score		
Low (3–8)	59	28.6
Medium (9–13)	100	48.6
High (14 and above)	47	22.8

between tooth wear and OHR-QoL, with more severe tooth wear associated with greater oral health impact on daily life.

The prevalence of tooth wear among the population is rising, and it is becoming an important public health problem.

Certain dietary patterns, increased intake of citrus fruits, improper brushing technique, and parafunctional habits may be a few important issues that need to look into.³

Dental professionals should focus on patients' clinical characteristics as well as their impacts on QoL. Preventive or restorative management should be tailored as per the need. OHIP-14 measures have the potential to offer insights into how oral conditions affect aspects of daily life that are essential for patients and individuals.¹ Traditional or professionally determined outcome measures for the assessment of tooth wear can be used for the prioritization of care for those who need it most.¹⁶ Further research could look into the impact of each of these clinical entities on QoL. This may aid in identifying the factors with the greatest impact on people's lives. Future studies need to be conducted to assess dental hypersensitivity and esthetics in relation to tooth wear and their impact on QoL.

The various oral problems and their severity in the community can be analyzed using several methods. They are usually used to determine both the occurrence of diseases and the associated conditions in the community. In this study, the impact of tooth wear and its effect on well-being is measured using an instrument like OHIP-14. This is in agreement with other available literature.^{17,18} The present study had a few limitations, such as a small sample size and the study was cross-sectional in nature. A large proportion of the study population had diabetes and hypertension as a systemic illness. The future study should focus on assessing the impact of systemic disease on tooth wear is not evaluated in the present study.

CONCLUSION

In conclusion, the results of the present study showed the basic erosive tooth index low score (range 3–8) was seen in 59 (22.85%). A medium score (range 9–13) was seen in 100 (71.3%), and a high score (14 and above) was seen in 47 (22.8%). Moderate and severe (high) tooth wear had an impact on QoL. Thus, the present study provides some evidence for the impact of tooth wear on the QoL among the study participants. Tailor-made instructions will help to set a goal and incorporate planning and self-monitoring to make the behavior change more effective. Future studies should focus on this direction.

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