



Reason for tooth material loss among FMR patients - A retrospective study

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ABSTRACT

Tooth wear is a general term describing the loss of dental hard tissues, from the surface of the teeth caused by factors other than dental caries, trauma and developmental disorders. Attrition, Abrasion and erosion usually cause alterations of the tooth surfaces and manifest as tooth wear. Tooth surface loss may be considered physiological or pathological. Physiological tooth surface loss occurs as a result of mastication and adjustment, which is required for the teeth to function correctly. Physiological tooth surface loss may also occur at interproximal tooth surfaces due to friction between the adjacent teeth. Inversely, pathological tooth surface loss represents unacceptable levels of dental hard tissue loss. It is characterized by abnormal destruction, which may require treatment. The aim was to assess the reason for tooth material loss among FMR diagnosis patients. A retrospective study sample of 65 cases was collected from DIAS (Dental Information Archiving Software). The data was converted into an excel sheet for tabulation and further statistical analysis were done in SPSS. The p-value was insignificant and the current study proves that the reason for tooth material loss is predominantly caused by attrition. Within the limits of the study, the reason for tooth material loss is due to attrition.



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INTRODUCTION

Tooth wear is a general term describing the loss of dental hard tissues from the surfaces of the teeth caused by factors other than dental caries, trauma and developmental disorders. Attrition, erosion and abrasion usually cause alteration of the tooth surface and manifest tooth wear (Litonjua *et al.*, 2004; Jain *et al.*, 2019). The term abrasion is derived from the Latin verb *abradere* (to scrad off). It describes the pathological wearing off involving the dental hard tissue via a mechanical process involving foreign objects. The foreign objects are said to be repeatedly introduced in the mouth and cause the condition (Lussi and Jaeggi, 2006; Jyothi, 2017). Depending on the etiology. The patterns may

vary from localized to diffuse. The term abfraction describes a wedge-shaped defect at the cementoenamel junction of a tooth. Lesions due to abfraction are also termed as cervical stress lesions. Attrition is the condition resulting mainly from tooth to tooth contact without any foreign substance intervention. It may also be described as physiological wearing off and is defined as the action of rubbing against something (Briggs *et al.*, 1996; Duraisamy, 2019). The term erosion is described exclusively as a surface phenomenon differs from caries in which there is the destruction of both the surface and the subsurface areas of the human teeth (Mehta, 2012; Selvan and Ganapathy, 2016). Tooth surface loss may be considered physiological or pathological. Physiological tooth surface loss occurs as a result of mastication and adjustment, which is required for the teeth to function correctly (Kreulen *et al.*, 2010; Ganapathy, 2016). Physiological tooth surface loss may also occur at interproximal tooth surfaces due to friction between the adjacent teeth. Inversely, pathological tooth surface loss represents unacceptable levels of dental hard tissue loss. It is characterized by abnormal destruction, which may require treatment (Subasree *et al.*, 2016; Restrepo, 2017). Pathological tooth surface loss is considered to be a common clinical finding in both children and adults, and its prevalence increases with age. Pathological tooth surface loss lesions may be found to affect any tooth surface. However, even though each type of tooth surface loss has its own clinical appearance when present on its own, the four types may occur concurrently and interact to create a mixed tooth surface loss lesion, which may make diagnosis difficult (Dahl, 1989; Jain *et al.*, 2017). Tooth surface loss may be asymptomatic with patients who are thus unaware of it, and it is only revealed during a clinical examination. However, it may also be symptomatic and symptoms such as tooth hypersensitivity, function impairment and negative effects on the patient's appearance may encourage the patient to seek dental advice. In physiological processes that occur as part of the ageing process, causing an enamel loss between 28-30 nm per annum (Fareed *et al.*, 1990; Vijayalakshmi and Ganapathy, 2016). Indeed, various forms of tooth wear that commonly occur are linked to, diet, parafunctional study activity and so on. This leads to the loss of hard tissues because of a combination of mechanical and chemical processes. Tooth surface loss forms do not include trauma, or bacteria or developmental disorders. Since current study is more prevalent to attrition, the wear from attrition may be localized on the occlusal surface of posterior teeth, the palatal surface of anterior maxillary teeth, the labial sur-

faces of mandibular anterior teeth, the labial surfaces of mandibular anterior teeth, and the incisal edges of the anterior teeth (Lyon *et al.*, 1987; Ganapathy *et al.*, 2017). The affected surfaces are of attrition may be associated with yellowish-brown discoloration if the wear has penetrated the enamel wear may also concern interproximal surfaces leading to mesial drifting and broadening of proximal contacts. Pathological tooth wear can trigger symptoms such as tooth hypersensitivity, pulpal complications, discoloration and loss of functions (Øilo *et al.*, 1990; Ashok and Suvitha, 2016). Additionally, the esthetics of patients can also be impaired when the severe loss of tooth substance changes the patient's physiognomy, such as the position of the smile line, the horizontal occlusal plane and the incisal edge position (Addy and Shellis, 2006; Ashok *et al.*, 2014). Therefore, prevention and clinical treatments are needed for pathological dental wear. That, both dentists and research professionals, are required to devise strategies to minimize and manage dental wear based on an understanding of associated wear mechanism (Khan *et al.*, 1998; Venugopalan, 2014). Initial management of tooth surface loss depends on an accurate diagnosis of the condition, the identification of the etiology and frequent monitoring of the successive charges; hence to prevent further damage. Treatment planning is sometimes very challenging and it is very necessary that accurate analysis of the tooth surface loss is made at an early stage and that satisfactory preventive measures are carried out (Smith and Knight, 1984; Kannan and Venugopalan, 2018). The interrelationship of the four modes of tooth surface loss and individual susceptibility influence the degree of tooth wear. Recognition of the multifactorial nature of the condition is the first step in its management, as failure to appreciate this may lead to inappropriate management and ultimate failure of restorative therapy (Okunseri *et al.*, 2015). While considering all the above factors, our study aims at analysing the reason behind tooth material loss among FMR patients.

MATERIALS AND METHODS

The study was carried out in an institutional setting with the advantage of flexible data available, and the disadvantage is limited population covered. The approval was granted by the Institutional Ethics Committee. The study involves two examiners. Internal validity- Random selection of participants, External validity- Defining the eligibility criteria of the sample Generalised to the south Indian population

Based on internal and external validity, data was col-

lected. The data timeline included the patients who recorded with tooth material loss in an FMR diagnosis between 1st August 2019 to 31st December 2019. Data was collected from the patient records, 70 case sheets of the patients were reviewed. Cross verification of data was done by photographic and radiographic views to minimise the sampling bias. Data retrieved were chronologically recorded and tabulated in MS Excel sheet.

Parameters assessed and tabulated were:

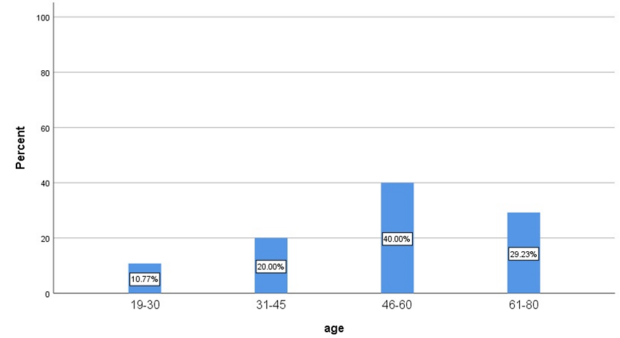
1. Patient name
2. Age
3. Gender
4. Treatment name
5. Teeth no
6. Reason for tooth material loss

The variables were coded and imported to SPSS. Using SPSS version 20.0, descriptive statistics were carried out. Chi-square test was used for inferential statistics, p-value <0.05 was considered to be statistically significant.

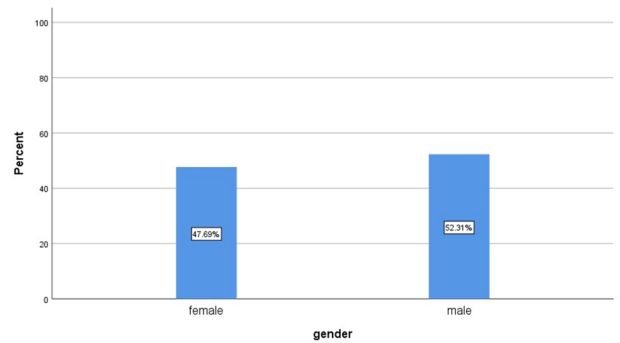
RESULTS AND DISCUSSION

Graph 1, Shows the frequency of reason for tooth material loss based on age from 19-80 years. The X-axis represents the age distribution and the Y-axis represents the frequency of reason for tooth material loss according to age category. Out of which 46-60years of age category are found to be high with tooth material loss which is about 40%. Graph 2, Shows the frequency of reason for tooth material loss based on gender. Among this category population of males are more prevalent to tooth material loss. The X-axis represents the gender distribution and the Y-axis represents the frequency of reason for tooth material loss. Out of which males are found to be high with tooth material loss which is about 52.3%. Graph 3, Shows frequency of reason for tooth material loss based on the treatment done. FMR diagnosis is the only treatment done for the entire population. The X-axis represents the treatment name and Y-axis represents the frequency of reason for tooth material loss. Out of which all the patients have undergone FMR Diagnosis, which is about 100%.

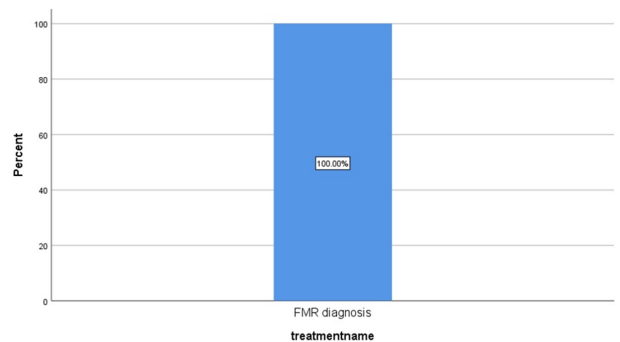
Graph 4, Shows the frequency of reason for tooth material loss based on the teeth number/arch. The X-axis represents the teeth number/arch, and the Y-axis represents the reason for tooth material loss



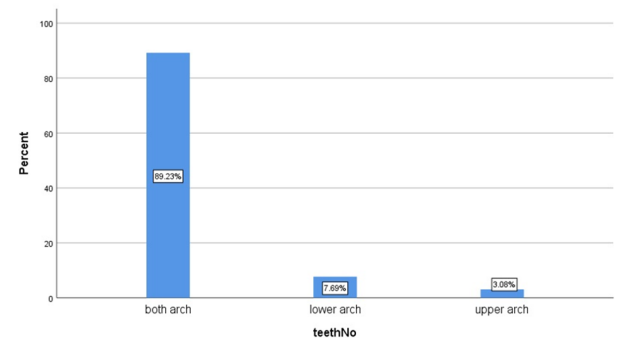
Graph 1: Distribution of study subjects based on age and tooth material loss



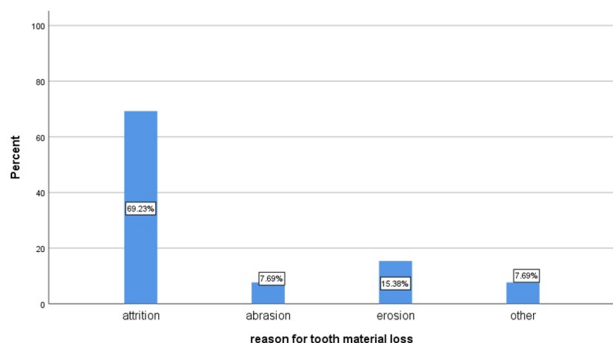
Graph 2: Distribution of study subjects based on gender and tooth material loss



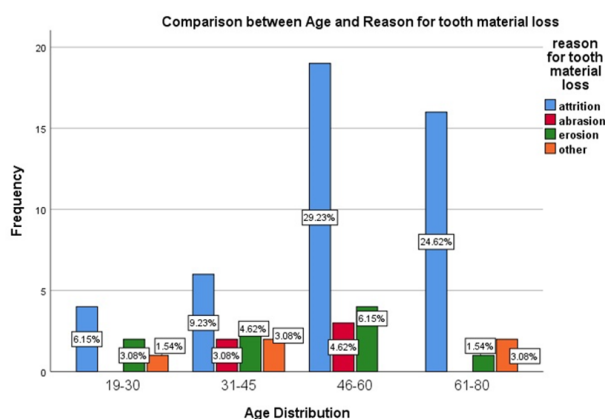
Graph 3: Depicts treatment in tooth material loss



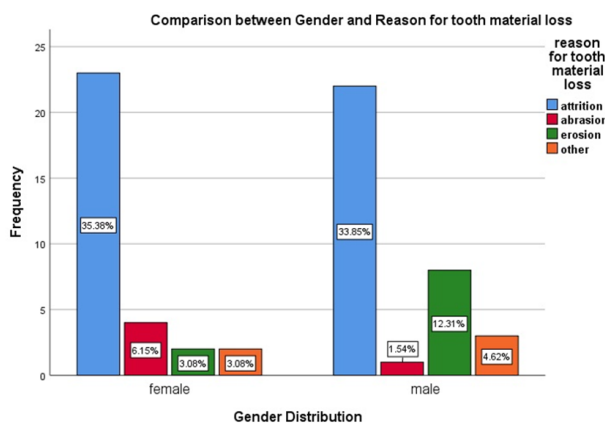
Graph 4: Depicts the relation between teeth number/arch and reason for tooth material loss.



Graph 5: Depicts the reason for tooth material loss.



Graph 6: Association between age and tooth material loss in the study subjects



Graph 7: Depicts the Association between gender and tooth material loss in the study subjects.

according to the arches. Out of which most of the patient shave been recorded with tooth material loss in both arches which is about 89.3%. Graph 5, Shows the frequency of reason for tooth material loss. Among these categories, most of the patients were recorded with attrition for loss of the tooth. The X-axis represents the reason for tooth material loss and the Y-axis represents the frequency of the respective reason for tooth material loss. Out

of which attrition is the main cause for tooth material loss which is about 69.2%. Graph 6 - Comparison between age and reason for tooth material loss. Among the comparison age, category 46-60 years old have significant loss of tooth material mainly attrition. Where blue colour denotes attrition, pink denotes abrasion, green denotes erosion and orange denotes others. The X-axis represents the age distribution and the Y-axis represents the frequency of reason for tooth material loss. Association between age and reason for tooth material loss was done using Chi-square test(P value=0.24) was found to be statistically not significant. Graph 7 - Comparison between gender and reason for tooth material loss. Among the comparison, males have significant loss of tooth material loss. Where blue colour denotes attrition, pink denotes abrasion, green denotes erosion and orange denotes others. The X-axis represents the gender distribution and the Y-axis represents the frequency of reason for tooth material loss. Association between gender and reason for tooth material loss was done using Chi-square test(P value=0.13) was found to be statistically not significant.

According to the current study, there were a total of 65 patients who reported to the OP during august 2019 to December 2109 of saveetha dental college. Out of which, 26% of the patients in the age group of 46-60 years. 19% of the patients in the age group of 61-80 years,13% of the patients in the age group of 31-45 years and 7% in the age group of 19-30 years. Distribution of patients based on gender and recorded with material tooth losses were 34% of the male population and 31% of them were females. Distribution of patients based on treatment undergone. All 65 patients have undergone FMR diagnosis that is about 100%. Distribution of patients based on teeth number/arch recorded with tooth material loss was, 88% of the patients had tooth material loss in both arch and 5% in the lower arch and 2% in upper arch alone. Distribution of patients based on the reason for tooth material loss, 95% of patients had attrition, 10% had erosion, and 5% had abrasion (Imfeld, 1996; Basha et al., 2018) to Ricca Chairunnisa et al. (Chairunnisa and Sihombing, 2017). By comparing age and reason for tooth material loss it is evident that 46-60 years of age have significant loss of tooth material where attrition is about 29.3%, abrasion is about 4.6% and erosion is about 6.1% and Chi-square test(P value=0.24) was found to be statistically not significant. By comparing gender and reason for tooth material loss it is evident that females have significant loss of tooth material loss where attrition is 35.3%, abrasion is 6.1% and erosion is 3.1%

and Chi-square test (P value=0.13) was found to be statistically not significant. There was a significant loss due to material loss which results in imbalance occlusion of teeth so that teeth will receive a larger load. The study also concluded there was partial tooth loss in patients who are aged above 18 years.

According to Schmitt (2019), even though there was a preventive measure to control tooth material loss, there was a significant increase in attrition with age. In this study, attrition was significant in the age group of 40-50 years. According to McKee and Molnar (1988); Ajay (2017), there was relatively increased attrition in the middle-aged population due to relatively food habits and bruxism. In this study, attrition was predominantly found in males than in female population.

According to Jarkander et al. (2018), Dental erosion is significant in younger adults due to consumption of soft drinks, juice and sports drinks, which causes tooth hypersensitivity when eating and drinking. Predominantly males were subjected to erosion, according to Wetselaar et al. (2016). Tooth wear has significantly increased in the past few years.

This study proves that tooth wear increases with age and the most commonly affected population is females. According to Lewis and Smith (1973), There is a significant relationship between erosion and attrition in extensive tooth tissue loss due to systemic diseases and personal and food habits, lack of oral dental hygiene also.

Moreover, most of the studies compared above proves that the reason for tooth material loss is commonly present in males and the main cause is due to attrition (Awasthi, 2018). These are also opposing studies to prove that erosion in the female population is prevalent. But still, this study has a significant p-value to prove that attrition is the main cause of teeth material loss. The current study possesses a few limitations like small sample size. The results go well-matched with existing literature evidence, making the overall consensus agreeable.

CONCLUSION

Within the limits of the study, the reason for tooth material is attrition. Due to the insignificant p-value concluded from the current study. Preventive measurements should be taken to reduce attrition by better food habits and good oral hygiene. Better treatment should be provided for the benefit of patients and satisfaction.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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