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COMPARISON BETWEEN INCISAL AND OCCLUSAL TOOTH WEAR IN PATIENTS UNDERGOING DENTAL TREATMENT

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Abstract

Tooth Wear (TW) is a progressive condition that affects our dentition throughout life. It includes attrition, abrasion, erosion and abfraction. Since attrition is the most prevalent type of TW, we have attempted to compare its incidence occlusally (in posterior teeth) and incisally (in anterior teeth), hoping that the results may help recruit appropriate methods of prophylaxis to decrease the incidence of TW in patients undergoing dental treatments. A retrospective cross-sectional study was conducted using 86,000 patient records from Saveetha Dental College between June 2019 and April 2020. Patients with established records of attrition in their dental statuses were selected from the age of 40 to 70 years. A Microsoft Excel data spreadsheet was used to collect data and was later exported to SPSS for Windows. Out of a total of 57 patients, 77.2% were males and 22.8% were females highlighting a male predilection for TW. The highest incidence with 47.4% was seen both incisally and occlusally - that is, in patients having attrition in both sites. It was followed by patients having attrition only in the occlusal aspect (31.6%) and lastly patients with only incisal TW (21.1%). On cross-tabulating gender and the type of TW, we inferred that in males it was most common to experience TW both incisally and occlusally and that they experienced incisal tooth wear the least. In females, it was suggested that the most amount of TW was incident occlusally and least of all, incisally. Once lost, tooth structure cannot be naturally replaced. Thus, its prevention is imperative. Identifying a pattern in its incidence is a great step forward in terms of improving existing prophylactic measures. Thus, further studies must be carried out to overcome our limitations and to confirm our findings.

KEYWORDS: *Tooth Wear; Occlusal Tooth Wear; Incisal Tooth Wear; Gender; Incidence.*

Introduction

Tooth wear can be defined as the loss of tooth substance by means other than dental decay [1]. It is an extremely common condition that is prevalent in almost 97% of the total population [2]. Tooth wear includes attrition, abrasion, erosion and abfraction [3,4]. Attrition is the loss of occlusal surfaces due to the impact of a tooth against another tooth. Abrasion is the tooth wear on buccal surfaces, mainly caused due to toothbrushing. Erosion is the loss of dental hard tissue brought about by combined chemical-mechanical forces that are a result of food consumption. Abfraction explains how teeth can fracture - especially at the cementoenamel junction as a result of stress from biting, chewing and grinding [5–7]. Out of all the forms of tooth wear, attrition is the most commonly prevalent [8]. Also, it is established that tooth wear can be found in all age groups, but predominantly in adults and the older population [9,10]. In fact, up to 88% of tooth wear is found in older people [11]. The

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gradual loss of periodontal health as one ages also increases the susceptibility of elderly patients to tooth loss. Thus in our study, we selected patients with attrition and no other type of tooth wear in the adult population. Generally, it is convenient to employ the use of the Tooth Wear Index (TWI) developed by Smith and Knight, where four surfaces - namely the buccal, cervical, lingual and occluso-incisal surface of all the present teeth in the oral cavity are scored for tooth wear intensity [12–14]. But because the TWI presents with limitations and our study aims to compare the occlusal and incisal surfaces against each other, we have opted not to use this index and instead we have employed the use of the dental status of DIAS where we may obtain the type and position of the tooth such that we may analyse the incidence of anterior (incisal) and posterior (occlusal) attrition.

Although carries remained a great concern in the dental world for over several decades, its current decline has unveiled the increasing amount of tooth wear in our community that is commonly neglected, even though it results in a risk of increased susceptibility to tooth decay and dentin hypersensitivity that could cause pain and restoration failure. It may even lead to the loss of occlusal stability and altered dimensions in severe cases [15–17]. Anterior teeth are the pillars of dental aesthetics and thus anterior tooth wear plays an important role in the compromisation of the same. Although tooth wear is a natural sign of physiological aging and need not be contained, pathological tooth wear caused by parafunctional habits such as bruxism [18,19] are harmful and can cause severe tooth wear that must and can be prevented. Thus, our study aims to obtain results so as to pinpoint where attrition is more common and in turn help to better prophylaxis with the knowledge of its incidence and gender predilection.

MATERIALS AND METHOD

Study Design and Setting

This retrospective study examined the records of 86,000 patients from June 2019 to April 2020 undergoing treatment at Saveetha Dental College, Chennai, India. Ethical approval was obtained from the Institutional Ethics Committee. The study population included patients with established records of attrition in their dental statuses between the adult ages of 40 years to 70 years. They were separated according to their sex and the area of incidence of attrition - whether incisally (anteriorly) or occlusally (posteriorly) or both (incisally and occlusally). Mentally or physically disabled individuals were excluded from the study due to their difficulties experienced while participating.

Data Collection

The patient records of 86,000 patients who visited Saveetha Dental College from June 2019 to April 2020 were analysed and were used to identify 57 patients in the hospital database undergoing various dental treatments, but with an established record of attrition in their dental statuses. Relevant data such as patient age, sex and tooth number involved was recorded. Repealed patient records and incomplete entries were excluded. The data obtained was verified by an external reviewer.

Statistical Analysis

Data was recorded in Microsoft Excel 2016 (Microsoft Office 10) and was later exported to the Statistical Package for the Social Sciences for Windows. (Version 20.0, SPSS, Inc., Chicago, USA) and was subjected to statistical analysis [20–24].

RESULTS

The final dataset consisted of 57 patients of predominantly South Indian origin undergoing various treatments but with established attrition in three possible regions – incisally (anteriorly), occlusally (posteriorly) or in both (anteriorly and posteriorly). As inferred from Figure 1, 77.2% of the study population were males and 22.8% were females suggesting that tooth wear has a gender predilection in favour of males. The mean age of the study population was 50.8 years. The highest incidence of tooth wear was seen in the category of 'Both' with 47.4% followed by occlusal tooth wear (31.6%) and lastly by incisal tooth wear (21.1%). The most common type of

tooth wear in males was both (occlusal and incisal), followed by occlusal and finally incisal tooth wear (23>12>9). The most common type of tooth wear in females was occlusal tooth wear (6 people) followed by both (occlusal and incisal) where there were 4 people and finally incisal tooth wear (3 people). Thus, among both genders, incisal tooth wear occurred the least.

The style of our current research takes its roots from previous studies, where the investigators included various clinical reports, interventional studies [25–28], in-vitro studies [29] and systematic reviews [30–34].

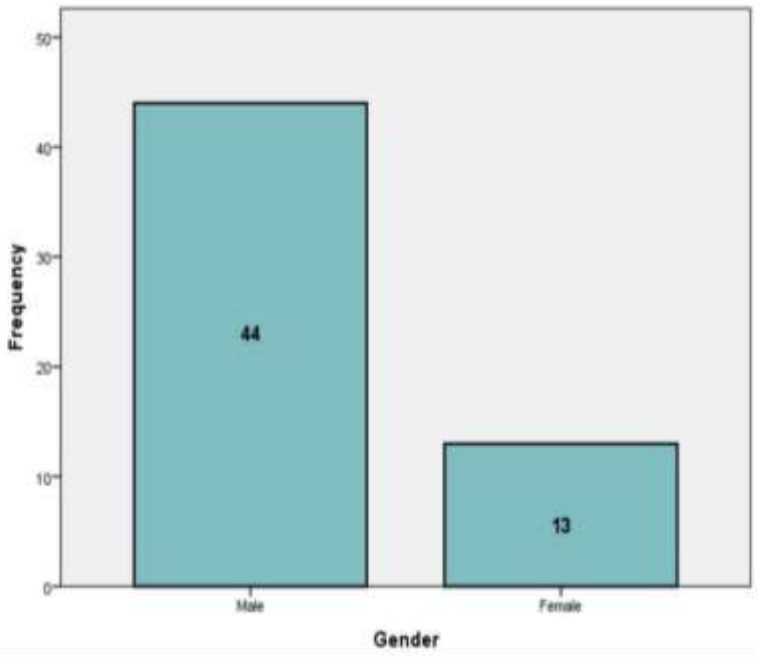

Figure 1 - Bar chart representing the gender wise distribution of the study population. The 'X' axis represents the gender and the 'Y' axis denotes the count of study participants. 44 participants of the total study population of 57 were males while only 13 were females. Hence there is a male predilection for tooth wear.

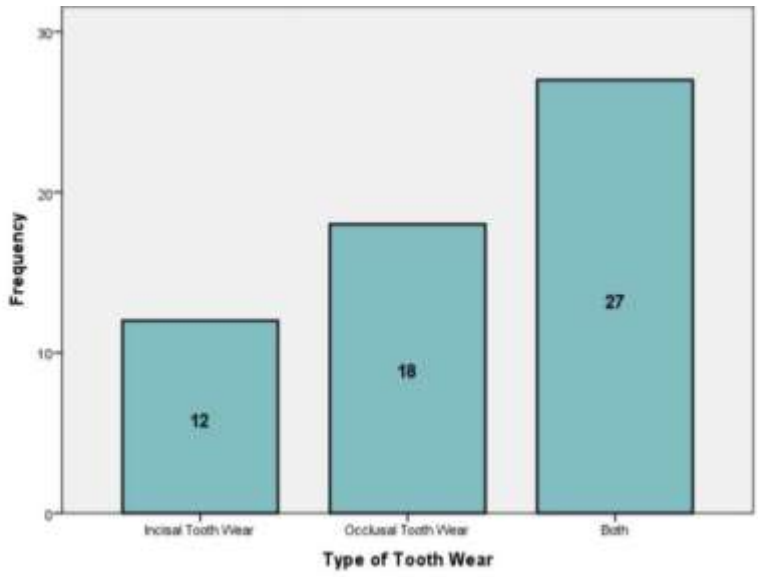

Figure 2 - Bar chart representing the distribution of the various types of tooth wear among the study population. The 'X' axis represents the type of tooth wear (incisal, occlusal or both) and the 'Y' axis denotes the count of

study participants. 12 participants had incisal tooth wear, 18 had occlusal tooth wear and 27 had both types. Hence it is more common to experience tooth wear in both the anterior (incisal) and posterior tooth regions (occlusal).

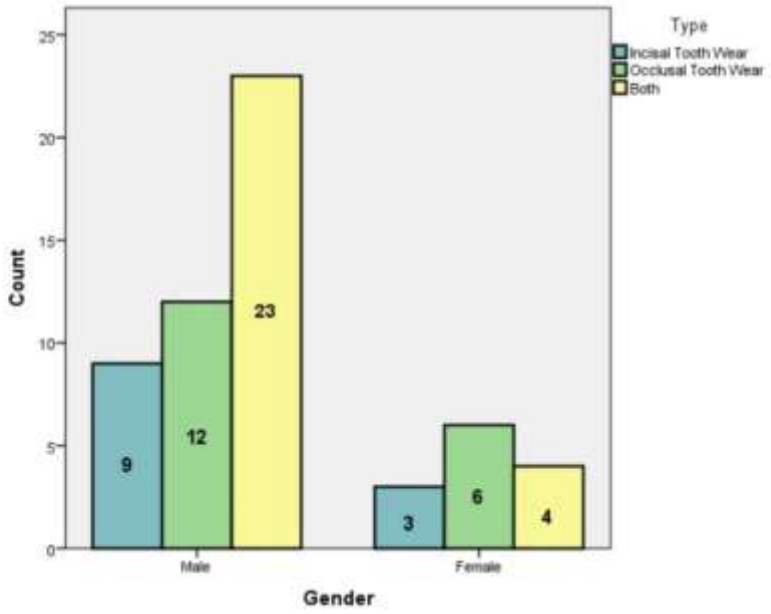

Figure 3 - Bar chart representing the statistically significant association between gender and the different types of tooth wear. The 'X' axis represents the gender and the 'Y' axis denotes the count of the study population in each group. Here the group of incisal tooth wear is denoted by the colour blue, occlusal tooth wear in green and both (incisal and occlusal) in yellow. In the male category, both (incisal and occlusal) was the most common type of tooth wear as seen in 23 out of 44 males, followed by occlusal tooth wear (12 participants) and lastly by incisal tooth wear (9 participants). In the female category, occlusal tooth wear was the most common type of tooth wear as seen in 6 out of 13 females, followed by both (incisal and occlusal) with 4 participants and lastly by incisal tooth wear (3 participants). Chi square test showed significant association between tooth wear and gender, where our Pearson Chi square value = 2.145, p value - 0.034 ($p<0.05$). Hence it is more common to experience tooth wear in both regions in males and in the occlusal region in females.

DISCUSSION

The data for this retrospective study was based predominantly on residents of South Indian cities seeking treatment at Saveetha Dental College, Chennai, India. Currently there are no studies directly seeking to identify the same - the comparison of incisal with occlusal tooth wear in patients undergoing dental treatments. Since there was no filtration process involved other than the exclusion of patients below the age of 40 years and above the age of 70 years and those with mental and physical disabilities, this study mostly remains free of bias. According to Figure 1, our study's findings suggest that males (77.2%) have a predilection for tooth wear when compared to females (22.8%). This may be explained by the fact that both in children as well as in adults, males have a higher bite force and are thus subjected to a higher risk of tooth wear when compared to female children and adults [35,36]. Our findings also seem to be in line with various other studies [37]. In one study by Kumar M *et al*. undertaken in 2018, they concluded that males showed significantly higher tooth wear in both the maxillary as well as the mandibular arch in the anterior and posterior regions [38], which is in line with our findings of 9 males > 3 females anteriorly (incisally), 12 males > 6 females posteriorly (occlusally) and 23 males > 4 females both anteriorly and posteriorly (occlusally and incisally) - as suggested by Figure 3 and Table 1. Is a study conducted by Bo *et al*. in 2014, they stated that anterior teeth exhibit greater wear than posterior teeth [39] This is contradictory to our findings as inferred from Figure 2 where there is a maximum incidence of tooth wear in the subset of 'Both' with 47.4% of both anterior (incisal) and posterior (occlusal) tooth wear,

followed by occlusal tooth wear (31.6%) and finally incisal tooth wear (21.1%). This difference may arise from the possibility that our sample size was too small in comparison - 704 participants > 57 participants. There were certain limitations to our study such as possible error while examination, geographical barriers and a small population size due to age restrictions which brings down the overall generalisability of our study – so further research must be done to verify our findings.

CONCLUSION

Within the limits of our study, the following conclusions can be drawn - there is an existing predilection in regard to occlusal tooth wear, as proved by our statistically significant results. Due to our aforementioned limitations, male patients were more predominant in the study and the attrition was higher in both anteriors and in posteriors when compared to patients with only incisal or occlusal tooth wear. Further research must be done to assess the prevalence of tooth wear among males and females. Currently no known method is employable to regrow lost natural tooth structure, and so prevention and timely treatment is key.

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AUTHORS CONTRIBUTION

Author 1 - (Sathvika K.)

Carried out this study by collecting data from the patient records of Saveetha Dental College and then drafted the manuscript using the aforementioned information.

Author 2 - (Dr. Keerthi Sasanka L.)

Aided in the conception of the topic, has participated in the study and has supervised the preparation of the manuscript.

Author 3 - (Dr. Leelavathi L.)

Has participated in the framing of the study design and has coordinated in developing the manuscript. All the authors have discussed the details of the study among themselves and have contributed to the final manuscript.

CONFLICT OF INTEREST

Nil

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