Association of age and gender on prevalence of generalised attrition of mandibular molars

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Abstract: Currently, Tooth wear is perceived internationally as the ever increasing problem, especially in the elderly as it is more prevalent in that age group.Further more, dietary habits, presence of GERD and socioeconomic status has also shown to affect the prevalence of tooth wear. The aim of the study is to check the association of age and gender on generalised attrition of lower molars.Tooth wear is used to describe the loss of hard tissue caused by frictional forces between opposing teeth or between the tooth's occlusal surface and food during masticatory and non-masticatory movements,with no occurrence of dental caries or trauma.The current study is an institutional based retrospective study performed over a review of 49832 cases. The results obtained shows the association of age and gender on prevalence of generalised attrition of lower molars. Within the limitations of the study, the most commonly affected gender is male and the most commonly affected age group with attrition is 25 to 84 years of age. The most commonly attrited lower molars is 36 followed by 46, 37 and 47 respectively.

Keywords: Attrition; Retrospective study; Mandibular molars; Vertical dimension at occlusion; GERD

INTRODUCTION

Dental attrition is considered the most visible sign of functional wear and possibly bruxism.[(Yadav, 2011)] Tooth wear is used to describe the loss of hard tissue caused by frictional forces between opposing teeth or between the tooth's occlusion surface and food during masticatory and non-masticatory movements,with no occurrence of dental caries or trauma.[(Rashid, Hanif and Nasim, 2015)]The four main mechanisms of tooth wear are erosion, attrition, abrasion and abfraction.[(Nascimento *et al.*, 2016)] Attrition is the physiological wearing of dental hard tissue through tooth to tooth contact, without the intervention of foreign substances.[(Liu *et al.*, 2014)]

Currently, tooth wear is perceived internationally as the ever increasing problem, especially in the elderly as it is more prevalent in that age group [(Bardsley, 2008)]. Furthermore, dietary habits, presence of GERD and socioeconomic status has also shown to affect the prevalence of tooth wear.[(Sun *et al.*, 2017)] Dental attrition is also considered as a visible sign of physiological functional wear and rapid onset of bruxism.[(Farzaneh, Salari and Fekrazad, 2014; Sun *et al.*, 2017)].It is properly seen more as a result of functional disturbances to the masticatory system. TMJ dysfunction is also a factor for long-standing attrition.[(Anwar, Syreen and Kumar, 2017)]

Tooth with severe loss of coronal structure due to decay or attrition often go for extraction as it cannot support a crown. The restoration of such teeth with only core build-up and no post or crown has been specified in the literature with regards to its fracture resistance to the occlusal forces. Parafunction such as bruxism will generate high loads resulting in attrition. Bruxism was a self-reported factor which may not be accurately stated by patients. Furthermore, diagnosis of aetiological factors from patient histories can be difficult and imprecise.[(Ravinthar and Jayalakshmi, 2018),(Prabha and Ranjan, 2018)] The success of direct composites in a challenging clinical situation such as the worn dentition is dependent on replacement of missing posterior units as on good clinical technique. Little evidence exists on the clinical technique specifically indicated to optimise composite survival in erosion and attrition.[(Nasim *et al.*, 2018; Prabha and Ranjan, 2018; Gopalasamy and

Ranjan, 2020)(Milosevic and Burnside, 2016),(Nasim *et al.*, 2018; Prabha and Ranjan, 2018; Gopalasamy and Ranjan, 2020)]

Occlusion wear and tear is a gradual process happening throughout life.[(Choudhari and Ranjan, 2019)] Excessive occlusion wear may lead to an occlusal disharmony, pulpal trauma, aesthetic disfigurement and impaired function. Tooth wear can be classified as attrition, abrasion and erosion depending on the cause.[(Sperber, 2017; Nasim *et al.*, 2018)] It is extremely important to identify the factors which contribute to excessive wear and reduce the vertical dimension at occlusion [VDO]. Considering the adverse effects of attrition of the masticatory system, a Retrospective study was planned to correlate the age and gender to attrition and its prevalence in lower molars, conducted on patients attending a private institution based in South India.Our team has rich experience in research and we have collaborated with numerous authors over various topics in the past decade (Deogade, Gupta and Ariga, 2018; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; Jeevanandan and Govindaraju, 2018; J *et al.*, 2018; Menon *et al.*, 2018; Prabakar *et al.*, 2018; Rajeshkumar *et al.*, 2018, 2019; Vishnu Prasad *et al.*, 2018; Wahab *et al.*, 2018; Dua *et al.*, 2019; Duraisamy *et al.*, 2019; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Gheena and Ezhilarasan, 2019; Malli Sureshbabu *et al.*, 2019; Mehta *et al.*, 2019; Panchal, Jeevanandan and Subramanian, 2019; Rajendran *et al.*, 2019; Ramakrishnan, Dhanalakshmi and Subramanian, 2019; Sharma *et al.*, 2019; Varghese, Ramesh and Veeraiyan, 2019; Gomathi *et al.*, 2020; Samuel, Acharya and Rao, 2020)

MATERIALS AND METHOD
The current study is an institutional based retrospective study performed at Saveetha dental college,chennai. The necessary approvals were obtained from the Institutional Ethical committee. All the data collected was cross verified by an examiner to avoid any missing case- records.

A total of 919 subjects who reported with generalised attrition of lower molars were chosen for the study in a total of 49,832 subjects screened for the data. All the data collected was formatted and tabulated using Microsoft Excel (Version - 2020). All the case records and treatment records were obtained from the patient management software known as DIAS. The dependent variable was attrition and lower molars. The statistical analysis was performed using IBM SPSS (Version - 24).Chi square test was applied and level of significance was set at $p<0.05$.

RESULTS AND DISCUSSION
In our study , the result can be summarized as Graph 1 Shows the various frequencies of age reporting with attrition. Graph 2 shows the frequencies of gender reporting with attrition. Graph 3 shows the frequencies of mandibular molars, 36,37,46,47 associated with attrition.The most commonly reported teeth in mandibular molars are 36,37,46,47. Graph.4 shows the association of gender to the affected attrited tooth and Graph.5 shows the association of age to the affected attrited tooth. In the current study, we chose the most commonly reported mandibular molar teeth with attrition which are 36,37,46,47 and their prevalence on attrition.Pearson chi square value;4.442, df- 3, P value is .214(>0.05) which is statistically not significant association between gender and teeth number.(Chi-square test).However for association of age, Pearson chi square value 44.170, df 18 , P value is 0.001 (<0.05) which proves a significant association between age and attrition of teeth. The obtained results clearly suggest that the age ranging between 41 to 60 years shows the maximum attrition rates in 36 and 46.

In this study, the result shows the frequency of age associated with generalised attrition of lower molars in graph 1. The prevalence of attrition is between 20 to 80 years of age. The mean obtained was 52.68 and the standard deviation was 11.68.. Age ranging from 10 to 30 showed minimal attrition of 36, 37, 47 and 46. In a systematic review of the results of tooth wear by all causes, Van't Spijker A. concluded that the percentage of adult patients presenting with severe tooth wear increased from 3% at the age of 20 years to 17% at the age of 70 years, with a tendency to develop more wear with age.[(Van't Spijker *et al.*, 2009)]which is almost supporting our result.

The frequency of attrition in different gender groups was shown in Graph 2 . Within the obtained results there were more than 550 male subjects reporting with attrition and a little over 300 female subjects reporting with attrition. Various para functional habits, oral hygiene, smoking, dietary habits are more frequently observed in males or females thus attrition is more prevalent in males than females. The mean obtained was 1.36 with a standard deviation of .48.In developed countries, the prevalence of tooth wear is on the rise, which could be due to changes in dietary patterns [(Fareed, Johansson and Omar, 1990; Kelleher and Bishop, 1999)]. Oral habits are repetitive behaviors in the oral cavity that result in loss of tooth structure, including dietary habits, brushing techniques, bruxism, parafunctional habits and regurgitation. Their effect is dependent on the nature, onset and duration of the habits.

The frequency of mandibular molars associated with attrition was shown in Graph 3. With the obtained results, 36 showed the highest prevalence of attrition, followed by 46, 37 and 47 respectively.The correlation between gender and attrition was shown in Graph 4 . The study shows that 214 male subjects and 137 female subjects reported with attrition in 36. 110 male subjects and 56 female subjects reported with attrition of 37. 176 male

subjects and 78 female subjects reported with attrition of 46. 88 male subjects and 52 female subjects reported with attrition of 47 within the obtained results.Similar results were reported in a large epidemiological study with German dental patients, in which the extent of tooth wear was scored on a scale from 0 to 3; in this study, the mean wear scores increased from 0.6 among 20- to 29-year-olds to 1.4 in 70- to 79-year-olds [(Bernhardt *et al.*, 2004; Van't Spijker *et al.*, 2009)(Fareed, Johansson and Omar, 1990)]. The incisal surfaces of canines and incisors, together with the occlusal surfaces of molars and premolars, are the functional surfaces of the dentition.[(Bernhardt *et al.*, 2004; Van't Spijker *et al.*, 2009)] This classification indicates their role in mastication and in providing guidance in excursive movements of the mandible.

Within the results obtained, age ranging between 41 to 60 years shows the maximum attrition rates in 36 and 46. Age ranging from 10 to 30 showed minimal attrition of 36, 37, 47 and 46. There is a gradual increase of Generalised attrition of lower molars with the increase in age, thereby concluding that prevalence of attrition is higher in older age groups due to masticatory forces and long standing frictional forces. The prevalence of tooth wear varies around the globe, and the etiology of tooth wear is multifactorial [(Fareed, Johansson and Omar, 1990)]. The role of acidic foods and drinks is likely important to the progression of tooth wear. There is a considerable body of evidence from laboratory studies that indicates that low pH acidic foods and drinks cause erosion of enamel and dentin. The coarseness or grit of the diet during function is a main causative factor in occlusal wear. Bruxism is thought to affect 5-20% of the normal population, and it is associated with tooth wear.[(Moazzez, Smith and Bartlett, 2000),(Bartlett *et al.*, 2011)]. Previously our team had conducted numerous clinical trials [(Ramamoorthi, Nivedhitha and Divyanand, 2015; Nasim *et al.*, 2018; Janani, Palanivelu and Sandhya, 2020)] in vitro studies [(Ramanathan and Solete, 2015; Nandakumar and Nasim, 2018; Teja, Ramesh and Priya, 2018; Rajendran *et al.*, 2019; Siddique *et al.*, 2019)]and surveyed [(M. P. Manohar and Sharma, 2018; Jose, P. and Subbaiyan, 2020)] and reviewed various aspects of endodontics and conservative dentistry (*Website*, no date; Noor, S Syed Shihaab and Pradeep, 2016; Kumar and Delphine Priscilla Antony, 2018; Ravinthar and Jayalakshmi, 2018; R, Rajakeerthi and Ms, 2019)] over the past five years (Ramamoorthi, Nivedhitha and Divyanand, 2015; Neelakantan *et al.*, 2017; M. Manohar and Sharma, 2018; Nasim and Nandakumar, 2018; R, Rajakeerthi and Ms, 2019)6]. Now we are focusing on retrospective studies, the idea for which has stemmed from the current interest in our community.Our institution is passionate about high quality evidence based research and has excelled in various fields ((Pc, Marimuthu and Devadoss, 2018; Ramesh *et al.*, 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai *et al.*, 2019; Sridharan *et al.*, 2019; Vijayashree Priyadharsini, 2019; Mathew *et al.*, 2020)

FIGURES
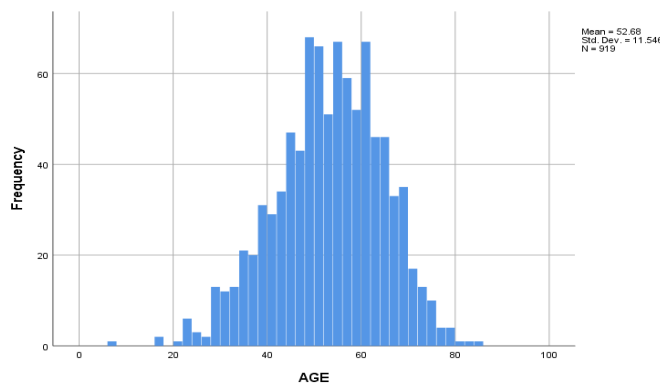
Graph 1: Frequency of age associated with attrition where x axis represents age and y axis represents frequency of restorations where most commonly affected affected age group is 20 to 80 years.
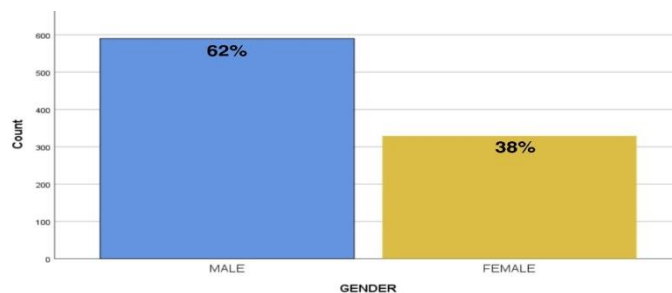
Graph 2: Frequency of gender associated with attrition where x axis represents gender and y axis represents frequency of restorations. (Blue) colour represents male and (yellow) colour represents female. From the obtained results, 62% males showed higher predilection towards generalised attrition when compared to females.
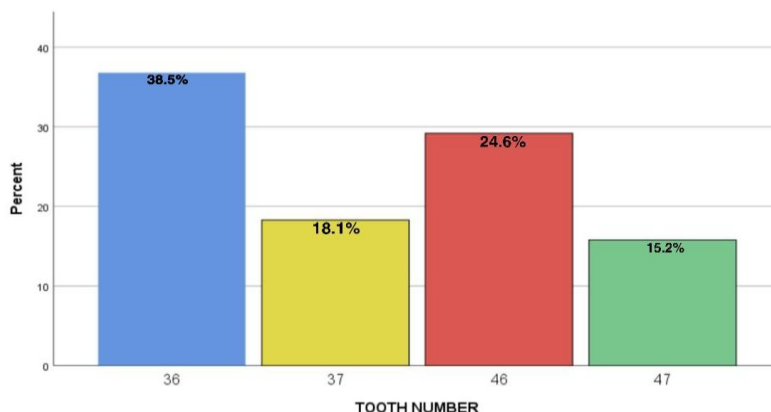
Graph 3: Frequency of mandibular molars associated with attrition, where x axis represents the teeth (FDI) involved and y axis represents percentage. Within the obtained results, 38% of 36 were involved , followed 46, 37 and 47.
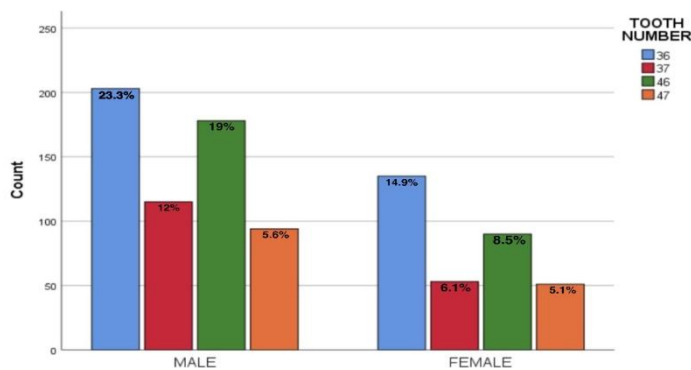
Graph 4: This graph represents the association between gender and teeth attrited where x axis represent gender and y axis represents no of teeth where blue colour denotes 36, red colour denotes 37, green colour denotes 46 and orange colour denotes 47.Pearson chi square value-4.442, df- 3, P value is 0.218(>0.05) Which is not a significant association between gender and attrition of teeth, However the maximum attrition occurred on tooth no 36 in both genders.
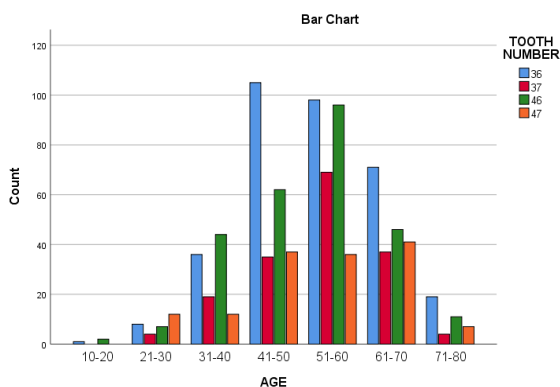
Graph 5: This graph represents the association between age and teeth attrited where x axis represent age groups and y axis represents frequency of teeth. .Pearson chi square value 44.170, df , P value is 0.001 (<0.05) which proves a significant association between age and attrition of teeth. The obtained results clearly suggest that the age ranging between 41 to 60 years shows the maximum attrition rates in 36 and 46. Age ranging from 10 to 30 showed minimal attrition of 36, 37, 47 and 46.

LIMITATIONS

Relatively small sample size and specific group population were the limitations of the study and not being able to assess the etiology of attrition.

FUTURE SCOPE

A larger sample size with broad consideration of various ethenic group , proper diagnosis, treatment planning and to analyse the various restorative options can add significance to the study.

CONCLUSION

Within the limitations of the study, the most commonly affected gender is male and the result clearly shows that the age ranging between 41 to 60 have maximum attrition rates in 36 and 46. The most commonly attrited lower molars is 36 followed by 46, 37 and 47 respectively.

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AUTHOR CONTRIBUTION

Karthik EVG contributed in the concept design of the study, sequence alignment, statistical analysis and drafted the manuscript. Dr.Manish Ranjan participated in the design of the study, statistical framework, manuscript drafting. Dr.Uma Maheswari contributed in coordination of the study, manuscript drafting and proofreading. All authors read and approved the final manuscript.

Conflict of interest
NIL

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