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Fixed Prosthesis In Missing Maxillary First Molar Among Medium Aged Adult: A Retrospective Study

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ABSTRACT

Loss of maxillary molar can have negative impact on functional, psychological and social consequences. Study of this along with the knowledge of these causes can reduce the number of patients involved in losing molars due to lack of awareness and lack of regular dental visits. The aim of this study is to educate and evaluate the incidence of fixed partial dentures as the treatment opted by the patient with missing maxillary first molar, among the age group of 35-50 years. Patients included in this retrospective study were those who reported to Saveetha Dental College and Hospitals with missing maxillary first molar. The data was collected from patient records dated from june 2019 to march 2020 and analysed. The collected data was tabulated and analysed using SPSS software. Among 177 patients, 69.2% were females and 30.8% were males. Highest prevalence of loss of maxillary first molar was among the age group of 35-43 years. Majority were edentulous with a single missing maxillary first molar 36.7%. Among all, 35.9% of the participants opted and had fixed partial denture as the prosthesis for the edntulous space. The incidence of tooth loss among male and females was due to their socio-economic status and lack of awareness on oral hygiene and regular dental visits. This demonstrates the need of preventive programs in order to control the cause like dental caries and to provide education for oral health.

Keywords: Edentations, Fixed partial denture, medium aged adults, missing maxillary first molar.

INTRODUCTION

The first tooth to develop among permanent dentition is the first molar, its development is initiated at birth and at the age of 6-7 years, the first molar erupts into the oral cavity (Ariga et al., 2018). During this period the first molar becomes the last tooth in the arch and its dexterity for maintenance of oral hygiene becomes difficult due to the limited accessibility(Kannan and Venugopalan, 2018). Moreover, the morphology of the first molar includes deep pits

and fissures which makes it more prone for food lodgement, this inturn leads to dental caries (Hegde and Ragavendran, 2012). Dental caries is a multifactorial disease of the tooth. It is influenced by various factors like the microorganisms, teeth morphology, saliva and also our current lifestyle. There are numerous factors that influence dental caries like the environmental factors, social factors and the cultural factors (Jyothi et al., 2017). The appearance of dental caries are highly correlated with the cariogenic diet of ours and the access to dental care. The incidence of periodontal disease and caries that affect the molar can differ by age, gender,education, dental health issues or habits, and access to professional care among different social groups (Rezaie et al., 2018). The main predictors of tooth missing are caries and periodontitis. And the negligence towards the treatment of initial stage of periodontitis or dental caries and lack of awareness in retaining the teeth after symptomatic pulp involvement leads to loss of the teeth (Artun and Thalib, 2011; Çağlaroğlu et al., 2008). Numerous studies have been conducted on the various causes of permanent tooth extraction among children, adolescents and adults in industrialized countries (Angelillo et al., 1996; Haddad et al., 1999).

Loss of first permanent molars can negatively affect both arches. As the first molar is said to be the key of occlusion, its loss also results in reduced masticatory efficiency and leads to supra eruption of opposing teeth over a time period, causing migration of adjacent teeth and occlusal disharmony(Ganapathy et al., 2016).

Understanding the aetiology of tooth loss in a population is important in conducting dental health programs for preventive measures and an awareness of the required prosthesis or the replacement of the missing tooth is also necessary. Various treatment options are available for the replacement of the missing tooth or for the closure of space created. Fixed partial denture (FPD) is commonly used in a situation where the second or third molar is present. But some of the drawbacks of Fixed partial denture include hypersensitivity on improper fixation, chances of caries on abutments, loss of adjacent tooth structures of tooth preparation, eventually leading sensitivity of that adjacent tooth structure and also food lodgement beneath improperly fabricated pontics(Kannan and Venugopalan, 2018). A better option of treatment is a prosthetic implant but the success of it is hindered by peri-implantitis (Duraisamy et al., 2019; Ganapathy et al., 2017; Scrascia et al., 2020).Previously our team has a rich experience in working on various research projects across multiple disciplines The (Hafeez and Others, 2016; Krishnan et al., 2018; Somasundaram et al., 2015)(Choudhari and Thenmozhi, 2016; Dhinesh et al., 2016; Felicita and Sumathi Felicita, 2018; GovinDaraju and Gurunathan, 2017; Gurunathan and Shanmugaavel, 2016; Kumar and Rahman, 2017; Palati et al., 2020; Paramasivam et al., 2020; Saravanan et al., 2018; Sneha and Others, 2016; Vijayakumar Jain et al., 2019; Wu et al., 2019)

The idea for this study stemmed from the current interest in our community. With this in mind, the aim of this study was to evaluate the incidence of fixed partial denture as the treatment opted by the patients with missing maxillary first molar.

MATERIALS AND METHODS

A retrospective study was conducted in a University setting at Saveetha Dental College and Hospitals. The advantage of conducting this study in a University setting was the availability of data from the patient records with the involvement of both the genders. The unavailability of location specific data was the disadvantage of this study. Ethical approval for conducting the study was obtained from the Institutional Scientific Review Board, Saveetha Dental College and Hospitals.

Data collected for this study was from the patient who had visited the institution for treatment from June 2019 till March 2020. Out of 86000 patients reported during this period, a total of 117 patients who have to undergo prosthetic treatment for missing maxillary first molar were collected. The sampling bias for the study was minimised by including data of all the patients among the age group of 35 to 50 years who had missing maxillary first molar.

The data collected from patient records were analysed. The collected data from the prosthodontic status of the patient record was then tabulated in excel and then imported into SPSS software. Incomplete data was verified with the concerned department or patient or excluded from the study.

The collected data included age, gender, tooth involved, treatment suggestion and treatment done.

A statistical test was done using a chi-square test with SPSS by IBM. Independent variables included oral habits and systemic condition of the participants, whereas the dependent variables included the age and missing maxillary first molar. All of these were analysed using correlation and association.

RESULTS AND DISCUSSION

A total of 117 participants were involved with the missing maxillary molar. Among them 69.2% were females and 30.8% were males. The study sample includes the participants under the age group of 35 - 50 years. The prevalence

of loss of molar was the highest among the age group of 35 - 43 years (58.9%) as seen in (Graph 1). The prevalence of loss of missing maxillary first molar increases as the age increases. Statistical analysis of data demonstrates that the majority of edentates involved one single tooth in the maxillary arch (36.7%) and edentulousness of both the maxillary first molars constituted 26.6% (Graph 2). From the total of edentulous area or the edentation, 34.2% were restored using fixed partial dentures. Majority of the participants did not opt for any treatment (65.8%) due to various reasons like their economic status, willingness towards the treatment and their ability to afford (Graph 3). The number of patients who had received fixed partial dentures as their prosthetic treatment is 42 (35.9%) (Graph 3) with a statistically significant p value of <0.05 (Table 1). In accordance to the age group, 35.3% of the patients among the age group of 35 - 43 years opted for fixed partial denture as their treatment and among the age group of 43 - 50 years, 34.7% of them opted for fixed partial denture as a treatment option for the restoration of edentates. In comparison of both the age groups, there is not much significance on the treatment or prosthesis opted to restore the edentations, which is the fixed partial denture (Graph 4).

The present study showed that out of 117 participants with missing maxillary first molars only 35.9% of them opted fixed partial denture as a treatment option. The maximum number of cases seen in age groups of 35 - 43 years (58.1%). This could be due to the increased risk of periodontal pathologies as the age advances and due to increase in progression of caries. In a study conducted by Vignarajah. S showed that various reasons for permanent tooth being edentate was found to have a greater prevalence of loss of tooth in the age 40 years and above(Vignarajah, 1993). Upadhyay C et al., stated in his study that a steady rise in the loss of missing first molars was seen from the mid of 3rd to 4th decade (47.39%) and the probability to lose the molar increased and reached 68% as the age increases by 6th - 7th decade (Upadhyaya and Humagain, 2009) . Also in contradiction, Hedge et al., shows the maximum loss of first maxillary molars among the age group of 56 - 65 years (23.3%) (Hegde et al., 2018). This increase is due to the progression of caries coupled with periodontal disease as the age increases.

Among the participants involved in this study, significantly 64.7% under the age group of 35 - 43 years and 65.3% under the age group of 43 - 50 years have not opted fixed dental prosthesis as the treatment option. These patients either go with temporary partial dentures due to their socio-economic status or as they do not want to disturb the morphology of the tooth which is needed to be used as the abutments. Whereas others opted for Dental implants being the better options for the restoration of edentations(Ashok and Suvitha, 2016; Ranganathan et al., 2017; Vijayalakshmi and Ganapathy, 2016).

The multidimensional relationship between behavioral risk factors, socioeconomic status and tooth decay as a major cause of tooth extraction is well established(Patturaja and Pradeep, 2016). The choice of prosthesis to be used for the restoration of edentations are decided by the patient in accordance to their economic status. Families that are economically disadvantaged have lesser access to dental care and to the use of other health care services, hence they tend to cause the least or they are unable to undergo regular dental visits for the maintenance of their oral hygiene (Basha et al., 2018; Subashri and Uma Maheshwari, 2016; Subasree et al., 2016).

The socio-economic status is inversely associated with the presence of edentations in the oral cavity of the patients. The subjects which are in medium and low levels are under higher risks of becoming edentulous(Venugopalan et al., 2014). The high concern about the consequences and management of edentation is mainly associated with high socio-economical level. The main reasons for neglecting the edentation is due to the lack of awareness and the inadequate financial constraints of the patient (Khazaei et al., 2012).

The present study shows that the prevalence of missing maxillary first molars is commonly seen in female patients (62.2%) than males. In contradiction, study by Hedge et al., showed that 59% of the male participants with higher prevalence of missing maxillary first molar than the female (41%)(Hegde et al., 2018). Locker D, J. Ford and J. L. Leake in their study on the incidence of and risk factors for tooth loss found that males had more percentage of losing one or more teeth than females. This could be due to adverse habits like smoking, alcohol, tobacco chewing in males(Ajay et al., 2017).

The limitations of the study conducted includes the reduction or the availability of the data, the unequal distribution of cases and the unavailability of area specific datas. Hence, the results of this study must be interpreted within the limitations of this study and further cohort studies must be done including larger data. Such study should also include certain other parameters like the reasons for extraction, the patients' socio-economic status and their diet.

CONCLUSION

Within the limits of this study, the highest predominance of missing maxillary first molars was among the females than the males. With an increase in the prevalence of missing maxillary first molars among the age group of 35 - 43 years, 35.9% of the participants chose fixed partial denture prosthesis as the treatment choice for the restoration of their edentates.

AUTHORS' CONTRIBUTIONS

Conceptualisation: Pooja Umaiyal and Ashok V; methodology: Pooja Umaiyal and Ashok V; validation: Pooja Umaiyal and Ashok V; formal analysis: Pooja Umaiyal and Ashok V; writing-original draft preparation: Pooja Umaiyal; writing-review and editing:Ashok V;visualisation: Jaiganesh.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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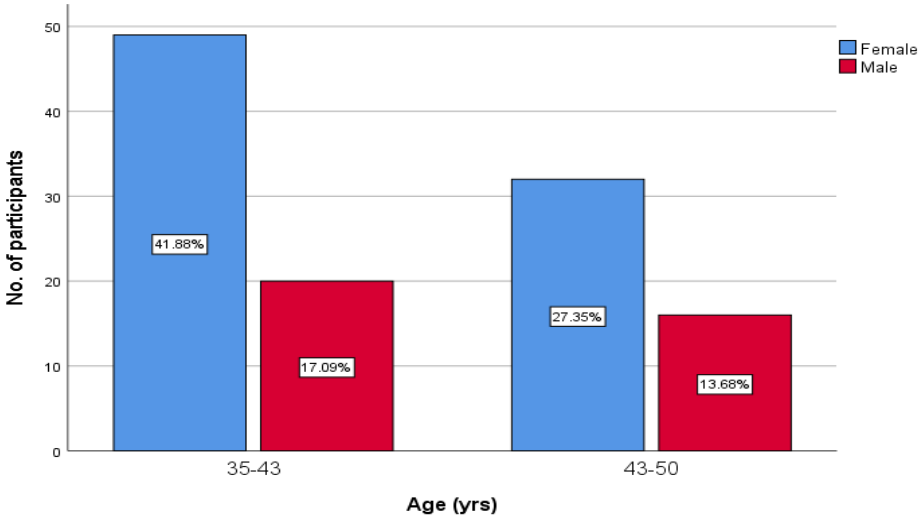
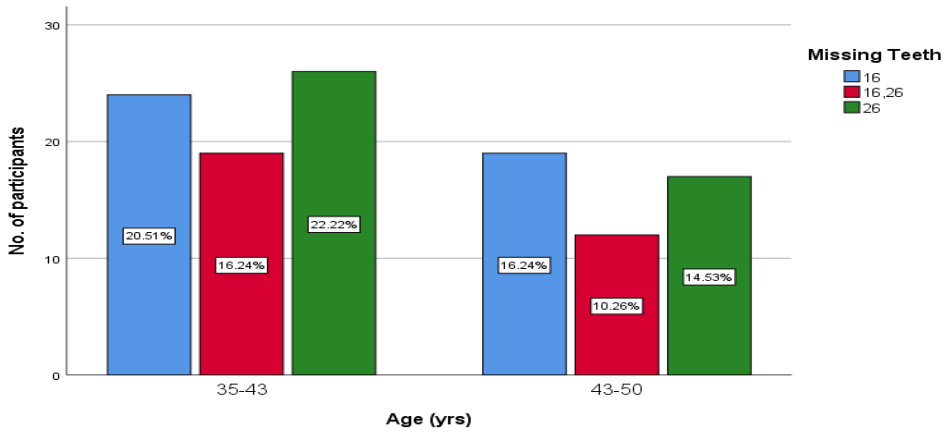


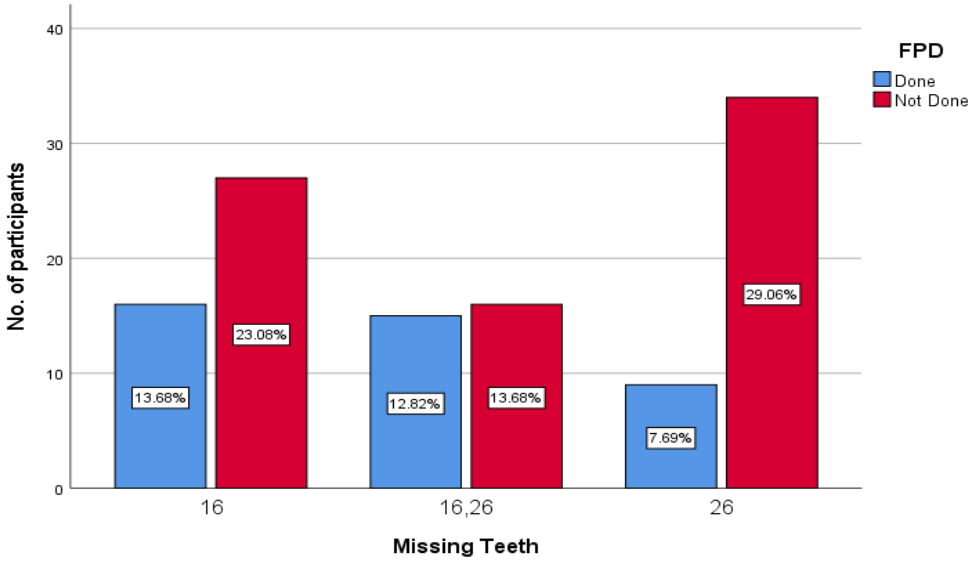
GRAPHS

Graph 1 represents the association of the total number of participants based on gender and age group. X axis represents the age group of the participants and Y axis represents the number of participants in terms of percentage. Study population among the age group of 35-43 yrs (58.9%) highest among the patients with missing maxillary first molar, it also shows the predominance of females (69.2%) denoted by 'blue' than Males (30.8%) denoted by 'red', however it is statistically insignificant with a p value >0.05. Therefore, according to the graph female participants had more missing maxillary first molars than males. (Pearson Chi Square: 0.251,df: 1, p value: 6.16)



Graph 2 represents the association of the missing maxillary first molar according to the age group of the study population. X axis represents the age group of the study population and Y axis represents the number of participants in terms of percentage. 36.7% of the population predominantly had single missing right maxillary first molars denoted by 'blue' and single missing left maxillary first molars denoted by 'green', whereas missing maxillary first molars on both the quadrants denoted by 'red' summed up to 26.6%. According to this graph, Single missing maxillary first

molar was more predominant than the bilaterally missing maxillary first molar. (Pearson Chi Square- 0.286, df- 2, p value- 0.867 (>0.05))



Graph 3 represents the frequency distribution of the fixed partial denture (FPD) as a treatment option for missing maxillary first molar. X axis represents the missing teeth and Y axis represents the number of participants in terms of percentage. Only 34.2% of the participants opted FPD (denoted by 'blue') as a treatment choice for the restoration of the edentations. Chi square test was done and association was found to be statistically significant. However according to this graph, participants opting FPD as a treatment plan were lesser than participants opting various other treatments for restoration of edentations. (Pearson Chi Square- 6.3, df- 2, p value- 0.043 (<0.05))

Table 1: Association of treatment opted by the patient according to the missing first maxillary molar (chi-square test)

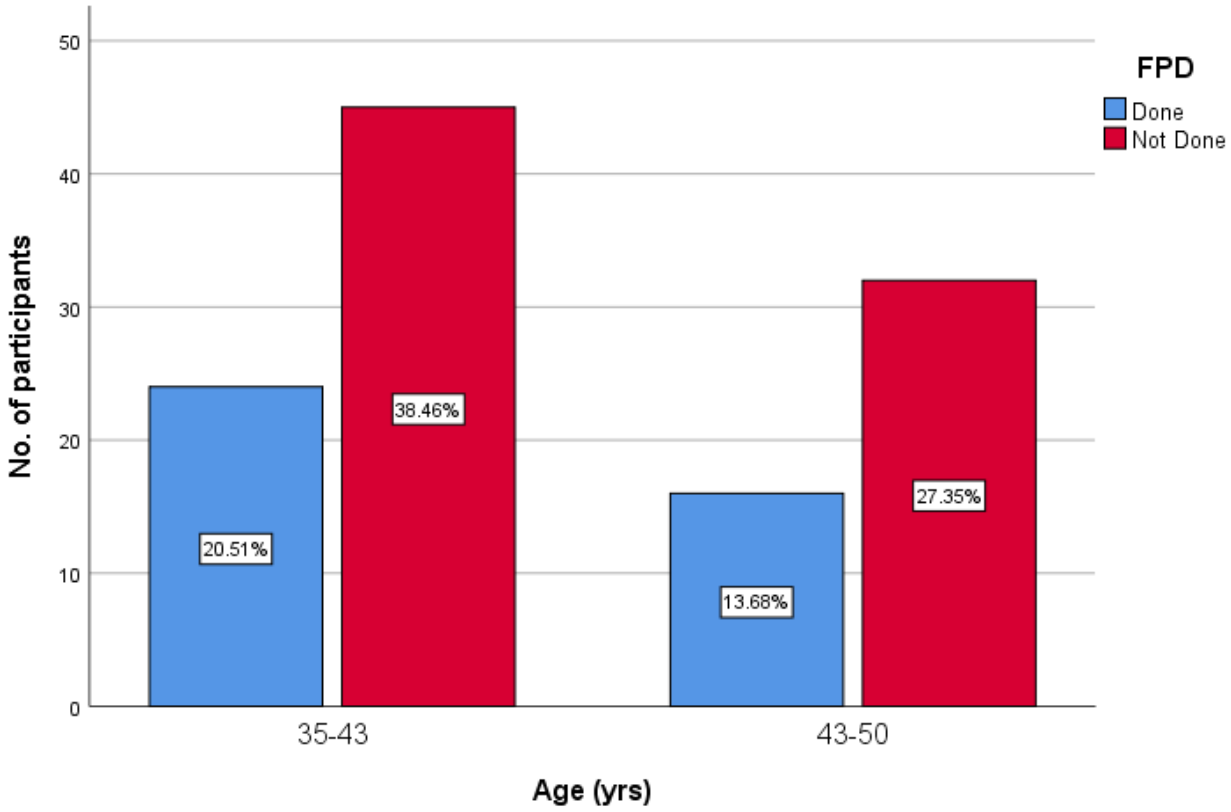
Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.311[a]	2	.043
Likelihood Ratio	6.464	2	.039
N of Valid Cases	117		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.60.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.232	.043
	Cramer's V	.232	.043
N of Valid Cases		117	



Graph 4 represents the distribution of fixed partial denture (FPD) as a treatment option based on the age group of the participants. X axis represents the age group of the participants and Y axis represents the number of participants in terms of percentage. 20.51% and 13.68% of the participants underwent FPD (denoted by 'blue') as the prosthesis for restoration of edentations among the age group of 35-43 years and 43-50 years respectively with an insignificant p value >0.05. According to this graph, participants opting FPD as a treatment plan were lesser among both the age groups than participants opting various other treatments for restoration of edentations. (Pearson Chi Square- 0.026, df- 2, p value- 0.871 (>0.05))