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On

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Editorial Communication

BIOSCIENCE BIOTECHNOLOGY RESEARCH COMMUNICATIONS VOL (14) No 10 2021 Special Issue On Recent Advances in Oro-facial Research

Foreword

The special issue of **Bioscience Biotechnology Research Communications Vol 14 No (10) 2021 on "Recent Advances in Oro-facial Research**" aims to provide evidence based original research articles from experts in various fields of dentistry on different recent perspectives of dental research.

This special issue contains 50 original articles which forms the platform for providing scientific knowledge on **Recent Advances in Oro- facial Research**. The contributions are related to various management protocols which includes pharmaceutical, surgical and comprehensive management involving various fields of Dental Sciences.

The published research articles will aim to motivate young researchers to establish their research work on a high profound platform.

Best wishes and thanks for the contributions from undergraduates, postgraduates, research scholars and faculty members from Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Chennai India for their academic efforts.

Guest Editors

Professor Lakshmi Thangavelu PhD Professor Deepa Gurunadhan PhD Professor Surendar PhD Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences Chennai India CONTENTS



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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 was 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 edentulous 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. 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.

KEY WORDS: 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. 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. Moreover,



the morphology of the first molar includes deep pits and fissures which makes it more prone for food lodgement, this in turn 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; Kannan and Venugopalan, 2018; Ariga et al., 2018; Scrascia et al., 2020; Lacarbonara et al., 2021).

The appearance of dental caries is 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. 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. Numerous studies have been conducted on the various causes of permanent tooth extraction among children, adolescents and adults in industrialized countries (Angelillo, Nobile and Pavia, 1996; Haddad et al., 1999; Çağlaroğlu et al., 2008; Artun and Thalib, 2011; Rezaie et al., 2018; Scrascia et al., 2020; Cimõeset al., 2021).

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. 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. A better option of treatment is a prosthetic implant but the success of it is hindered by peri-implantitis (Ganapathy et al., 2016; Ganapathy et al., 2017; Kannan and Venugopalan, 2018; Duraisamy et al., 2019; Scrascia et al., 2020; Fareen et al., 2021).

Previously our team has a rich experience in working on various research projects across multiple disciplines (Gheena and Ezhilarasan, 2019; Ke et al., 2019; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Sharma et al., 2019; Varghese et al., 2019; Venu et 1., 2019; Venu et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project. 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.

MATERIAL 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 were done. A statistical test was done using a chi-square test with SPSS by IBM. Independent variables were 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.

Figure 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)



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 (Figure 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% (Figure 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 (Figure 3). The number of patients who had received fixed partial dentures as their prosthetic treatment is 42 (35.9%) (Figure 3) with a statistically significant p value of <0.05 (Table 1).

Figure 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)).



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	6.311a	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.

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 Figure 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).



treatment or prosthesis opted to restore the edentations, which is the fixed partial denture (Figure 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 Showed those 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; Scrascia et al., 2020; Fareen et al., 2021).

Table 2				
Symmetric Measures	Value	Approximate Significance		
Nominal by Nominal	Phi Cramer's V	.232 .043 232 043		
N of Valid Cases	117	.202 .015		

Upadhyay 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%). 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%

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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; Vijayalakshmi and Ganapathy, 2016; Ranganathan et al., 2017; Hegde et al., 2018; Scrascia et al., 2020; Cimõeset al., 2021).

Figure 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).



The multidimensional relationship between behavioral risk factors, socioeconomic status and tooth decay as a major cause of tooth extraction is well established. 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. 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. 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; Venugopalan et al., 2014; Patturaja and Pradeep, 2016; Subashri and Uma Maheshwari, 2016; Subasree et al., 2016; Basha et al., 2018; Manicone et al., 2021).

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%). Locker et al., suggested 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).Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc et al., 2018; Hegde et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020). 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 data. 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.

Conflict of Interest: The authors declare that they have no conflicts of interest.

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Evaluation of Blood Sugar Level in Children Between Age Group of 1- 6 Years: A Cross Sectional Study

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ABSTRACT

Diabetes is a metabolic disorder which is characterised by high blood sugar level which results from defect in action of insulin. Diabetes is considered as the third most common disease in children as well as adolescents. It is observed that Type 1 diabetes mellitus is more common in children below 10 years of age whereas Type 2 Diabetes Mellitus is observed more in children between 10-17 years of age. This study was done to assess levels of Random blood sugar level in children with early childhood caries. Data collection from patient management software. 86 children were included in the study whose blood sugar level was compared to the normal range of blood sugar level in children. (80-140mg/dl) The children were divided into three groups- below normal range, normal range and above normal range. There was no statistically significant difference between the three groups(p>0.05). Out of eighty-six children, twelve children and blood sugar level below the normal range, seventy-three children had blood sugar levels within the normal range and one child had blood sugar level above normal range. There is no significant correlation between random blood sugar level and dental caries in 1-6 years old children. It is recommended that in future more research should be performed with a larger sample size in order to establish better clarification with respect to the topic.

KEY WORDS: RANDOM BLOOD SUGAR LEVEL, EARLY CHILDHOOD CARIES, DIABETES, CHILDREN.

INTRODUCTION

Diabetes is a metabolic disorder which is characterised by high blood sugar level which results from defect in action of insulin. Diabetes is considered as the third most common disease in children as well as adolescents. It is observed that Type 1 diabetes mellitus is more common in children below 10 years of age whereas Type 2 Diabetes Mellitus is observed more in children between 10-17 years of age. Diagnosis of diabetic condition is done by assessment of the fasting blood glucose level. If the fasting blood glucose level exceeds 126mg/dl the child is considered to be hyperglycemic (National Diabetes Education Program, 2001; Association



et al., 2011; Ekoé and Zimmet, 2012; Pachoński et al., 2020; Mizia et al., 2021).

Few epidemiological studies correlating prevalence of dental caries with diabetes mellitus have derived contradictory results. According to Wegner et al., the frequency of caries in diabetic children is higher than those without the metabolic disorder. Early childhood caries (ECC) is a health condition developing globally. It can begin early in life and the condition tends to get severe if it goes untreated. It affects the quality of life of the child as the child may have severe issues like inability to chew, speech defects and unesthetic appearance (Wegner, 1971; Lin et al., 1999; Moore et al., 2001; Twetman et al., 2002; Somasundaram et al., 2015; Govindaraju et al., 2017; Ravikumar et al., 2017; Jeevanandan and Govindaraju, 2018; Panchal et al., 2019; Abdelseed, 2021).

Diet and feeding practices also play an important role in acquisition of the infection and development of caries. Previously our team has a rich experience in working on various research projects across multiple disciplines (Govindaraju et al., 2017a; Jeevanandan, 2017; Mahesh,



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2018; Gheena and Ezhilarasan, 2019; Ke et al., 2019; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Sharma et al., 2019; Varghese et al., 2019; Venu et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project.

There is no literature focussing on the correlation between blood sugar level and early childhood caries. The purpose of this study is to assess if the random blood sugar level of the child has any correlation with early childhood caries.

MATERIAL AND METHODS

The study was based on a university setting. The ethical approval was given by the Institutional Scientific Review Board, Saveetha Dental College and Hospitals. There were three reviewers involved in the study. One of the reviewers was an external reviewer. The data for the study was collected from patient management software. Inclusion criteria: Child with early childhood caries (based on DMFT score), Age group: 1-6 years old. A total of eightysix children were included in the study from whom consent was taken prior the study. The procedure was explained to the parents or the guardian. The included children were sent for a blood test. The data was segregated and tabulated. The parameters assessed were, age and blood sugar level of children. Grouping of parameters was done on the excel sheet. The data was then copied into the SPSS 2.0 software and statistical analysis was done.

Statistical analysis: Descriptive statistics was used for the analysis. Chi square test was performed to correlate the three groups of blood sugar levels. All analysis was performed using statistical software (SPSS inc version 2.0, Chicago IL, USA) and p value less than 0.05 was considered statistically significant.

RESULTS AND DISCUSSION

Out of a sample of eighty-six children included in the study, forty-four children were boys and forty-two children were girls (Figure 1). Twelve children had blood sugar level below the normal range. Seventy-three children had blood sugar level well within the normal range. Only one child had blood sugar level above the normal range (Figure 2). There was no statistically significant difference between the three groups. No significant correlation was found between random blood sugar level and early childhood caries in 1-6 years old children.

Diabetes is usually characterised by the deficiency in the level of insulin and dysfunctioning of the pancreatic beta cells. It has been proved in the past that diabetes poses risk for the cardiovascular and the renal system. Diabetes leads to disturbance in the glucose metabolism. This might lead to severe hyperglycemia and insulin deficiency. Certain disorders of the oral cavity have been associated with diabetes. Caries, gingival inflammation, periodontal inflammation, altered salivary function, taste dysfunction, oral mucosal diseases and infections such as lichen planus, aphthous stomatitis and candidiasis are associated with diabetes (Ferrannini, 1998; Siudikiene et al., 2005; Lamster, 2012; Abdelseed, 2021).

Figure 1: Bar chart representing the gender of the children included in the study. Blue represents boys included in the study and red represents girls included in the study. X axis represents the gender of the children and Y axis represents the total number of children included in the study. Out of the total sample of 86 children 52% were boys and 48% were girls.



Figure 2: Bar chart representing level of blood sugar level in different age groups where blue represents below normal range, red represents normal range and green represents above normal range. X axis represents the age of the child and Y axis represents the number of children. Children in the age group of 3-4 years had normal and below normal range of random blood sugar level than that of children in the age group of 1-2 years and 5-6 years, however it is not statistically significant. Chi-square test, p-0.246 (p<0.05 which is not statistically significant).



Assessment of blood sugar level in children is one of the ways to identify if the child is able to balance insulin from food and exercise. Abnormality in blood sugar levels produces symptoms associated with hyperglycemia as well as hypoglycemia. The relationship between diabetes and dental caries is complicated. Children suffering from type 1 diabetes are recommended a carbohydrate free diet along with restriction of cariogenic food. Children affected with type 2 diabetes tend to have a greater exposure to cariogenic food. Diet for children with diabetes includes intake of fat and protein and carbohydrates upto 50-60% of the daily calorie intake. Dental caries prevalence in diabetic children is due to interaction of genetic factors, oral microflora, diet and oral hygiene practices. Diabetic children tend to have increased prevalence of oral microflora like streptococcus mutans and lactobacilli. Salivary flow rate is reduced in children affected with diabetes (Ship, 2003; Panchal et al., 2019; Lakshmanan et al., 2020; Abdelseed, 2021)

This further leads to accumulation of microorganisms causing dental caries. Reduced salivary flow rate caused by hyperglycemia is characteristic mainly for periods of poor metabolic control of diabetes. During this period, glucose leakage into the oral cavity may occur, thereby facilitating the growth of aciduric and acidogenic bacteria and caries lesion development. A clear picture is not provided in previous literature regarding the relationship between dental caries and diabetes mellitus (Siudikiene et al., 2008; Sampaio et al., 2011; Panchal et al., 2019; Hanberger et al., 2021).

Jones et al reported an elevated risk of caries due to high blood sugar level. There is no literature correlating random blood sugar level with early childhood caries in children. Early childhood caries is defined as the presence of one or more decayed (non cavitated or cavitated lesions), missing (because of caries) or filled tooth surfaces in any primary tooth in a child aged 71 months or younger. Early childhood caries is often associated with certain factors like high sugar intake, lack of oral hygiene, lack of fluoride exposure and enamel defects. It is often associated with many oral health or systemic conditions (Jones et al., 1992; Christabel et al., 2015; Gurunathan and Shanmugaavel, 2016; Govindaraju and Gurunathan, 2017; Packiri et al., 2017; Govindaraju, 2017b; Subramanyam et al., 2018; Lakshmanan et al., 2020).

In the present study the children affected with early childhood caries were sent for a blood test where their random blood sugar level was evaluated. It was observed that most of the children (seventy-three children) affected with early childhood caries had their blood sugar level well within the normal range. Twelve children had blood sugar level below the normal range. These twelve children were further examined and their parents were questioned and a detailed history was taken. The parents were questioned about certain signs and symptoms like extreme hunger, tremors, rapid heart rate, weakness, drowsiness, confusion, headache and loss of consciousness. The parents of these children were asked to consult a child specialist immediately. One child had blood sugar level above the normal range. This child was detected with Type 1 diabetes mellitus in his first year of life. No relationship was established between blood sugar levels and early childhood caries in the present study. Reduction in salivary flow rate is usually present in children with high blood sugar levels. This further leads to caries. This has been proved by certain authors (Harrison and Bowen, 1987; Rivera Gómez et al., 2006; Jeevanandan and Govindaraju, 2018; Panchal et al., 2019; Mathew et al., 2020).

In the present study no child complained of dry mouth. Several studies have established a relationship of dental caries with blood sugar levels but no studies have been performed where blood sugar levels can be correlated with early childhood caries. In the present study random children were selected with early childhood caries. Specifically, children suffering from diabetes could have been included in the study to observe if they are affected with early childhood caries. Another limitation of the study was that the sample size included in the study was small. Further studies can be performed with a larger sample size and a more restricted inclusion criteria can be considered to establish a correlation between early childhood caries and blood sugar level. Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Priyadharsini, 2019; Mathew et al., 2020).

CONCLUSION

In the present study it was proved that there was no significant correlation between blood sugar and dental caries in children between the age group of 1-6 years. It is recommended that in future more research should be performed with a larger sample size in order to establish better clarification with respect to the topic.

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Primary Molars Indicated For Pulpectomy or Extraction in Children Between the Age Group of 3-6 Years

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ABSTRACT

Pulpectomy is a procedure where canals of the primary teeth are debrided and are shaped and obturation is done with a resorbable material. Pulpectomy aims to preserve the tooth until it is replaced by the successor permanent tooth. In a primary tooth that is decayed pulpectomy should be ideally the choice of treatment rather than extraction in order to preserve the integrity of the surrounding tissues as it is more conservative in its approach. This study was done to evaluate the ratio of pulpectomy to extraction cases in primary molars in children aged between 3 to 6 years of age. Data collection from patient management software was done. Children in the age group of 3-6 years were included in the study. Samples of primary molars indicated for pulpectomy and extraction were tabulated and evaluated in SPSS software. Out of total 1692 teeth, 292 were indicated for extraction and 1400 were indicated for pulpectomy. It was concluded that the ratio of cases indicated for pulpectomy was more as compared to the cases indicated for extraction in children aged between 3-6 years of age. Mandibular primary molars are considerably affected more as compared to maxillary primary molars. Oral health education must be promoted amongst parents in order to preserve the primary teeth to avoid any malocclusion in permanent dentition.

KEY WORDS: PRIMARY MOLARS, PULPECTOMY, EXTRACTION, MANDIBULAR PRIMARY MOLARS.

INTRODUCTION

One of the major goals of any pediatric dentist is to preserve the primary teeth and prevent its premature exfoliation. Pulpectomy is a procedure where canals of the primary teeth are debrided and are shaped and obturation is done with a resorbable material. Pulpectomy is indicated in teeth exhibiting pulpal hemorrhage, irreversible pulpitis and pulp necrosis. Pulpectomy aims to preserve the tooth until it is replaced by the successor permanent tooth. Pulpectomy assists in providing a symptom free state during the development of the dentition, thus avoiding premature exfoliation or extraction of the tooth. A restored primary tooth helps in maintaining arch length, improves masticatory

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function and also enhances esthetics. It prevents a child from adapting to deleterious habits and also speech alterations due to decay in anterior teeth. Few scenarios that lead to premature loss of primary teeth involve trauma, congenital defects, deficiency of the length of the arch and decay. These factors in turn lead to resorption of the affected primary tooth (Owen, 1971; Thomas et al., 1994; Ngan et al., 1999; Pedersen et al., 1978; Goerig and Camp, 1983; Walia, 2014; Fuks and Peretz, 2016; Sureshbabu et al., 2019; Samuel et al., 2020).

Early loss of primary teeth leads to severe problems associated with malocclusion like lack of space, rotation of the teeth and impaction. Certain factors like lack of access to oral health care or lack of education of parents regarding oral health in rural areas leads to negligence, further leading to premature loss of teeth. In order to reduce chances of premature exfoliation, pediatric dentists must identify the factors leading to this. Previously our team has a rich experience in working on various research projects across multiple disciplines (Chhabra and Chhabra, 2012; Gheena and Ezhilarasan, 2019; Ke et al., 2019; Sureshbabu et al.,





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2019; Mehta et al., 2019; Samuel et al., 2019; Sharma et al., 2019; Varghese et al., 2019; Venu et al., 2019; Venu et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project. This study is aimed to evaluate the cases indicated for pulpectomy compared to the cases indicated for extraction in primary molars in 3- 6 years old children.

MATERIAL AND METHODS

The study was based in a university setting. The ethical approval was given by the Institutional Scientific Review Board, Saveetha Dental College and Hospitals. There were three reviewers involved in the study which included one external reviewer. Data was collected from Saveetha Dental College database. A total of 1692 teeth were included in the study. The segregation of data was initiated after ethical approval. Inclusion criteria: Children in the age group of 3-6 years were included in this study. Treatment plan indicating pulpectomy of the primary molar. Treatment plan indicating extraction of the primary molar.

Exclusion criteria: Children suffering from any underlying systemic conditions or mental health conditions were excluded from this study. The collected data was entered in the excel data sheet and grouping of parameters was done. After grouping the parameters, the data was copied into the SPSS 2.0 software and statistical analysis was done.

Statistical analysis: Chi square test was done to compare both the procedures. Statistical analysis was done in SPSS version 2.0, Chicago, IL, USA.

Figure 1: Bar chart representing the cases indicated for pulpectomy and extraction in primary molars where blue indicates the number of pulpectomies done and red indicates the number of extractions done. X axis represents the gender of the children and Y axis represents the total number of children indicated for treatment. The total number of pulpectomies done in males (47.90%) was greater than the total number of pulpectomies done in females (34.70%). The total number of extractions done in males (10.20%) was greater than the total number of extractions done in females (7.20%).



RESULTS AND DISCUSSION

Out of 1692 teeth included in the study, 833 were boys and 859 were girls (Figure 1). 292 children were indicated for extraction and 1400 children were indicated for pulpectomy. 981 primary mandibular molars were affected as compared to 711 maxillary primary molars. (Figure 2). The cases indicated for pulpectomy were more in primary mandibular molars as compared to maxillary molars. A statistically significant difference between the number of teeth indicated for both the procedures was obtained (p<0.05).

Figure 2: Bar chart representing the cases indicated for pulpectomy and extraction in primary molars where blue indicates the number of pulpectomies done and red indicates the number of extractions done. X axis represents the maxillary or Mandibular arch indicated for treatment and Y axis represents the number of teeth indicated for treatment. Maximum number of pulpectomies were done in mandibular primary molars (60.66%) compared to maxillary primary molars (22.14%). Maximum number of extractions were done in mandibular primary molars (10.8%) compared to maxillary primary molars (6.40%). Chi square test was done to compare both the treatments which was statistically significant (p=0.000).



One of the major concerns for any pediatric dentist is to preserve the primary teeth. Untreated caries has a negative impact on the quality of life of the child. Primary teeth have a major role to play in mastication, speech and aesthetics. Primary teeth play a vital role in the eruption of permanent teeth in respect to its position. Pulp inflammation can lead to early exfoliation of molars due to periapical infection or alveolar bone destruction. Tooth mortality in a population can provide information regarding the availability of dental care, the incidence of dental disease and attitudes towards tooth loss. Despite advances in oral health care dental caries in children is existing globally and many risk factors are associated with it (Murray et al., 1997; Mouradian, 2000; Christabel et al., 2015; Somasundaram et al., 2015; Gurunathan and Shanmugaavel, 2016; Packiri et al., 2017; Jeevanandan, 2017; Govindaraju and Gurunathan, 2017; Govindaraju et al., 2017a; Govindaraju et al., 2017b; Subramanyam et al., 2018; Jeevanandan and Govindaraju, 2018; Govindaraj et al., 2019; Lakshmanan et al., 2020).

The first treatment decision taken by and pediatric dentist is whether to retain or extract the decayed tooth based on the pulp vitality, pathology, restorability, and the duration of time for normal tooth exfoliation. It is essential for the dentist to note the signs and symptoms associated in respect to the particular tooth. In a primary tooth that is decayed pulpectomy should be ideally the choice of treatment rather than extraction in order to preserve the integrity of the surrounding tissues as it is more conservative in its approach. The goal of treatment should be elimination of microorganisms to reduce the rate of reinfection. Endodontic treatment of primary molars is more challenging due to the root canal morphology such as an increased number of accessories, ribbon-like canals, foramina and porosity in pulpal floors and its close proximity with its permanent successor. The type of pulpal therapy basically depends on the pulp vitality and the presence or absence of a radicular pathology (Govindaraju et al., 2017; Ravikumar et al., 2017; Panchal et al., 2019; Lakshmanan et al., 2020).

Pulpectomy is a pulp therapy that is indicated in irreversibly inflamed or necrotic pulp due to decay or trauma to the tooth often leading to a pathology. The root canals are debrided and shaped with hand or rotary files. Following debridement of the canals, the canals are irrigated and obturated with a resorbable material. The tooth is then restored with crown or restoration that prevents microleakage. Despite tooth extraction being a common intervention to provide oral health among children, literature related to reasons for extraction is limited. Extraction of teeth is indicated when there is a pathological infection that cannot be treated with a conservative approach, trauma, resorption of roots and orthodontic considerations. Early tooth loss leads to malocclusion, speech defects, functional disability and esthetic concerns. In order to reduce the incidence of tooth loss it is essential to identify its underlying cause. In a study done by M Bani et al it was observed that caries was the most identified reason for extraction followed by root resorption and trauma (Bani et al., 2015; Jain et al., 2019; Jose et al., 2020).

Extraction of primary molars before the age of 8 years has been found to delay the eruption of its successor. Premature loss of primary molars leads to the reduction in the length of the arch which is usually greater in the mandibular arch when compared to the maxillary arch. It also predisposes migration of the adjacent teeth leading to rotation, crowding, and impaction of the permanent dentition. Early loss of primary molars may lead to disturbance in sequence of eruption or permanent teeth. Loss of primary molars at an early stage may result in an increased risk of space closure. Certain cases have been reported where early loss of primary molars lead to impaction or permanent bicuspids. Hence it makes it essential to provide space maintainers to reduce the incidence of impaction (Czecholinski et al., 1994; Bani et al., 2015; Jain et al., 2019; Jose et al., 2020).

Some dentists usually prefer extraction over restoring a primary tooth, one of the reasons include complete destruction of the coronal portion of the tooth. In certain scenarios lack of knowledge regarding oral health amongst parents leads to negligence leading to early exfoliation. In the present study those children were included whose molars were indicated either for extraction or for pulpectomy. It was observed that the ratio of cases indicated for pulpectomy was higher as compared to the cases indicated for extraction. The cases indicated for extraction were indicated due to dental caries in most of the cases and also lack of knowledge amongst parents regarding oral health care and their attitude towards dental treatment for their children. A similar result was obtained in a study done by Bansal et al (Bansal et al., 2017; Jain et al., 2019; Jose et al., 2020).

It was observed that primary teeth were not given as much importance as the permanent teeth by the parents as the reason stated by most of them was natural exfoliation. In the present study it was observed that mandibular primary molars were more decayed as compared to maxillary primary molars. Similar results were obtained in a study done by Tewari et al which was contradictory to the results obtained in a study done by Gheyne et al where maxillary primary molars showed a higher caries incidence as compared to mandibular primary molars. It was observed that, when both the procedure groups were compared there was a statistical significant difference between the two groups(p<0.005) (Healey and Gheyne, 1943; Mandal et al., 2001; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020).

A responsible pediatric dentist should constantly encourage the parents to visit dental clinics with their children to examine their teeth. Also, apart from this it is the duty of every pediatric dentist to counsel the parent as well as the child on oral health care. Awareness can be increased with respect to preventive procedures like fluoride and sealant application. This will help in improving the quality of life of the child. Prevention of dental caries and preservation of the primary teeth should be the goal for every pediatric dentist. There were a few limitations in the study. A twodimensional radiograph was used to assess the tooth. Also, another limitation of this study was that the treatment plan was not decided by a single operator. After assessing and overcoming the limitations more such studies should be performed to create awareness among parents regarding oral hygiene and health care for their children. It can also focus on the treatment plan designed by an operator for every child and also the basis for the treatment suggested. A single operator can be included in future studies to avoid bias.Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020).

CONCLUSION

It was observed that the cases indicated for pulpectomy is higher than the cases indicated for extraction in children aged between 3-6 years. Mandibular primary molars are considerably affected more as compared to maxillary primary molars. Oral health education must be promoted amongst parents in order to preserve the primary teeth to avoid any malocclusion in permanent dentition.

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Association of Gender with Class II Cast Metal or Ceramic Restoration in MO and DO of Mandibular Molars- A Retrospective Study

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ABSTRACT

Dental caries being the major reason for predominant loss of tooth structure, several other reasons such as erosion, attrition, abfraction and fracture are also major reasons for the loss of hard tissue and eventually necessitating the requirement for a direct or an indirect restoration. Caries involving the proximal aspect of the truth in the posterior teeth are categorised as Class II caries and the restoration of it can be called as a class II restoration. Composite Restorations have also found a variety of applications in the modern dentistry. The primary advantage of composite is they are time and cost efficient with a very good aesthetic value. The aim of the study is to check the prevalence of a class II cast metal or ceramic restoration in mandibular molars. The current study is an institutional based retrospective study performed over a review of 49832 cases. Chi-square tests were performed between the obtained parameters. The results obtained show the prevalence of class II cast metal or ceramic restoration in lower molars. Within the limitations of the study, the most common type of restoration is Class 2 ceramic inlay in the disto-occlusal aspect. The most common gender is male and the most common affected tooth is 46.

KEY WORDS: CLASS II PROXIMAL RESTORATION; CAST METAL; CERAMIC; MANDIBULAR MOLARS.

INTRODUCTION

Dental caries being the major reason for predominant loss of tooth structure, several other reasons such as erosion, attrition, abfraction, fracture are also a major reason for the loss of hard tissue and eventually necessitating the requirement for a direct or an indirect restoration. There are two types of restorations that were commonly used to restore teeth namely, direct or indirect restoration. Caries involving the proximal aspect of the truth in the posterior teeth are categorised as Class II caries and the restoration

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of it can be called as a class II restoration. There are three types of class II restoration, which are Class II MO (Mesio-Occlusal), Class II DO (Disto-occlusal) and Class II MOD (Mesio-disto-occlusal) aspects. Direct restorations i.e., composites are used in areas where there is minimal loss of tooth structure. Indirect restorations such as cast metal, gold or ceramic restorations are widely used when the loss of tooth structure is more than 50% (Nandini, 2010; Chu et al., 2013; Azeem and Sureshbabu, 2018; Rashid et al., 2015; Azeem and Sureshbabu, 2018; Choudhari and Ranjan, 2019; Gopalasamy and Ranjan, 2020).

Cast Gold metal restorations were very popular in the past due to their excellent resistance to corrosion, minimal preparation and ease of handling and finishing, durability and longevity. The introduction of metal ceramic and all ceramic restorations in the late 1950s have had an impact on the treatment plan due to the survival rate of 94.7%. All ceramic restorations became very popular due to the high strength and aesthetics. The primary principal advantage of ceramic



restorations is their low fracture rate and high flexural strength (Shenoy and Shenoy, 2010; Givan, 2014; Givan, 2014; Zhang and Kelly, 2017; Azeem and Sureshbabu, 2018; Ravinthar and Jayalakshmi, 2018; Gopalasamy and Ranjan, 2020).

Composite Restorations have also found a variety of applications in the modern dentistry. The primary advantage of composite is they are time and cost efficient with a very good aesthetic value. The main disadvantages of composites are, polymerisation shrinkage and high occlusal wear. The seal and longevity of a composite restoration depends on various factors such as dimensions, shape, location, C factor, type of tooth and its load distribution (Nasim et al., 2010; Cramer et al., 2011; Malta etal., 2014; Soares et al., 2017; Soares et al., 2017; Azeem and Sureshbabu, 2018; Ravinthar and Jayalakshmi, 2018; Gopalasamy and Ranjan, 2020).

Indirect restorations have an upper hand in strength when compared to composites. Indirect restorations are exposed to light, heat and pressure in the lab which has significant strength and significant increase in the monomer polymer conversion rate and thus high young modulus and highly flexural strength are obtained. Previously our team has a rich experience in working on various research projects across multiple disciplines (Malta et al., 2014; Cramer et al., 2011; Gargari et al., 2013; Soares et al., 2017; Gheena and Ezhilarasan, 2019; Ke et al., 2019; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Sharma et al., 2019; Varghese et al., 2019; Venu et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project. Despite the extensive literature present, there is no consensus on which restoration is more beneficial. The aim of this study is to check the frequency of the type of cast metal restoration used in the lower molars and the incidence of cast metal restoration in mandibular molars.

MATERIAL AND METHODS

The current study was an institutional based retrospective study performed at Saveetha dental college. All the data collected was cross verified by an examiner to avoid any missing case records. All the incomplete case records were eliminated. A total of 31 subjects who underwent a class II cast metal or ceramic restoration in mandibular molars were chosen for the study in a total of 49,832 subjects screened for the data. The data was evaluated between all the composite class II restored teeth along with class II ceramic or cast metal restored teeth. All the data collected was formatted and tabulated using Microsoft Excel (Version - 2020). All the care records and treatment records were obtained from the patient management software. The dependent variable was attrition and lower molars. The statistical analysis was performed using IBM SPSS (Version - 24). Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020). We hope this study adds to this rich legacy.

RESULTS AND DISCUSSION

In this study we checked the frequency of the type of cast metal restoration used in the lower molars and the incidence of cast metal restoration in mandibular molars. Following results were obtained which were represented with different graphs.

Figure 1: Age And Frequency Of Restoration

Figure 1: shows the age to frequency of the restoration. X axis denotes the age and the Y axis denotes the frequency of restoration. 25 - 30 years of age subjects showed the highest frequency of undergoing ceramic restoration while 40 - 60 showed metal restoration. Mean obtained was 35 and the standard deviation was 10.8.



Figure 2: Sex And Frequency Of Restoration

Figure 2: Shows the frequency of restoration in specific gender groups. 1 on the graph legend denotes male and 2 on the graph legend denotes female. X axis denotes the gender groups and the Y axis denotes the frequency of restorations



Figure 3: Type Of Restoration Vs Tooth Number

Figure 4: Sex Vs Type Of Restoration

With the above obtained results, ceramic MO followed by ceramic DO follow by metal DO were the frequencies of restorations observed. Also, 46 has the highest incidence of 12, followed by 36 of 9 and 37, 47 with 5 each. A study conducted by Djiken et al., Showed that 19 out of 29

showed significant success rate of ceramic restorations. A study conducted by Suleiman et.al inlays/onlays showed a 97.4% success rate i.e., 1082/1093 subjects when compared to direct restorations. However, in the current knowledge of the author, there is no previous study which shows the prevalence/frequencies of the types of Class 2 restorations. (Bona et al., 2008; Morimoto et al., 2016; Rajendran et al., 2019; Jose et al., 2020).

Figure 3: shows the association between the different teeth and the different types of restoration. The x-axis denotes the tooth and y-axis represents the number of different types of restorations. Three types of restorations were included in this study. In this graph blue colour shows Class II metal inlay DO, Red colour shows Class 2 ceramic inlay MO, Green colour shows Class 2 ceramic inlay DO and orange colour shows the total no. of cast restoration in that tooth. The Pearson chi-square value obtained was 6.763. The p value obtained was 0.343 (p.>0.05) which shows the association between the tooth number and the type of restoration as non-significant, even though Class 2 metal inlay DO have its highest incidence in 36, ceramic inlay in 37, 46 and ceramic inlay MO in 46 respectively. A total of 14 Class 2 ceramic MO and 13 ceramics DO were observed.



Previously our team had conducted numerous clinical trials (Ramamoorthi et al., 2015a; Nasim et al., 2018; Janani et al., 2020), in vitro studies (Ramanathan and Solete, 2015; Nandakumar and Nasim, 2018; Teja et al., 2018; Rajendran et al., 2019; Siddique et al., 2019) and surveyed (Manohar and Sharma, 2018; Jose et al., 2020) and reviewed various aspects of endodontics and conservative dentistry (Noor et al., 2016; Kumar et al., 2018; Ravinthar and Jayalakshmi, 2018; Rajakeerthi and Ms, 2019; Teja and Ramesh, 2019; Ravinthar and Jayalakshmi, 2018; Rajakeerthi and Ms, 2019) over the past five years (Ramamoorthi et al., 2015b; Ramanathan and Solete, 2015; Noor et al., 2016; Neelakantan et al., 2017; Manohar and Sharma, 2018; Nasim and Nandakumar, 2018; Rajakeerthi and Ms, 2019; Ramanathan and Solete, 2015; Noor et al., 2016; Kumar et al., 2018; Janani et al., 2020).Now we are focusing on retrospective studies, the idea for which has stemmed from the current interest in our community. Relatively small sample size and specific group population were the limitations of the study and not being able to assess the etiology of attrition. A larger sample size, proper diagnosis, treatment planning and to analyse the various restorative options can add significance to the study.

Figure 4: shows the association between gender and the no of different types of restoration. The x-axis denotes restorations in gender and y-axis represents the no. of restorations. Three types of restorations were included in this study. In this graph, blue colour represents male, red colour represents female and green colour represents total number. The statistics show that males have higher incidence than females. A total of 22 males and 9 female subjects were observed in the study. There is no significant association between gender and type of restoration as the p value obtained was .974 (>0.05) making the correlation non-significant, but the obtained values show that for any kind of restorations males were more in numbers. A total of 4 class II metal DO, followed by 8 Class II ceramic DO and 10 ceramic class II ceramic MO was observed in males, while 1 class II metal DO, 4 ceramic class II ceramic MO and 4 ceramic class II DO was observed in female subjects.



CONCLUSION

Within the limitations of the study, the most common type of restoration is Class 2 ceramic inlay in the disto-occlusal aspect. The most common effective gender is male and the most common affected tooth is 46.

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Prevalence on the Types of Denture Stomatitis Reported in A Private Dental Hospital: A Retrospective Study

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ABSTRACT

Denture stomatitis affects the denture bearing surfaces of the oral mucosa, which is characterised by inflammation followed by erythema, denture stomatitis occurs due to superficial infection by candida species which is due to various factors such as ill-fitting prosthesis, long period of denture wearing. Predisposing factors such as diabetes mellitus, bad oral hygiene which in turn cause the accumulation of yeast organisms contribute towards denture stomatitis. The aim of this study was to find the prevalence of denture stomatitis and its association with oral hygiene status and diabetes mellitus. The results of this study showed that Type 2 denture stomatitis according to Newton's classification which is a localised area of erythema involving the whole or part of denture bearing surface was the most common type of denture stomatitis. Maxillary palatal surface was the most common site of occurrence of stomatitis, the drug which was most preferably used was topical 1% clotrimazole. Statistical analysis was done using Pearson chi-square analysis which revealed no statistically significant association between denture stomatitis and age, gender, oral hygiene status and diabetes mellitus. Association done between denture stomatitis and oral hygiene index-simplified has shown that there is no statistically significant association (0.501 p value >0.05).

KEY WORDS: DENTURE STOMATITIS; INFLAMMATION; NEWTON CLASSIFICATION; CANDIDIASIS

INTRODUCTION

Denture stomatitis affects the denture bearing surfaces of the oral mucosa, it is characterised by areas of erythema which is preceded by inflammation in the mucosal area that is covered by denture. Epidemiology studies have shown that about 15-70% of denture wearers experienced denture stomatitis. The occurrence of denture stomatitis was due to the accumulation of yeast or organisms such as candida species which is due to various factors such as ill-fitting prosthesis, long period of denture wearing, older denture, ill-hygiene of the patient, continuous wearing of denture (Pattanaik et al. 2010; Gendreau and Loewy 2011; Steele et al. 2015; Aoun and Cassia, 2016; Dharman and Muthukrishnan 2016; Rohini



and Kumar 2017; Muthukrishnan and Kumar 2017; Rohini and Kumar 2017; Patil et al. 2018; ; Chaitanya et al. 2018; Maheswari et al. 2018; Gauch et al. 2018; Subha and Arvind 2019; Krishnaswamy et al. 2020).

The classification of denture stomatitis is based on the classification given by newton in 1962: Type-1- a localised simple inflammation or pinpoint hyperemia, Type-2-an erythematous or generalised simple type seen as more diffuse erythema involving a part or the entire denture covered mucosa, Type-3- a granular Type commonly involving the centre part of the hard palate and the alveolar ridges. Previous research done suggests that the females: male ratio was about 3:1 showing the higher predilection towards females, along with other predisposing factors such as nocturnal denture wearers, non-maintenance of oral hygiene, microbes, duration of denture usage, systemic conditions such as diabetes mellitus and various immunodeficiencies, dryness of mouth (Xerostomia), trauma due to occlusion, poor nutritional status of the patient, foods high in carbohydrates, tobacco habits such as smoking and tobacco chewing, allergic reaction of the body towards certain denture resin materials, plaque accumulation on



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the mucosal surface of the denture, followed by age of the patient (Choudhury et al. 2015; Muthukrishnan et al., 2016; Karthikeyan et al., 2016; Chaitanya et al. 2017; Krishnaswamy et al. 2020).

Candidiasis induced denture stomatitis is the most common, candida organisms that are known to induce denture stomatitis includes Candida tropicalis, Candida dubliniensis and Candida krusei. Previously our team has a rich experience in working on various research projects across multiple disciplines (Chaitanya et al. 2017; Varghese et al., 2019; Venu et al., 2019; Samuel et al. 2019; Mehta et al. 2019; Sharma et al. 2019; Sureshbabu et al. 2019; Gheena and Ezhilarasan 2019; Vignesh et al. 2019; Ke et al. 2019; Jain et al. 2019; Sathish and Karthick 2020; Samuel et al., 2020; Muthukrishnan et al. 2020; Krishnaswamy et al. 2020; Jose et al., 2020). Now the growing trend in this area motivated us to pursue this project. The aim of this study is to assess the prevalence of denture stomatitis in a hospital setting. The objectives of this study was to find the factors that cause denture stomatitis and to evaluate its association with age and gender along with predisposing factors such as oral hygiene and diabetes mellitus.

Figure 1: Pie chart representing the age distribution in patients with denture stomatitis, Prevalence percentage of denture stomatitis was highest in 30-60 years as 57.1%(grey), followed by 34.7%(blue) in >60 years, and least prevalent as 8.2%(green) in 10-29 years.



The lacunae of this study is less number of patients and statistical analysis of the present study is only of descriptive type, the rationale of this study to understanding the denture stomatitis and its age and gender based prevalence which would pay way for further epidemiological studies in the future.

MATERIAL AND METHODS

The retrospective study on prevalence of Aphthous stomatitis treated in the department of Oral Medicine was conducted in a hospital setting. Approval of ethical clearance was given by the Scientific Review Board SDC/SIHEC/2020/DIASDATA/0619-0320. The number of

people involved in current research are three members (principal investigator, guide and reviewer). The sampling was done by collecting the data from September 2019 (01/09/2019) to April 2020 (01/04/2020). In this data, all the case sheets were reviewed, cross verification done, duplicate entries were removed and photographic evidence was used. The cases recorded with complete documentation of complaint, history of present illness and complete documentation of presence or absence of medical history and follow up cases alone were included in the study. The incomplete documented records with no proper treatment and follow up details were excluded from the study. Measures taken to minimise sampling is by means of convenience sampling and by selecting cases that are diagnosed and treated only in the oral medicine department.

Figure 2: Bar graph representing gender distribution in patients with denture stomatitis, X-axis represents gender, Y-axis represents the frequency percentage of patients with denture stomatitis. Frequency distribution shows that gender distribution in this study was more in female patients (59.2%) followed by male patients (40.8%).



Figure 3: Bar graph representing frequency percentage of patients with denture stomatitis based on newton's classification of denture stomatitis. X-axis represents Newton's classification of patients with denture stomatitis, Y-axis represents the frequency percentage of patients with denture stomatitis and it revealed that Type-2(pink) as 59.2%, Type-1(orange) as 26.5% and Type 3(yellow) as 14.3% with highest prevalence reported in Type 2 denture stomatitis.



The current study was conducted in a hospital setting in which the demographic data such as such as age, gender and medical history data such as presence or absence of systemic diseases and general and oral examination details such as oral hygiene status and clinical features of denture stomatitis was retrieved from the database. The dependent variable considered as different types of denture stomatitis and independent variables were age, gender and oral hygiene status. The descriptive statistical tests used were frequency distribution tests. The inferential statistical tests such as the Pearsonchi square test were done. Statistical analysis such as frequency distribution and Pearson-chi square test was done using statistical software SPSS software (ver.26). Frequency distribution of types of denture stomatitis in age and gender and its association with age and gender, oral hygiene status and presence or absence of diabetes mellitus were analysed using Pearson chi-square analysis.

Figure 4: Bar graph representing the association between patients with denture stomatitis and age distribution, X-axis represents the denture stomatitis classification, Y-axis represents number of patients with denture stomatitis. Association analysis between denture stomatitis and age was done using a Pearson chi-square test which revealed no statistically significant association (0.434, p value >0.05). However, Type 1,2 and 3 are most prevalent in the 30-60 years age group.



RESULTS AND DISCUSSION

This study has shown that Type-2 denture stomatitis according to Newton's classification most prevalent in about 80% of cases. The most common site of prevalence of denture stomatitis in about 80% of the cases was in palatal mucosa and remaining 20% in the alveolar ridge. The mean age of the patient was around 63 years. The prevalence of denture stomatitis was observed in 3 age groups. The percentage of prevalence in denture stomatitis was more in patients between 30-60 years 57.1% followed by, 34.7% in >60 years, and 8.2% in 10-29 years (Figure 1). Frequency analysis of gender distribution in patients with denture stomatitis shows

that it was more prevalent in female patients, frequency analysis shows that gender predilection in this study was more towards female patients (59.2%) followed by male patients (40.8%) (Figure 2). The frequency percentage of patients with denture stomatitis based on Newton's classification has revealed that Type-2 type of denture stomatitis was more prevalent (59.2%) followed by Type 1 in 26.5% and Type 3 in 14.3% (Figure 3).

Figure 5: Bar graph representing the association between patients with denture stomatitis and Gender, X-axis represents the denture stomatitis classification, Y-axis represents number of patients with denture stomatitis. Pearson chi-square test revealed no statistically significant association (0.352, p value >0.05). However, it is seen that type 1 is more prevalent in males and type 3 in females.



Figure 6: Bar graph representing the association between patients with denture stomatitis and OHI-S, X-axis represents the denture stomatitis classification, Y-axis represents number of patients with denture stomatitis, Association analysis between denture stomatitis and OHI-S was done using pearson chi-square test which revealed no statistically significant association (0.501, p value >0.05). However poor oral hygiene was more prevalent in type 2 denture stomatitis patients.



The association between denture stomatitis and age done has shown that denture stomatitis is more prevalent in the 30-60 years age group. Association analysis was

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done between denture stomatitis and age, using Pearson chi-square test which shows no statistical association (0.434, p value > 0.05). (Figure 4). The association between denture stomatitis and gender done shows that type 1 denture stomatitis is more prevalent in males and type 3 more prevalent in females. Association analysis between denture stomatitis and gender was done using a Pearson chi-square test which shows no statistically significant association (0.352, p value >0.05). (Figure 5). The association between denture stomatitis and Oral hygiene index-simplified (OHI-S) done shows that poor oral hygiene is more prevalent in type 2 denture stomatitis patients. Association analysis between denture stomatitis and OHI-S was done using Pearson chi-square test which shows no statistically significant association (0.501, p value >0.05). (Figure 6). The association between OHI-S and age done shows that poor oral hygiene index is seen in patients in the 30-60 years and 60 years above range.

Figure 7: Bar graph representing the association between patients with OHI-S and age distribution in patients with denture stomatitis, X-axis represents the OHI-S, Y-axis represents number of patients with denture stomatitis, Association analysis between OHI-S and age was done using Pearson chi-square test which revealed no statistically significant association (0.352, p value >0.05). However, poor oral hygiene index is seen in patients in the 30-60 years and 60 years above range.



Association analysis between OHI-S and age was done using Pearson chi-square test which shows no statistically significant association (0.352, p value >0.05) (Figure 7). The drug of choice in the present study was 1% clotrimazole mouth paint which is used on all patients, the medical history that was more prevalent was diabetes mellitus, mean score of oral hygiene status of all the patients was about 1.6 (Fair). Frequency analysis of age distribution in patients with denture stomatitis reveals that denture stomatitis was more prevalent between the 30-60 years age group. The association between OHI-S and gender done shows that poor hygiene status was more prevalent in male patients, both poor and good grades were prevalent in female patients. Association analysis between OHI-S and gender was done using pearson chi-square test which shows no statistically significant association (0.434, p value >0.05) (Figure 8).

The association between denture stomatitis and diabetes mellitus showed that Type 1 denture mellitus is more prevalent in diabetes mellitus patients while not prevalent in Type 2 and Type 3 patients. Association analysis between Denture stomatitis classification and diabetes mellitus was done using Pearson chi-square test which shows no statistically significant association (0.354, p value >0.05). However (Figure 9) Studies done by Pesee et al. (2015) has shown that gingivitis and diabetes has a strong association with the occurrence of denture stomatitis, the cause of xerostomia due to decreased salivary flow has resulted in less lubrication and more friction to the denture bearing surfaces and hence more chances of candida infection which is similar to the current study where diabetes is a predisposing factor for denture stomatitis (Pesee and Arpornsuwan 2015; Misra et al. 2015 Arvind et al., 2018; Mathew et al. 2020).

Figure 8: Bar graph representing the association between patients with OHI-S and gender distribution in patients with denture stomatitis, X-axis represents the OHI-S, Y-axis represents number of patients with denture stomatitis. Pearson chi-square test revealed no statistical association (0.434, p value >0.05). Poor hygiene status more prevalent in male patients, both poor and good scores were prevalent in female patients



Few other studies revealed that denture stomatitis increases with age and medical conditions such as diabetes mellitus can be aggravating factors, along with predisposing factors such as the denture age/duration of denture wearing (in years/months) with oral hygiene scores of 2.3 (fair), but the present study has shown an OHI of 1.6(fair).Our institution is passionate about high quality evidence based research and has excelled in various fields Hyperlink "https://paperpile.com/c/ nAmPRM/hjrV5+Gzx5Z+LBvxT+sT3K1+9RbtK+x2JGP +m2eZ8" (Vijayashree Priyadharsini 2019; Ezhilarasan, Apoorva, and Ashok Vardhan 2019; Ramesh et al. 2018; Mathew et al. 2020; Sridharan et al. 2019; Pc, Marimuthu, and Devadoss 2018; Ramadurai et al. 2019). We hope this study adds to this rich legacy.

Figure 9: Bar graph representing the association between patients with denture stomatitis classification and history of diabetes mellitus. X-axis represents the Denture stomatitis classification; Y-axis represents the number of patients with diabetes mellitus. Pearson chi-square test revealed no statistically significant association (0.354, p value >0.05). Diabetes mellitus was more prevalent in Type 1 denture stomatitis patients.



CONCLUSION

This study concludes that Type 2 denture stomatitis was the most prevalent in all age groups and patients with diabetes mellitus had more incidence of denture stomatitis. Topical application of 1% clotrimazole has been successful in treating patients infected by denture stomatitis. The results of association between oral hygiene status and denture stomatitis has proved that there is no statistical significant association (0.501, p value >0.05), however the overall mean score of oral hygiene score was 1.6 in patients with denture stomatitis , hence this study results proves that maintenance of good oral hygiene plays a vital role in preventing recurrence of denture stomatitis especially with patients who are associated with other predisposing factors such as diabetes mellitus

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Assessment of Upper and Lower Airway Dimensions in Different Growth Patterns in Class I Skeletal Malocclusions

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ABSTRACT

The upper airway is a structure responsible for one of the main vital functions in the human organism i.e., breathing. The aim of this study was to determine whether the growth pattern had an effect on the upper airway and lower airway. 30 Pre-treatment lateral cephalograms of individuals ageing between 18-40 years were taken from patients reporting to the Department of Orthodontics in Saveetha Dental College. Skeletal Class I was determined based on ANB angle (ANB:0-4 °). Different growth patterns of the mandible in the vertical dimension were categorized into horizontal growth pattern, average growth pattern and vertical growth pattern and these formed the three groups. McNamara's analysis was used as a standard analysis to measure upper and lower airway dimensions. ONE-WAY ANOVA showed that for the Upper airway, all the three growth patterns had comparable widths as the results were statistically insignificant (p>0.05). For lower airways, ONE-WAY ANOVA showed that vertical growth patterns had larger airway dimensions than horizontal and average growth patterns. Results were statistically significant (p<0.05). Thus, this study concludes that upper airway dimensions were similar irrespective of the growth pattern while the lower airway was affected by the growth pattern.

KEY WORDS: GROWTH PATTERN; LOWER AIRWAY; MCNAMARA'S ANALYSIS; UPPER AIRWAY.

INTRODUCTION

The upper airway is a structure responsible for one of the main vital functions in the human organism i.e., breathing. There exists a close relationship between the pharynx and the dentofacial structures. The Pharynx is divided into 3 parts: oropharynx, nasopharynx, and laryngopharynx. Oropharynx and nasopharynx play an important role in respiration and deglutition. According to the Balter's philosophy, Class II malocclusions are a consequence of backward positioning of the tongue. Literature proves that the dimensions of oropharynx and nasopharynx vary with craniofacial growth or functional appliance therapy. There are studies that show association between respiratory function and maxillary and mandibular growth. Therefore, consideration of the pharyngeal airway should be included in the orthodontic diagnosis and treatment planning (Geetanshu et al., no date;



Rizk et al., 2016; Jena et al., 2010; Jain et al., 2019; Samuel et al., 2020).

Studying the effects of pharyngeal airway obstruction on the various growth patterns have been done in craniofacial biology since Angle's time. The Functional matrix hypothesis, states that relative soft tissue surrounding the skeleton determines pharyngeal size. Evidence from previous studies show that an altered upper airway may be a cause for vertical malocclusion. In a study done by Mergen and Jacob, the size of the airway was greater in normal occlusion than in patients with distal occlusion. Kirjavaninen showed that a skeletal class II malocclusion results in a narrower airway than that of class I malocclusions. In Class II malocclusions the respiratory function is impeded in the region of pharynx and there is faulty deglutition and mouth breathing. Studies have shown that pharyngeal airway reduction affects growth patterns. However, Aboudara has stated that no correlation exists between dento facial pattern and pharyngeal airway (Mergen and Jacobs, 1970; Ceylan and Oktay, 1995; Kartikaya et al., ; Kirjavainen and Kirjavainen, 2007; Lima et al., 2008; Aboudara et al., 2009; Grewal and Godhane, 2010; Ucar and Uysal, 2011; Vignesh et al., 2019; Samuel et al., 2020).

Previously our team has a rich experience in working on various research projects across multiple disciplines (Gheena





and Ezhilarasan, 2019; Ke et al., 2019; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Sharma et al., 2019; Varghese et al., 2019; Venu et al., 2019; Subramani and Raju, 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project. Hence this study was planned to compare the upper and lower airways in different growth patterns and to determine if the growth pattern is a factor that is responsible for airway changes.

MATERIAL AND METHODS

30 Pre-Treatment lateral cephalograms of patients between age groups 18-40 years were taken from the data available in the Department of Orthodontics. This study was conducted in Saveetha dental college, Chennai. Sample power calculation was obtained after doing G power calculation from previous article. Inclusion criteria for the study was patients having Skeletal Class I malocclusion with ANB angle between 0 to 4 Degrees. To eliminate the potential influence of growth and aging, only post-pubertal subjects were selected as subjects for this study. Patients with ANB angle greater than 4 degrees were excluded from the study (Lakshmi et al, 2018).

FACAD software was used for tracing cephalograms and making measurements. Cephalograms were Calibrated and Standardized for each patient. Skeletal Class I patients were selected based on the ANB angle (ANB:0-4 °). A study conducted by rubika et al used Gonial angle to diagnose the growth pattern. In this study, different growth patterns were categorized according to the SN-MP angle into Horizontal growth pattern (low angle), Average growth pattern (average angle) and Vertical growth pattern (high angle). Thus, 30 patients were divided into three groups: average growth pattern (n=10), horizontal growth pattern (n=10), vertical growth pattern (n=10).

Table 1. Mean Values for upper airway. The table depicts that the mean values of the width of the upper airway are almost the same irrespective of the growth patterns.

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower	Upper		
					Bound	Bound		
Vertical growth pattern	10	13.040	4.0618	1.2845	10.134	15.946	8.1	21.1
Horizontal growth pattern	10	13.880	3.7496	1.1857	11.198	16.562	6.3	17.8
Average growth pattern	10	14.500	2.6055	.8239	12.636	16.364	11.2	18.7
Total	30	13.807	3.4584	.6314	12.515	15.098	6.3	21.1

Figure 1: The scattered bar graph represents the upper airway dimensions for the various growth patterns. X axis denotes the growth pattern (vertical growth pattern= purple, horizontal growth pattern= orange, average growth pattern= green). Y axis denotes the upper airway dimensions. Each dot represents the upper airway width for the respective growth pattern.



Mcnamara's analysis was used as a standard analysis to measure upper and lower airway dimensions. Upper airway dimension was measured from a point on the Table 2. ONE-WAY ANOVA for upper airway. There are no statistically significant differences between the groups (p<0.05). Tables 1 and 2 depict that in vertical, horizontal and average growth patterns, the upper airway width had the same average values, indicating that upper airway dimensions had similar values irrespective of the growth patterns.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.739	2	5.369	.431	.654*
Within Groups	336.120	27	12.449		
Total	346.859	29			

posterior outline of the soft palate to the closest point on the distal wall of the pharynx. (Average value:15-20mm). Lower airway dimension was measured from the point of intersection of the distal part of the tongue and lower border of the mandible to the point which was nearest on the distal wall of the pharynx (Average value:11-14mm) (Lakshmi et al, 2018). **Statistical Analysis:** 1) Descriptive statistics like Mean and standard deviation, standard errors, and maximum and minimum values were calculated for the upper and lower airway measurements for different growth patterns. 2) ONE-WAY ANOVA was done to do intergroup comparisons of airways among different growth patterns (average, horizontal and vertical growth patterns). Post hoc tukey and bonferroni test was done to know the significance pairwise. All the statistical analyses were performed using SPSS Software.

Table 3. Post hoc tests for intergroup comparisons in the upper airway. Table 3 shows that no statistical significance was seen in any groups (*p>0.05), indicating that the upper airway had similar dimensions for all the three growth patterns under study.

	(I) Growth pattern	(J)Growth pattern	Mean Difference (I-J)	Std. Error	Sig.	95% Cont Interva	fidence 1
Tukey HSD	Vertical growth pattern	Horizontal growth pattern Average growth pattern	8400 -1.4600	1.5779 1.5779	.856* .629*	-4.752 -5.372	3.072 2.452
	Horizontal growth pattern	vertical growth pattern Average growth pattern	.8400 6200	1.5779 1.5779	.856* .919*	-3.072 -4.532	4.752 3.292
	Average growth pattern	Vertical growth pattern Horizontal growth pattern	1.4600 .6200	1.5779 1.5779	.629* .919*	-2.452 -3.292	5.372 4.532
Bonferroni	Vertical growth pattern	Horizontal growth pattern Average growth pattern	8400 -1.4600	1.5779 1.5779	1.000* 1.000*	-4.868 -5.488	3.188 2.568
	Horizontal growth pattern,	Vertical growth pattern Average growth pattern	.8400 6200	1.5779 1.5779	1.000* 1.000*	-3.188 -4.648	4.868 3.408
	Average growth pattern	Vertical growth pattern Horizontal growth pattern	1.4600 .6200	1.5779 1.5779	1.000* 1.000*	-2.568 -3.408	5.488 4.648

Table 4: Mean Values for Lower airway dimensions. The table depicts that the mean value for lower airway width is the maximum for vertical growth pattern followed by horizontal growth pattern and the least for average growth pattern.

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower	Upper		
					Bound	Bound		
Vertical growth pattern	10	14.500	2.6055	.8239	12.636	16.364	11.2	18.7
Horizontal growth pattern	10	11.340	3.5221	1.1138	8.820	13.860	7.3	17.8
Average growth pattern	10	9.830	1.8013	.5696	8.541	11.119	7.0	13.0
Total	30	11.890	3.2985	.6022	10.658	13.122	7.0	18.7

RESULTS AND DISCUSSION

The results of this study showed that for the upper airway, all growth patterns had comparable widths (Table 1 and Figure 1). ONE-WAY ANOVA, Post hoc tukey and bonferroni tests for intergroup comparisons also showed that results were statistically insignificant. (p>0.05) (Tables 2&3). This indicates that the upper airway is unaffected by the growth pattern of the mandible in the vertical dimension. However, for lower airway, the vertical growth pattern group had comparatively larger airway dimensions than horizontal and average growth patterns (Table 4 and Figure 2). ONE-WAY ANOVA, post hoc tukey and bonferroni tests for intergroup comparisons between average and vertical growth patterns, and in between horizontal and vertical

growth patterns showed results were statistically significant (p<0.02) (Tables 5&6). Thus, the lower airway is affected by the growth pattern of the mandible.

Malkoc et al had stated that cephalometric films are significantly reliable and reproducible in determining airway dimensions. When computed tomography (CT) and cephalometric films were compared in subjects with skeletal malocclusion, Cameron et al. had found a significant positive relationship between nasopharyngeal airway size on cephalometric films and its true volumetric size as determined from CBCT scan in adolescents. Hence, we used lateral head films for airway measurements (Malkoc et al., 2005; Samuel et al., 2020). Figure 2: The scattered bar graph represents the mean lower airway dimensions for the various growth patterns. X axis denotes the growth pattern (vertical growth pattern= purple, horizontal growth pattern= orange, average growth pattern= green). Y axis denotes the lower airway dimensions. Each dot represents the lower airway width for the respective growth pattern.



In this study, comparison of upper and lower airway was carried out in class I skeletal malocclusions in different growth patterns. The results showed that upper airway dimensions had nearly similar widths for each group with Table 5. ONE-WAY ANOVA for lower airway. Table 5 depicts that p value < 0.05, therefore it is statistically significant indicating that differences were seen in the lower airway dimensions between the vertical, horizontal and average growth patterns

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	113.582	2	56.791	7.593	.002
Within Groups	201.945	27	7.479		
Total	315.527	29			

the mean of the three groups combined being 13.8 mm. Lower airway dimensions revealed that the mean width of all the three groups combined was 11.89 mm Hence, the average means of the lower airway derived from this study are consistent with the ones stated in Mcnamara's analysis (11-14mm) while the upper airway values are slightly short of the McNamara's values (15-20mm). Reduced upper airway has a risk of causing Obstructive sleep apnea. Based on the results treatments should be directed in such a way so as to prevent the reduction of nasopharyngeal anteroposterior width, or even help to increase them (Viswanath et al., 2015; Mathew et al., 2020).

Table 6. Post hoc tests for intergroup comparisons in the lower airway. Table 6 depicts tests done for intergroup comparisons for lower airway dimensions in between average and vertical growth patterns, and in between horizontal and vertical growth patterns shows statistical significance for these groups. (*p<0.05). Whereas, for comparison between horizontal and average growth patterns, no statistical significance was seen (*p>0.05). Thus, the results show that the dimensions of the lower airway are significantly larger in individuals with vertical growth patterns when compared to the horizontal and average growth patterns.

	(I) Growth pattern	(J)Growth pattern	Mean Difference	Std. Error	Sig.	95% Con Interva	fidence al
			(I-J)			Lower	Upper
						Bound	Bound
Tukey HSD	Vertical growth pattern	Horizontal growth pattern	3.1600*	1.2231	.040*	.128	6.192
		Average growth pattern	4.6700*	1.2231	.002*	1.638	7.702
	Horizontal growth pattern	Vertical growth pattern	-3.1600*	1.2231	.040*	-6.192	128
		Average growth pattern	1.5100	1.2231	.444**	-1.522	4.542
	Average growth pattern	Vertical growth pattern	-4.6700*	1.2231	.002*	-7.702	-1.638
		Horizontal growth pattern	-1.5100	1.2231	.444**	-4.542	1.522
Bonferroni	Vertical growth pattern	Horizontal growth pattern	3.1600*	1.2231	.047*	.038	6.282
		Average growth pattern	4.6700*	1.2231	.002*	1.548	7.792
	Horizontal growth pattern	Vertical growth pattern	-3.1600*	1.2231	.047*	-6.282	038
		Average growth pattern	1.5100	1.2231	.683**	-1.612	4.632
	Average growth pattern	Vertical growth pattern	-4.6700*	1.2231	.002*	-7.792	-1.548
		Horizontal growth pattern	-1.5100	1.2231	.683*	-4.632	1.612

The results of this study were not in support of the report which other authors who have done similar studies mentioned below. A study by Bhagya laxmi et al stated that there was significant narrowing of the upper airway in hyperdivergent cases. Anapaula et al stated that brachyfacial patterns have larger width than meso facial and dolichofacial individuals. Faruk et al stated that Nasopharyngeal airway space and upper posterior airway space in Class I subjects were found to be larger in low angle subjects than in high angle subjects. Geetanshu et al stated that upper pharyngeal airway width in subjects with vertical growth patterns was narrow as compared to average growth pattern while no statistically significant differences in lower airway dimensions were noted. Joseph et al. reported that the nasopharyngeal airway in hyperdivergent individuals was significantly narrower than that in normodivergent individuals. However, they suggested that this difference occurred because of the relative bimaxillary retrusion exhibited by the hyperdivergent group. The wide variety of results makes it an ideal topic for large scale studies in different populations (Joseph et al., 1998; Lakshmi et al., 2018; Mathew et al., 2020)

Limitations of this study were that the sample size was very limited. Patients included in the study were restricted to one department and one university. Hence, full scope of study was not reached. Subjective error during linear measurements on FACAD software as measurements were done by a single examiner. Being a retrospective study, a direct assessment of the breathing patterns was not possible. Hence, pharyngeal obstructions could not be ruled out as patients could not be evaluated clinically. Further research with a large sample size is necessary for the study to reach its full scope and potential.Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020).

CONCLUSION

This study concludes that upper airway dimensions were in the average range and did not alter with the growth pattern of the mandible. Whereas, the lower airway was significantly higher for vertical growth pattern. Mild narrowing of lower airways was seen for average growers in comparison with average values stated by McNamara. Hence growth patterns can be considered to have effect on lower airway dimensions. Based on the results, treatments should be directed in such a way as to prevent the reduction of nasopharyngeal anteroposterior width, or even help to increase them.

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Evaluating the Prevalence of Oral Submucous Fibrosis with Oral Squamous Cell Carcinoma in An Out-Patient Population Over a Period of 8 Months

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ABSTRACT

This study was to evaluate the prevalence of OSMF with OSCC in the outpatient population in the institution over a period of 8 months. Introduction: Oral submucous fibrosis (OSMF) is a characteristic premalignant condition caused by betel chewing, which can also lead to oral Squamous cell carcinoma (OSCC), risk of malignant transformation is further increased by concomitant tobacco consumption. The demographic data were retrieved from the archives of an institution. Data collected were tabulated using Microsoft excel sheets. Descriptive statistics with cross tables were done using IBM, SPSS software and further evaluated. Results and conclusion: The association between site of lesion and habit history of OSMF patients show habits are more among bilateral lesions with 33.33% of pan chewing habit followed by 30% of areca nut chewing followed by 15% of hans habit, 5% of mawa habit, 3.33% of Gutka habit and 5% of patient with no history. Unilateral lesions show Areca nut chewing about 3.33% and pan chewing habit about 5%. The OSMF patients with 95% not associated with OSCC and 5% associated with OSCC, among which 3.33% Well differentiated squamous cell carcinoma (WDSCC) and 1.67% Moderately differentiated squamous cell carcinoma (MDSCC), reported in the institution. The early diagnosis of Oral Potentially Malignant Disorders (OPMD) like OSMF plays an important role in treatment. Proper timely diagnosis, habit counselling and nutritional supplements advice leading to good quality life, also help in prevention of Malignant transformation.

KEY WORDS: OSMF, MALIGNANT PRESENTATION, OSCC, JUXTA-EPITHELIAL INFLAMMATORY REACTION.

INTRODUCTION

Oral submucous fibrosis (OSMF) is an insidious, Chronic disease affecting any part of oral cavity and sometimes pharynx, although occasionally preceded by and/or association with vesicle formation, it is always associated with juxta - epithelial inflammatory reaction followed by fibro-elastic Change of the lamina propria, with epithelial atrophy leading to stiffness of the oral mucosa and causing trismus and inability to eat, as described by Pindborg (1973). There are various factors related to oral submucous fibrosis, various studies have proved that areca nut chewing (arecoline) play a main role in pathogenesis, leading to oral



mucosal irritation and subsequent fibrosis. Other important factors collagen metabolism where vitamin c plays an important role in conversion of proline to hydroxyproline. Vitamin C is naturally an antioxidant preventing oxidative damage to tissues, physiological and various pathological conditions. The worldwide estimate of OSMF shows among. India and southeast Asians, with an overall prevalence rate in India of approximately 0.2-05%, gender prevalence of 0.2-2.3% shown in males and females of about 1.2- 4.57% (Phatak, 1979; Murti et al., 1995; Rajalalitha and Vali, 2005; Tilakaratne et al., 2006; Guruprasad et al., 2014; Chakraborthy et al., 2014; Sherlin et al., 2015 Bhat et al., 2017; Iqbal et al., 2020; Panta et al., 2021).

Oral submucous fibrosis (OSMF) is an Oral potentially malignant disorder (OPMD), a chronic resistant disease. The knowledge of pathogenesis of oral submucous fibrosis and oral cancer is important. OSMF was first described by Schwartz in 1952, where it was classified as an idiopathic disorder by the Tematrophia idiopathica (tropica) Mucosaeoris. OSCC arising from OSMF has been estimated to be between 2% and 8%. Various diagnostic tools have



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been raised in recent advances. The progression of a normal epithelium to pre-cancerous lesion to carcinoma, needs stroma modification, important for tumor progression. OSMF is classified as an Oral potentially malignant disorder (OPMD), with an increased risk of malignant transformation compared to other OPMDs (Tilakaratne et al., 2006; More et al., 2012; Jayaraj et al., 2015; Ray et al., 2016; Hema Shree et al., 2019; Iqbal et al., 2020).

Oral leukoplakia, viral infections and oral epithelial dysplasia also reported with malignant transformation. Malignant transformation does not follow sequential progression; in many cases it may revert to normal. A series of epidemiological surveys conducted in india and south Africa with malignant changes reported about 3% to 6% in OSMF cases. A Study reported a malignant transformation rate of 7.6% over 10 years of observational period. OSCC has a more common subtype, oral tongue squamous cell carcinoma, a more common site of occurrence reported (Pindborg, 1977; Murti et al., 1985a; Sivaramakrishnan and Ramani, 2015; Gifrina et al., 2015; Viveka et al., 2016; Gupta and Ramani, 2016; Thangaraj et al., 2016; Sridharan et al., 2019; Gheena and Ezhilarasan, 2019 Sridharan et al., 2019; Iqbal et al., 2020).

The possible precancerous nature of oral submucous fibrosis was first mentioned by paymaster in 1956, who described the development of slow growing squamous cell carcinoma in one third of the cases with Submucous fibrosis. A study shows the necessity to evaluate the individual's metabolites level to prevent malignant transformation of oral leukoplakia and improved prognosis of OSCC patients. Various studies on Oral submucous fibrosis done with analysis of age, vascularity of tissue, habits and oral cancer, the importance to be given for association between OSMF and OSMF with OSCC. The Study is aimed to evaluate the prevalence of OSMF with OSCC in the outpatient population in the institution over a period of 8 months (Paymaster, 1956; Sridharan et al., 2019; Panta et al., 2021).

MATERIAL AND METHODS

This retrospective study was performed on Oral submucous fibrosis (OSMF) cases referred to the department of oral pathology during the period of June 2019 to February 2020 which included review cases from previous years. The study was conducted in an institution situated in the Chennai, Southern part of India. The ethical approval was given by the institution, SDC/SIHEC/2020/DIASDATA/0619-0320.

The demographic data collected from dental archives after reviewing and analysing 86,000 patients' reports were retrieved, which includes all the cases diagnosed with oral submucous fibrosis. The details of age, gender, habit history, diagnoses history, site of occurrence and grading of oral submucous fibrosis (OSMF), were tabulated using Microsoft excel sheets. All the data collected was entered and analysis was done using the Statistical package of social science (SPSS) by IBM, using variables like age, gender, habit history and site of lesions. Oral submucous fibrosis (OSMF) patients and OSMF with OSCC (Oral squamous cell carcinoma) were obtained from their review appointments. Frequency Analysis of clinical grading, site of occurrence and habit history done. The site of occurrence of Oral submucous fibrosis into unilateral lesions (Left buccal mucosa) and bilateral lesions (Right and left buccal mucosa) was correlated with habits history and grading of lesions. Association of OSMF and OSMF with OSCC was analysed and represented as a chart. Association between site and grade of lesion and site, habit history and diagnosis analysed using chi-square test and descriptive statistics, with P value <0.05 considered as statistically significant.

RESULTS AND DISCUSSION

The sample collected n=60 was used for analysis of habit history, site of lesion and grading of lesion.

Figure 1: Figure showed percentage of different grades of oral submucous fibrosis among the samples collected, which shows 71.67% of Grade 1 is more common.



Figure 2: Figure represents the percentage of patients with and without habit history among the samples collected, shows 38.33% of pan chewing and 33.33% of areca nut chewing which had the highest frequency.



In this study, the total number of OSMF patients taken was 60, which was divided and graded according to mouth opening into grade 1 for about 71.67%, grade 2 for about 15%, grade 3 for about 1.67% and grading not applicable for 11.67%, represented in Figure-1. The analysis of habits history among patients who were diagnosed with Oral

Submucous Fibrosis (OSMF) shows Areca nut chewing in 33.3%, Pan chewing habit in 38.3%, Hans chewing habit in 15%, Mawa chewing in 5%, Gutka chewing in 3.33% and patient with no habit history in 5%, represented in Figure-2. The analysis of the site of lesion shows more prevalence in right and left buccal mucosa (bilateral) with 91.67% and less among left buccal mucosa (unilateral) with 8.33%, represented in Figure-3.

Figure 3: Figure represents percentage of site of lesion among the samples collected, shows 91.67% more common in bilateral buccal mucosa.



Figure 4: Figure represents the association between site of lesion and grading of lesion among the samples collected, which shows overall percentage in left buccal mucosa lesions had grade 1(6.67%) and grading not applicable (1.67%). The bilateral buccal mucosal lesions had grade 1(65%), grade 2(15%), grade 3(1.67%) and grading not applicable (10%). The Cross-table analysis shows Pearson chi-square value of 1.287; p-value=0.732 which is > 0.05, statistically not significant showing that there is no significant association between site and grade of the lesion.



Figure 5: Figure showed association between site of lesion and habit history among the samples collected. The overall percentage of site bilateral lesions (right and left buccal mucosa) are more common with 33.33% of pan chewing followed by 30% of areca nut chewing habits, unilateral lesions (left buccal mucosa) are lesser with 3.33% of areca nut chewing and 5% of pan chewing habit.



Figure 6: Figure showed Oral submucous fibrosis (OSMF) with Oral squamous cell carcinoma (OSCC) presentation, where 95% patients diagnosed with OSMF reported no OSCC and overall, 5% cases showed OSCC presentation.



In this study Association between site and grade of lesion of Oral Submucous Fibrosis (OSMF), the overall percentage shows the right and left buccal mucosa lesion occurrence as common, shows grade 1 of 65%, grade 2 of 15%, grade 3 of 1.67% and grading not applicable for 10%. The lesions in left buccal mucosa are less common, shows grade 1 of 6.67% and grading not applicable for 1.67%, represented in Figure-4. The descriptive statistics with cross tables analysis of associations by chi square test shows p-value=0.732 which is > 0.05, statistically insignificant. The association between site of lesion and habit history of patients diagnosed with Oral submucous fibrosis (OSMF), shows habits are more among bilateral lesions (right and left

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buccal mucosa lesions) with 33.33% of pan chewing habit followed by 30% of areca nut chewing followed by 15% of hans habit, 5% of mawa habit, 3.33% of Gutka habit and 5% of patient with no history history. Unilateral lesions (left buccal mucosa lesions) showed Areca nut chewing about 3.33% and pan chewing habit about 5% reported, shown in Figure-5. Chi square test showed P=0.808, P value is > 0.05 (statistically insignificant).

The frequency of OSMF patients and OSMF patients with OSCC presentation is represented in Figure-6. The Oral submucous fibrosis (OSMF) patients with 95% no malignant presentation (OSCC) and 5% showed OSCC presentation, among which 3.33% Well differentiated squamous cell carcinoma (WDSCC) and 1.67% Moderately differentiated squamous cell carcinoma (MDSCC) reported. The sample data collected from management software (DIAS) and cross verification done with clinical photographs, dental photography plays an important role in document preservation. This study helps in association between OSMF and malignant presentation, the prevalence rate of OSMF with OSCC is evaluated. The oral submucous fibrosis (OSMF) being a precancerous condition, early diagnosis and treatment helps in reduction of malignant transformation (Hannah et al., 2018).

In this study patients with Oral submucous fibrosis (OSMF) were more common among males with 90% than females with 10%. The OSMF patients with OSCC are more common among elderly people with above 40 years of age, where males are more commonly affected (66.7%) than females (33.3%). Studies have been reported in OSMF cases with male predilection for OSMF. Literature in a study shows concordance with present study showing significant male predominance. Analysis of habit history in this study shows pan chewing and Areca nut habit more common than gutkha and hans. Similar to a population based case control study in Lucknow, which states the use of pan masala leads to increased risk of developing OSMF. A previous study shows habitual gutkha chewing was more prevalent than gutkha with tobacco. Another study showed a strong association between gutkha chewing and OSMF (Sinor et al., 1990; Babu et al., 1996; Kumar, 2016; Yang et al., 2018; Iqbal et al., 2020; Chaudhry et al., 2021).

In this study OSMF with OSCC prevalence of 5% was reported, paymaster in 1956 was the first to see the precancerous nature of OSMF and described the malignant presentation with OSMF. Understanding of the mechanisms of malignant transformation may lead to early detection of OSCC arising in the background of OSMF. A study reported 6% prevalence over a period of 10 years. Another study reported a to 8% Malignant presentation in OSMF cases. Pindborg with a series of epidemiological surveys conducted in India which reported 3% to 6% malignant transformation. As in previous studies this study also showed 5% of OSMF patients' presenting with OSCC. However, large scale study has to be done to substantiate the findings in our study and to determine the malignant transformation rate. A study with a larger representative population in a multicentric pattern would yield further baseline data. The early diagnosis of oral potentially malignant disorders like OSMF plays an important role in treatment. Proper timely diagnosis, habit counselling and nutritional supplements advice leading to good quality life, also help in prevention of Malignant transformation (Paymaster, 1956; Pindborg, 1973; Murti et al., 1985b; Jangid et al., 2015; Swathy et al., 2015; Ray et al., 2016; Jayasinghe et al., 2016; Iqbal et al., 2020; Panta et al., 2021).

CONCLUSION

This study has been showed the prevalence of OSMF cases and OSMF cases with OSCC presentation. Within the limitations of the study, the OSMF cases with malignant presentation were observed more in males than females. The habit history shows; pan chewing and Areca nut chewing to be more prevalent than mawa and hans and a minor proportion of patients affected without habit history. A prevalence of 5% of OSMF cases with OSCC were observed in our study. OSMF being considered as a disease predominant in the southeast asian region, awareness of habit cessation particularly Pan chewing and Areca nut chewing among the population would go a long way in reducing the incidence of this Potentially Malignant Disorder.

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Prevalence of Pits and Fissure Caries in 7 to 14 Year Old Children - A Retrospective Study

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ABSTRACT

Dental caries is considered to be a significant public health problem worldwide with cases being reported in both developed and developing countries. It has been reported that the occlusal surfaces with prominent pits and fissures morphology increases the risk of caries development. The aim of this study was to evaluate the prevalence of pits and fissure caries in 7-14 years children. It was a retrospective study conducted by reviewing 5,000 patient case records. A total of 1000 case records of patients for a period of December 2019 to April 2020 with complete records were reviewed and analysed. Patient's age, gender and presence of pits and fissure caries, caries in upper or lower arch were collected from the patient's case records. The obtained data was analysed using the SPSS version 23.0. Descriptive analysis was done for the assessment of age, gender and dental arches involved. Chi square test was used to evaluate the association of pits and fissure caries with age and gender. The overall prevalence of pits and fissures caries was about 61.7%. Prevalence among 7-9 years old children was 25.1%. Higher predilection for pits and fissures caries was seen in males (34.5%) when compared to females (26.0%). Most of the cases showed the presence of pits and fissures in both arches (63.7%). Within the limits of the present study, pits and fissures caries exhibit higher prevalence in 7-9 years old children, male predilection and more common in both arches in an individual. There is a paramount need to educate the parents and caregivers about the importance of preventive measure in preventing caries and progression of decay in children.

KEY WORDS: CHILDREN; PIT AND FISSURE CARIES; PREVALENCE; SCHOOL CHILDREN.

INTRODUCTION

Dental caries is considered to be a significant public health problem worldwide with cases being reported in both developed and developing countries It is a complex multifactorial disease with numerous risk and preventive factors which affects individuals from all age groups, particularly in children; Dental caries are often associated with various risk factors including age, gender, dietary



habits and oral hygiene practices. In children, periods of tooth eruption, harmful dietary habits and types of muscle movements during suckling and swallowing are considered as the common factors of dental caries. These conditions are further exaggerated by the presence of dry mouth, poor oral hygiene and other factors which may contribute to the development of dental caries (Marsh, 2003; Sudha et al., 2005; Bagramian et al., 2009; Ayele et al., 2013; Al Agili, 2013; Al-Ansari, 2014; Christabel and Linda-Christabel, 2015; Nair et al., 2018; Aldossary et al., 2018; Raj et al., 2020).

Patterns of early childhood caries usually begin to change at the age of three which affects the first and second primary molars. A report stated that children with dental caries in the primary dentition tend to develop the same in the permanent dentition as they have demonstrated the factors required for developing dental caries in their early



life along with the presence of biofilm and environmental factors such as diet responsible for caries formation even after the loss of primary teeth (Li and Wang, 2002; Ayele et al., 2013; Govindaraju et al., 2017; Govindaraju et al., 2017b; Hall-Scullin et al., 2017; Mulani and Mathur, 2020).

The anatomy of the human dentition varies in which the anterior teeth exhibit smooth surfaces while the posterior teeth have smooth proximal surfaces and more tortuous morphology on the occlusal surface. The occlusal surfaces of the teeth are seen as incompletely coalesced areas represented by pits, fissures and grooves which act as stagnation sites for biofilm and cariogenic microorganisms. It has been reported that the occlusal surfaces with prominent pits and fissures morphology increases the risk of caries development to approximately 12.5% in the permanent dentition which accounts for most of the caries. The presence of plaque or biofilm on the pits and fissures of a partially erupted tooth also increases the risk of dental caries. Previous studies on the biofilm of pits and fissures caries described the presence of a unique architecture and specification of the biofilm based on the ecological niche where the roughened and opaque enamel underneath a layer of plaque is related to the presence of caries in the pits and fissures of a tooth (Dige et al., 2014; Carvalho et al., 2016; Wright, 2018; Mulani and Mathur, 2020).

Prevalence of dental caries in permanent teeth is mainly attributed to the individual morphology of the tooth in which pits and fissures on the occlusal surfaces of permanent teeth are particularly susceptible to the development of dental caries. The anatomy of the pits and fissures makes it difficult for proper oral hygiene practices such as tooth brushing to be carried out and less accessible for fluoride application as compared to the other surfaces of the tooth. Moreover, the development of pits and fissures caries is said to be more aggressive than the ability of fluoride to stimulate remineralization in these stagnation areas in order to prevent caries formation. Pits and fissures of the teeth increases the tendency of food accumulation which eventually becomes a shelter for microorganisms and stimulates the accumulation of dental plaque as they prevent oral hygiene practices to be carried out properly (Axelsson and Per Axelsson; 2004; Veiga et al., 2015; Somasundaram et al., 2015; Govindaraju and Gurunathan, 2017; Mahesh 2018; Wright, 2018; Raj et al., 2020).

Previously, it has been indicated that about 90% of dental caries in children are observed in pits and fissures areas which provides the rationale for sealant application due to its high prevalence in these areas. Another study revealed that pits and fissures caries contribute to approximately 80% to 90% of all caries in the permanent posterior teeth and 44% in the primary teeth. Genetic studies suggested that an individual's genetic determinants may affect the risk and resistance to dental caries by reporting that the heritable influence on pits and fissures caries development varies from 20% to 50%. First permanent molars usually exhibit high susceptibility to dental caries in the occlusal pits and fissures, followed by second permanent molars due to their morphological features, early period of eruption and its

position in the oral cavity (Kaste et al., 1996; Beauchamp et al., 2009; Shaffer et al., 2012; Aldossary et al., 2018; Jeevanandan and Govindaraju, 2018; Mulani and Mathur, 2020).

Various methods have been introduced to prevent the development of pits and fissures caries in which most studies recommended the application of pits and fissures sealants, particularly for pits and fissures that are deep and narrow in order to form a physical barrier that prevent further accumulation of plaque in specific anatomical areas of the tooth. Dental sealants refer to resin or glass-ionomer cement (GIC) based flowable materials applied on the occlusal surfaces of teeth as the first line of defense to prevent the development of dental caries, especially in children. Pits and fissures sealant acts by forming a micromechanical bond with the tooth which prevents the access by cariogenic microorganisms to their nutritional source and reduces the risk of caries development (Simonsen, 1978; Francis et al., 2007; Jeevanandan, 2017; Packiri et al., 2017; Ealla et al., 2018; Panchal et al., 2019; Mulani and Mathur, 2020).

Previous studies have discussed the effectiveness of pits and fissures sealants as a method of caries prevention and control in children which can be done in both individual and community level of interventions. Application of pits and fissures sealant as a primary preventive measure is highly recommended in order to prevent the development of dental caries, along with controlling and arresting the formation of incipient dental caries. Therefore, the pit and fissure sealant program are important among school children. Previously our team has a rich experience in working on various research projects across multiple disciplines (Ahovuo-Saloranta et al., 1999; Rose, 2001; Wright et al., 2016; Hou et al., 2017; Ravikumar et al., 2017; Aldossary et al., 2018; Gheena and Ezhilarasan, 2019; Ke et al., 2019; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Sharma et al., 2019; Varghese et al., 2019; Venu et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project. Henceforth, this study was done to evaluate the prevalence of pits and fissure caries in 7 to 14 years old school going children of South Indian population.

MATERIAL AND METHODS

Study Design and Setting: A retrospective study was conducted by reviewing 5,000 patient case records of the Saveetha Dental College and Hospital, Chennai, India for a period of December 2019 to April 2020. A total of two examiners were involved in this study. An effort had been made to confirm that the sorted case records contained information on pits and fissure caries. Prior permission use of the case records analysis was obtained from the institutional review board with the ethical approval number of SDC/SIHEC/2020/DIASDATA/0619-0320.

Study Population and Sampling: A total of 1000 case records of patients with signed informed consent were sorted following the assessment of 5,000 case reports. The

inclusion criteria of this study were children within 7 to 14 years of age and both genders. The adult patients and medically compromised patients were excluded from the study. Convenience sampling method was done for this study.

Data Collection: Information on the patient's age, gender and pits and fissures caries present or absent and involved dental arch were collected from the patient's case records. Age of the patients were categorized for statistical convenience as 7-9yrs, 10-11yrs and 12-14 yrs. Management of incomplete or censored data was excluded from the study.

Statistical Analysis: Tabulation and analysis of the collected data were done using Statistical Package for Social Sciences for Windows version 23.0 (SPSS Inc., Chicago, IL, USA). Descriptive analysis was done to assess the prevalence of pits and fissures caries in different age groups, gender and dental arches. Chi-square test was used to evaluate the association of pits and fissures caries with age and gender. Significant level test was set such that p>0.05 is considered significant.

RESULTS AND DISCUSSION

Our present study involves a total of 1000 patients following the assessment of 5,000 case records based on the inclusion criteria of children within the 7 to 14 years of age and both genders while adult patients and medically compromised patients are excluded from this study. It is reported that pits and fissures caries are present in 617 (61.7%) of the children in our study. The age groups in this study consist of 7-9 years (28.10%), 10-11 (31.90%) and 12-14 years (40.00%). (Figure 1) Most of the patients are males (60.30%) compared to females (39.70%). (Figure 2) In most of the cases, pits and fissures caries are present in both upper and lower arches of an individual in this study (63.70%) and lower arch (25.77%) is commonly involved with pits and fissures caries compared to upper arch (10.53%) (Figure 3). It is observed that there is a positive correlation present between pits and fissures caries and age (p<0.05) (Figure 4) (Table 1).

High prevalence of pits and fissures caries is seen in children within 7-9 years (25.1%), followed by 12-14 years (19.9%) and 10-11 years (15.5%). It has been reported previously that the occurrence of dental caries in general tends to increase as the age increases with high prevalence among individuals in the low socioeconomic class. It was once generally accepted that pits and fissure of the teeth would become infected with bacteria within 10 years of erupting into the oral cavity. A previous study stated that only the first permanent molars are evaluated in their study involving children within 6 to 9 years of age as they are a key to the permanent dentition with high susceptibility to pits and fissures caries due to their morphology and have almost erupted in this age of children (Sayed and Salah, 2011; Babu et al., 2014; Aldossary et al., 2018; Raj et al., 2020).

According to Babu et al., sealant application should be done at the age of 3 to 4 years as they are the most important period for sealing the susceptible deciduous teeth, followed by 6 to 7 years age group for the first permanent molars and 11 to 13 years age groups for protecting the second permanent molars and premolars from pits and fissure caries. Previous studies revealed that nearly half of the children in their study on dental caries involved children from 11 to 15 years of age (51.5%) which was associated with sociodemographic factors and lack of awareness on oral hygiene (Babu et al., 2014; Gurunathan and Shanmugaavel, 2016; Zeru, 2019; Raj et al., 2020).

Table 1. Table representing association between pit and fissure caries based on age group and gender. There is a significant association between age and pits and fissures caries, Pearson Chi-Square value - 135.92; p=0.000 (<0.05). Similarly, there is a significant association between gender and pit and fissure caries, Pearson Chi-Square value - 6.863; p=0.009 (<0.05).

Variables	Present	Absent	Statistical value
	n (%)	n (%)	
Age (Years)			
7 – 9	251 (25.10%)	30 (3.00%)	Pearson Chi-Square = 135.92
10 - 11	155 (15.50%)	164 (16.40%)	df = 2
12 - 14	199 (19.90%)	201 (20.10%)	p-value = 0.001
Gender			
Male	345 (34.50%)	258 (25.80%)	Pearson Chi-Square = 6.863
Female	260 (26.00%)	137 (13.70%)	df = 1
			p-value = 0.009

It is concluded that there is a statistically significant association between pits and fissures caries and gender (p<0.05). (Figure 5). Higher predilection for pits and fissures caries is in males (34.5%) as compared to females

(26.0%). A previous study by Yee & McDonald et al., stated that there is a significant difference (p<0.001) between genders with higher prevalence of dental caries seen in males compared to females, which is in accordance with

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our study. This finding was associated with the difference in diet between males and females in which males often consume diets with more sweets than females with improper oral and dental care. Dhar et al., also mentioned higher caries prevalence in males (48.1%) compared to females (45.3%) but no significant difference between genders. A study described the greater attention that female adolescents have on their oral health care compared to males which is justified by the higher prevalence of pits and fissures sealant application in females compared to males. A report stated that dental caries are also affected by the timing of tooth eruption in which females tend to undergo earlier eruption of the molars compared to males which increases their risk of developing pits and fissures caries earlier than males (Yee and McDonald, 2002; Dhar et al., 2007; Peres et al., 2007; Poutanen et al., 2007; Malvania et al., 2014; Veiga et al., 2015; Raj et al., 2020; Gürcan and Bayram, 2021).

Figure 1: Figure showing the frequency distribution of different age groups. X axis represents the age groups. Y axis represents the number of patients in each age group. The age groups in this study consist of 7-9 years (28.10%), 10-11 (31.90%) and 12-14 years (40.00%).



Figure 2: Figure showing the frequency distribution of genders. X axis represents genders. Y axis represents the number of patients of each gender. Most of the patients in this study are males (60.30%) as compared to females (39.70%).



Comparing both arches, higher prevalence of pits and fissure caries are seen in the lower arch (25.77%) than the upper

Figure 3: Figure showing the frequency of pits and fissures caries based on dental arches. X axis represents the dental arches. Y axis represents the number of patients in each dental arch involved. In most of the cases, pits and fissures caries are present in both upper and lower arches of an individual in this study (63.70%) and lower arch (25.77%) is commonly involved with pits and fissures caries compared to upper arch (10.53%).



Figure 4: Figure showing the association between pits and fissures caries and its frequency among different age groups. X axis represents the age groups. Y axis represents the number of patients in each age group. Chi square test shows there is a significant association between age and pits and fissures caries, Pearson Chi-Square value - 135.92; p= 0.000 (<0.05). Prevalence of pits and fissures caries (Green) were more among children within the 7-9 years age group (25.10%) when compared to the other age groups.



arch (10.53%), although in most cases pits and fissures caries are seen in both arches (63.70%) (Figure 3). A study by Aldossary et al., stated that higher prevalence of caries is seen in the lower arch (14.4%) as compared to the upper arch (7.7%) which is in accordance with our study. This finding is mainly attributed to the difference in the morphology of the teeth and the time of eruption with mandibular teeth erupting earlier than the maxillary teeth which increases their time of exposure in oral cavity. The morphology of

permanent molars includes prominent pits and fissures with tortuous defects extending from the surface of the tooth to the dentinoenamel junction seen in the occlusal surfaces, buccal or facial surfaces of mandibular molars and palatal surface of maxillary molars which increases the risk of developing pits and fissures caries in these areas.

Figure 5: Figure showing the association between pits and fissures caries and its frequency among genders. X axis represents the genders. Y axis represents the number of patients of each gender. Chi square test shows there is a significant association between gender and pit and fissure caries, Pearson Chi-Square value=6.863; p= 0.009 (<0.05). Prevalence of pits and fissures caries (Green)were more among males (34.50%) when compared to females (26.00%).



The morphology of the pits and fissures on the surfaces of these teeth increases the risk of food accumulation which results in the formation of plaque over a period of time. This condition is influenced by the frequency and timing of fermentable carbohydrates intake which will be metabolized by specific microorganisms such as Streptococcus mutans leading to fermentation that releases large amount of acid and lowers the local pH that results in dissolution of the enamel and dentin minerals (Franco e Franco et al., 2007; Colak et al., 2013; Maher et al., 1992; Aldossary et al., 2018; Subramanyam et al., 2018; Santa et al., 2021).

Pits and fissures sealant is considered to be an effective and economical method for the primary prevention of dental caries which needs to be incorporated in oral health community programs. A study by Azarpazhooh et al., strongly supports the placement of sealants on primary and permanent molar teeth as both cost-effective and efficacious in the prevention of dental caries. This is further supported by Aldossary et al mentioning that school-based or national sealant programs should be highly promoted and implemented as an effective preventive approach, along with oral health education (Azarpazhooh and Main, 2008; Veiga et al., 2015; Carvalho et al., 2016; Hall-Scullin et al., 2017; Govindaraju and Gurunathan, 2017; Aldossary et al., 2018; Mahesh, 2018; Raj et al., 2020).

A study explained that the application of primary preventive methods, particularly pits and fissures sealant complemented with oral health education will help to reduce the financial impact of oral treatments and risk of developing dental caries. The present study had few limitations of study design. Since it is a retrospective study, follow up of subjects was not possible to extrapolate the study results. This study also failed to assess the other confounding variables such as education, socioeconomic status and habits of the patients. Further prospective study including all possible factors for pits and fissures caries has to be investigated to prove the hypothesis.Our institution is passionate about high quality evidence based research and has excelled in various fields (Veiga et al., 2015; Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree et al., 2019; Mathew et al., 2020). We hope this study adds to this rich legacy.

CONCLUSION

Within the limits of the present study, overall prevalence of pits and fissures caries was about 61.7%, pits and fissures caries were exhibited higher in 7-9 years old children, male predilection and more common in both arches in an individual. There is a paramount need to educate the parents and caregivers about the importance of pit and fissure application as a preventive measure in preventing caries and progression of decay in children.

Conflict of Interest: There was no conflict of interest.

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Prevalence on the Early Loss of Primary Molars and Indication for Space Maintainers

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ABSTRACT

The Aim of study was to investigate the prevalence of early loss of primary molar teeth and the need for different types of space maintainers in children in the Dravidian population. In this study 3000 Dravidian children between 3 and 10 years of age were examined for early loss of primary molars and the type of space maintainer indicated. The data were obtained from a patient management software and the data were analyzed using Chi-square test. The results indicated that prevalence of early primary molar loss was 32.1% from 3000 children examined with mean age of 7.8 ± 1.7 years with predominance of maxillary first molar (312 teeth) followed by mandibular first molar (298 teeth). Band and loop space maintainer was indicated in 536 children followed by lingual arch space maintainer in 66 children. Conclusion: Based on the findings of this study, the prevalence of early loss of primary molar is 32.1% with predominance of primary maxillary first molar and the commonly indicated space maintainer is band and loop. Clinical significance: Premature loss of the primary dentition is related to several morpho functional problems, and the utilization of space maintainers may help in the treatment of such problems.

KEY WORDS: EARLY LOSS, PREVALENCE, PRIMARY TEETH, SPACE MAINTAINER.

INTRODUCTION

The primary dentition plays a significant role in the growth and development of the child, in terms of facial aesthetics, phonation, mastication, prevention of deleterious oral habits, development of the dental arches, guidance and eruption of permanent teeth and also harmony of jaws and muscles of the face. Premature loss of primary tooth, principally the molars, may lead to lack of space in the dental arch, malocclusion and midline discrepancies in the permanent dentition. The reduction in arch length reduces the space required for succeeding teeth and thereby predisposes crowding, rotation or impaction of the permanent teeth. These factors accentuate the importance of maintaining them until the normal time of exfoliation (Leite-Cavalcanti et al., 2008; Setia et al., 2013; Christabel and Linda, 2015;



Gurunathan and Shanmugaavel, 2016; Jeevanandan, 2017; Lakshmanan et al., 2020).

Dental caries, trauma, or early root resorption are the prevailing sources for premature loss of primary teeth. Traumatic dental injuries to the primary teeth will substantially lead to avulsion, premature exfoliation, or extraction due to any complications or feeble prognosis. Primary tooth root resorption is affected by the environmental, hereditary, nutritional, and endocrine factors whereas the root formation of permanent dentition remained undisturbed. The premature loss of primary molars determines the early eruption of permanent teeth if it occurs in an interval close to its normal exfoliation and delay in the eruption of its successors if it occurs at an interval certainly early to that of its normal exfoliation. This is by reason that at the site of loss there is new bone formation on the dental germ, in addition to fibrosis in the gingival tissue due to the trauma caused by mastication. (Sleichter, 1963; Haralabakis et al., 1994; McDonald; 2004; Leite-Cavalcanti et al., 2008; Ahamed et al., 2012; Holan and Needleman, 2014; Govindaraju and Gurunathan, 2017; Packiri et al., 2017; Govindaraju et al., 2017; Panchal et al., 2019; Lakshmanan et al., 2020; Lakshmanan et al., 2020).

Management of space complications associated with the transitional stages from primary to permanent dentition is



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an integral part of pedodontic practice. The post-extraction site has a space loss in the initial few months, primarily due to the distal movement of the primary canine rather than the mesial movement of permanent molar. The rate and extent of space closure in maxilla that develop due to the movement of the teeth distal to the extraction site in a mesial direction is greater than the mandible in which the closure occurs due to distal movement by the teeth present mesial to the extraction site. The earlier the tooth loss, the greater the possibility for drift. Degree of crowding is directly related to the rate and amount of space loss after primary tooth loss. (Baume, 1950; Avramaki et al., 1998; Ibrahim et al., 1995; Cardoso et al., 2005; Jayachandar et al., 2019; Lakshmanan et al., 2020).

In case of premature loss of a primary tooth, it is crucial to fix a space maintainer in order to avoid detrimental impact on the normal development of occlusion, that can lead to future occlusal discrepancies such as arch shortening, mesial inclination of the first molar and impaction of the second premolar or canines, accompanied by rotation, supraeruption of the antagonistic teeth and impairment of the future periodontal support. (Terlaje and Donly, 2001; Da-Costa et al., 2019; Lakshmanan et al., 2020).

These complications can be prevented or their severity can be alleviated if the dentist performs appropriate planning and utilizes space maintainer during initial treatment in the mixed dentition. Various types of appliances are used as space maintainers, depending on the dental developmental stage, dental arch status, the number, location and type of primary teeth involved and also based on the child's cooperative ability. Previously our team has a rich experience in working on various research projects across multiple disciplines. Now the growing trend in this area motivated us to pursue this project. (Ke et al., 1938; Ramakrishnan et al., 2019; Sharma et al., 2019; Varghese et al., 2019; Venu et al., 2019; Samuel et al., 2019; Mehta et al., 2019; Gheena and Ezhilarasan, 2019; Venu et al., 2019; Vignesh et al., 2019; Malli et al., 2019; Vijayakumar et al., 2019; Sathish and Karthick, 2020; Samuel et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Jose et al., 2020).

The purpose of the current study was to investigate the prevalence of early loss of primary molar teeth and the need for space maintainers in Dravidian children between 3 to 10 years of age.

MATERIAL AND METHODS

This cross-sectional study was conducted in a university setting. The ethical clearance was obtained from the Institutional Review Board prior to the start of the study (SDC/SIHEC/2020/DIASDATA/0619-0320). Dental records of 3,000 children who had visited the department for extraction from June 2019 to April 2020 were retrospectively examined by a single examiner. Healthy children aged between 3 to 10 years and only children of Dravidian origin were chosen for the study. The data were collected from an existing patient management software and details obtained from the patient records were as follows:

age and gender of the child, type and number of teeth lost and type of space maintainer indicated.

Statistical analysis: The data were tabulated into a spreadsheet (Excel 2017: Microsoft office) and statistical analysis was done using SPSS software 17.0 version (SPSS Inc., Chicago, IL, USA). Descriptive statistics and Chi-square tests were performed to compare the obtained results.

Figure 1: Image represents the correlation of early loss of primary molar teeth and the type of tooth loss, where X-axis denotes the type of teeth and Y-axis denotes the type of tooth loss. Blue denotes unilateral loss and red denotes bilateral loss. Both unilateral loss and bilateral loss were most seen in primary maxillary 1st molar followed by primary mandibular 1st molar and statistically significant difference was obtained on comparing the type of tooth loss and the type of teeth (Chi-square test; P=0.02- statistically significant).



Figure 2: Image represents the correlation of type of space maintainer indicated in relation to the loss of primary molar teeth, where X-axis denotes the type of teeth and Y-axis denotes the type of space maintainer. Blue denotes band and loop, red denotes reverse band and loop, dark green denotes crown and loop, orange denotes nance, yellow denotes transpalatal arch, and light green denotes lingual arch. Band and loop were the most indicated space maintainer in case of early loss of any primary molars which was statistically significant (Chi-square test; P value=0.01statistically significant).



RESULTS AND DISCUSSION

In this study, the prevalence of early loss of primary molar teeth was 32.1% (963 teeth) from 3,000 children (males-1520; females- 1480) examined with mean age of 7.8 ± 1.7 years with predominance of primary maxillary first molar (32.4%), followed by primary mandibular first molar (31%), mandibular second molar (24%) and maxillary second molar (12.6%). These differences were statistically significant (P<0.05) (Table 1). Unilateral loss (65%) was observed to be more than the bilateral loss (35%) with statistically significant difference (P<0.05) (Table 2) (Figure 1).

Table 1. Comparison of early loss of primary molar teeth showing a higher prevalence of primary maxillary first molar (32.4%) followed by primary mandibular first molar (31%) and statistically significant difference was noted on comparing all the teeth. (Chi-square test; P-value=0.02statistically significant).

Primary tooth lost	Number of teeth	Percentage	P value
Primary maxillary 1 st molar	312	32.4	0.02
Primary mandibular 1 st molar	298	31.0	
Primary mandibular 2 nd molar	231	24.0	
Primary maxillary 2 nd molar	122	12.6	
Total	963	100	

Table 2. Comparison of location of tooth loss (Unilateral or Bilateral) showing a higher prevalence of unilateral loss (65%) followed by bilateral loss (35%) that was statistically significant. (Chi square test; P=0.02-statistically significant).

Type of tooth loss	No. of cases	Percentage	P value
Unilateral loss	630	65%	0.02
Bilateral loss	112	35%	

Band and loop space maintainer was indicated in 536 children, followed by lingual arch in 66 children. The least indicated space maintainer was the reverse band and loop (8 children). Table 3 shows the types of space maintainers indicated in children and (Figure 2) depicts the distribution of type of space maintainer indicated in relation to the early loss of primary molar teeth. The effect of early loss of primary teeth on the development of the dentition is an element of great interest. The loss of a primary tooth is mediated to be premature when it occurs at least one year earlier its normal exfoliation or after radiographic evidence that the permanent successor is still short of Nolla stage six coronary formation and root formation not yet started. (Terlaje and Donly, 2001; Somasundaram et al., 2015; Jeevanandan and Govindaraju, 2018; Lakshmanan and Gurunathan, 2019).

Table 3. Comparison of different types of space maintainers indicated in relation to the number of children with early loss of primary tooth, where band and loop was indicated in 536 children followed by lingual arch in 66 children. Statistically significant difference was obtained on comparing the types of space maintainers indicated. (Chisquare test; p value=0.01- statistically significant).

Types of space maintainers	No. of Children	P value
Band and loop	536	0.01
Lingual arch	66	
Crown and loop	62	
Nance palatal arch	49	
Transpalatal arch	23	
Reverse band and loop	8	

The premature loss of primary teeth was reported to be responsible for an earlier eruption of permanent successors and intervenes with the harmony of permanent dentition resulting in crowding induced by shifting and / or drifting of teeth toward the extraction space. Furthermore, psychological, morphological, esthetical and functional problems may develop from premature loss of primary teeth. The prevalence of premature loss of primary teeth in children has been previously chartered in a bunch of researches around the world. The current study consisted of screening a total number of 3,000 Dravidian children aged between 3-10 years, of which 1520 were boys (51%) and 1480 were girls (49%) (Saloom, 2005; Ravikumar et al., 2017; Govindaraju et al., 2017).

Since almost an equivalent number of male and female children were chosen for the study the findings of the study are not biased due to gender inaccuracy. Furthermore, the present study being conducted in an ethnically homogeneous community, could act as a reference for understanding the prevalence of early loss of primary teeth in Dravidian population which necessitates the action to be started for the prevention of early childhood caries among children. The children screened were from diverse socioeconomic status so that there is an outright distribution of children attached to various grades of society. It has been endorsed that child belonging to lower socioeconomic status have a higher incidence of dental caries (Sudha et al., 2006; Saravanan et al., 2008; Subramanyam et al., 2018).

Souza et al., 2016 stated that the major etiological component for the early loss of primary teeth was dental caries that were neglected due to socioeconomic problems and lack of knowledge regarding the importance of primary teeth. The possibility of tooth loss should also be considered due to the hypomineralization of the primary molars, since this deformity does not involve only the permanent incisors and molars, but also the primary molars, which may advance the carious lesion and consequently result in the tooth loss

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according to the literature. The increased prevalence of early loss of primary teeth in children may be due to the fact that many general dentists prefer to extract a carious primary tooth rather than restoring it, and it could also be attributed to the parent's knowledge and attitude regarding the extraction of primary teeth as they recognize that the teeth will eventually get replaced (Cavalcanti et al., 2008; Da-Costa et al., 2010; Silva et al., 2010; De-Souza et al., 2016; Da-Costa et al., 2019; Jayachandar et al., 2019).

The primary maxillary first molar (32.4%) followed by mandibular first molar (31%) are the most common teeth affected by premature loss, which is in accordance to the studies conducted by Cavalcanti et al.(2015), and Jayachandar et al.(2019), This outcome can be ascribed to the chronologic age of eruption of the first and second primary molars. The primary first molars which erupt earlier, abide in the oral environment for a longer duration and are ultimately more prone to dental caries. Furthermore, as the distal surface of primary second molar guides the erupting permanent first molar to adequately occlude the antagonist, dentists commonly would prefer to restore a primary second molar rather than extracting the tooth. This could be regarded as one of the reasons for increased prevalence of early loss of primary first molars than second molars. (Kobylińska et al., 2015; Cavalcanti et al., 2015; Javachandar et al., 2019).

Cardoso et al., (2005) reported the prevalence of premature loss of primary molars to be 54.6% in Brazillian children, da Costa et al., reported it to be 4.04% and Ahamed et al., stated the prevalence to be 16.5% in Indian children that contrast with the current study (32.1%). These differences could be attributed to the different sample size and criteria of the studies. One of the enormous challenges in pediatric dentistry is the management of space loss due to untimely loss of primary teeth. Various appliances can be used for maintaining the space based on the patient's age, status of dental arches and ability to cooperate for the treatment (Ahamed et al., 2012; Da-Costa et al., 2019).

The frequently indicated space maintainer in the current study is the band and loop, which is a non-functional fixed space maintainer indicated for non-collaborative patients, in cases where the premature loss is preferably unilateral. Band and loop space maintainer provided satisfactory results in terms of its survival rate, hygienization, cost factor and dentists cited it to be easy in fabrication, installation and removal of the appliance. Whereas the least indicated space maintainer in the present study is the reverse band and loop that is determined in case of premature loss of primary second molar where the support from permanent first molar is not suitable. For the bilateral loss of molars, the commonly indicated space maintainer is lingual arch followed by nance palatal arch and transpalatal arch depending on the clinical condition. (Setia, 2013; Watt et al., 2018; Chandra et al., 2018; Ramakrishnan et al., 2019).

The shortcomings of the present study were, the reason for specific space maintainers were not included and the treatment plan was not decided by a single operator. In future, long-term studies examining the longevity of different types of space maintainers could be carried out. Our institution is passionate about high quality evidence based research and has excelled in various fields (Ramesh et al., 2018; Pcet al., 2018; Vijayashree, 2019; Ezhilarasan et al., 2019; Sridharan et al., 2019; Ramadurai et al., 2019; Mathew et al., 2020). We hope this study adds to this rich legacy.

CONCLUSION

In the light of available evidence, the prevalence of premature loss of primary molar teeth was 32.1% with predominance of primary first molar. Unilateral loss was more prevalent than bilateral loss and the commonly indicated space maintainer was band and loop.

Clinical Significance: Premature loss of the primary dentition is related to several morphofunctional problems, and the utilization of space maintainers may help in the treatment of such problems.

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Association of Class I Dental Caries and Pulpectomy in Maxillary First Primary Molars Among Patients

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ABSTRACT

A major goal in pediatric dentistry is preservation of the integrity of primary teeth and their supporting tissues until the physiological process of exfoliation takes place. Pulpectomy serves such a purpose using various materials and techniques to fill the canals of primary teeth. Dental caries is prevailing for all age groups and more found in kids due to their eating habits. They keep eating without giving time for the PH to be back to normal, to prevent a barrier for caries. It's important for the tooth to be treated from caries. The aim of the study was to assess the pulpectomy in maxillary 1st primary molar with class 1 Caries. A total of 201 patients from the OP of Saveetha Dental College Chennai were randomly selected. They were informed about the study and details like age, gender and, tooth involvement, were collected. They were segregated according to their age and gender and this data was transferred to excel sheets. The data was copied to SPSS software for statistical analysis and chi square test was performed. Age group of 4 to 6 had high incidence and frequency of pulpectomy and was done for male when compared to females. This study concludes that male children have undergone more pulp therapy treatment than female children and also children of both genders are more prone to caries that led to pulp therapy at a very young age.

KEY WORDS: CLASS 1 CARIES, MAXILLARY MOLARS, PRIMARY TEETH, PULPECTOMY.

INTRODUCTION

A major objective of modern dentistry for children is to maintain the integrity of the primary dentition until normal exfoliation, for the purpose of promoting function, aesthetics and phonetics. The treatment of severely infected primary teeth can be challenging and there are few options for treating such teeth. American Academy of Pediatric Dentistry (AAPD) defines pulpectomy as a procedure which involves removal of the roof of the pulp chamber in order to gain access to the root canals which are debrided, enlarged, disinfected and filled later with a resorbable material.

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Consequently, the tooth can be maintained in the arch without vital pulp tissue, but not compromising the function of the tooth. A high success rate of pulpectomy in primary teeth has led pediatric dentists to prefer pulpectomy over extraction and space maintainer (Christabel and Gurunathan, 2015; Somasundaram et al., 2015; Jeevanandan, 2017; Govindaraju et al., 2017).

Management of the grossly carious primary molar is a common but sometimes challenging aspect of dental care for young children. It is therefore essential that clinicians are both confident and competent in selecting and undertaking the most appropriate treatment for grossly carious primary molars. The aim of pulp therapy in a primary dentition is to retain every primary tooth as a fully functional component. To fulfil this major goal, vital pulp therapy through pulpectomy, is the most widely accepted technique for treating primary teeth with irreversible inflammation affecting the pulp chamber However, in cases of irreversibly inflamed and necrotic radicular canals, a successful pulpotomy cannot



be achieved, and a partial or total pulpectomy is indicated (Trope and Bergenholtz, 2002; Parisav and Ghoddusi, 2015; Govindaraju et al., 2017; Ravikumar et al., 2017; Jeevanandan and Govindaraju, 2018; Panchal et al., 2019; Lakshmanan et al., 2020).

Pulpectomy is a conservative treatment approach to prevent the premature loss of primary teeth which can result in loss of arch length, in insufficient space for their erupting permanent teeth, tipping of molar teeth adjacent to the lost primary molar. In addition, pulpectomy is advantageous for retained primary molar teeth. Primary molar can be included in an interdisciplinary treatment approach, either by reducing the mesio distal width of the Crown or hemisection for orthodontic space management. Premature loss of the primary tooth may lead to accelerated or delayed eruption of the succedaneous tooth depending upon development of the permanent tooth. Because of high failure rate, pulp capping is not recommended for carious exposures in primary teeth. Other than mechanical exposure in a healthy tooth, all pulp exposures in primary teeth should be treated with pulpotomy, pulpectomy, or extraction. Thus, an appropriate pulpectomy of primary molar rather than extraction is a reasonable treatment option to ensure either the normal shedding pattern or longterm survival in instance of retention (Gesi et al., 2003; Aktan et al., 2012; Gurunathan and Shanmugaave 2016; Subramanyam et al., 2018; Mahesh, 2018; Lakshmanan et al., 2020).

By convention, any primary molar demonstrating a short duration of stimulus related pain with caries approximating the pulp is treated with vital pulp therapy. That is observed with symptoms including spontaneous pain, sinus tract, localised soft tissue inflammation, pathological mobility, radiographic evidence of abscess and resorption. When caries is confined to pulp, any treatment option should be addressed directly or indirectly. The purpose of study was done to find which molar is constantly being treated for pulpectomy and has been affected with caries (Oackiri, 2017; Govindaraju and Gurunathan, 2017).

MATERIAL AND METHODS

This was a retrospective study involved 201 patients with age between 1-10 years old visiting Saveetha Dental College and Hospital, Chennai from June 2019 till April 2020. Ethical approval was granted by the Institutional Ethics Committee of Saveetha Dental College. Data was collected based on the data availability from patients who underwent pulpectomy with class 1 Caries in the maxillary first left and right primary molars. All the data were based on clinical examination, photos and radiographic imaging in the system The inclusion criteria's Healthy co-operative children in the age group of 1-10 years, who had at least one primary tooth indicated for pulpectomy and exclusion criteria were patients who had systemic conditions. The internal validation includes randomisation including patients pulpectomy records. External validation includes cross verification of existing studies. The collected data was further segregated based on age, gender and added in excel sheets. The data added in excel sheets were transferred to SPSS software. Analysis like correlations, chi square tests

were done to come to a detailed result analysis. They were further represented in graphs for better understanding.

RESULTS AND DISCUSSION

A total of 201 patients were seen during the study period. Male children were more commonly affected than females and the upper left first primary molar was highly prone for class 1 caries among our study population. Age group of 4-6 years had a high incidence of class 1 caries that led to pulp therapy. From figure 1 we can see that 54.2% of male and 45.7% of female children underwent pulp therapy for class 1 Caries in primary maxillary first molars. Figure 2 depicts 19.90% of the study population belonged to the age group of 1-3 years, 45.7% belonged to the age group of 7-10 years. The age group between 4-6 yrs being the most vulnerable for class 1 Caries.

Figure 1: Figure shows the gender wise distribution of study population where female children (pink) were 45.7% and male children (dark blue) were 54.2%. Male children were more than females



Figure 2: Figure shows the age wise distribution of study population where 19.9% belonged to the group of 1-3 (light blue), 45.7% belonged to the age group of 4-6 (red) and 34.3% belonged to the age group 7-10 (green). It shows that children belonging to the age group of 4-6 were highly prevalent to class 1 Caries and underwent the highest pulpectomy procedure.





belonged to the age group of 4-6 and 17.41% belonged to the age group of 7-10. Figure 4 reveals that class 1 caries occurred highly in the upper left primary molar with 27.6% of them belonging to the age group of 4-6 years and 17.9% of population belonging to age 7-10. Figure 4 shows p = 0.740 (p>0.05) which shows insignificant association between age and teeth involved. Figure 5 shows that 31.34% male children underwent pulp therapy in the left upper primary molar and 25.37% of the female children underwent pulp therapy for 64. Figure 5 shows p = 0.736 (p>0.05) which shows insignificant association between teeth and gender.

Figure 3: Figure represents the association of age and gender. The x-axis represents the age of the children and Y-axis represents the percentage of the study population. Chi square was done and association was found to be statistically not significant. Chi square test value was 2.368 and P=0.306 (P>0.05), which is statistically not significant. From this graph we can infer that 23.88% of males (blue)belonging to the age group 4-6 were high followed by 21.89% of females (pink) of the same age group



Figure 4: figure shows the association of teeth that underwent pulpectomy and age distribution. X-axis represents the age of the patients and Y-axis represents the number of pulpectomy treated teeth. Chi square test was done and association was found to be statistically insignificant. Chi square test value was 0.603 and P=0.740 (P>0.05), which is statistically not significant. Hence from the graph we infer that the 64- upper left primary maxillary molar (27.86%) is more affected in children belonging to the age group 4-6 years (Dark green).



Figure 5: Figure shows the association of gender and teeth that underwent pulpectomy. X - axis represents the gender and Y-axis represents the number of pulpectomy treated teeth. Chi square test was done and association was found to be statistically insignificant. Chi square value was 0.114 and P=0.736 (P>0.05) which is statistically not significant. Hence from this figure we infer that male child had undergone the highest number of pulpectomy procedures (31.3%) in upper left maxillary primary molars-64 (Dark green).



In this study, pulpectomy done in maxillary primary molars with class 1 caries were analysed and correlated with gender, age and tooth involved. All the pulpectomy cases with class 1 caries occurring in right and left upper first molars were segregated according to age and gender. In our study 54.2%% of the male children were treated for pulpectomy and 45.8% were treated for pulpectomy. In a study by Santa Maria et al 82% of male children underwent pulpectomy and 15% of female children underwent pulpectomy. In a study, single visit endodontic treatment is carried out in 59.5% of pulpectomy cases, in our study all the cases included were multi visit rct. In another study 72.53% pulpectomy was done in cases with lesion and in our study all the cases (Velvart and Spoerry 1992; De-Souza et al., 2014; Santamaria et al., 2014; Panchal et al., 2019; Lakshmanan et al., 2020).

In this study 45.8% of females have undergone pulpectomy and 54.2% of the males underwent pulp therapy and, in a study, conducted in alaska 52.6% of the male children underwent pulp therapy and 47.4% of the female children underwent pulptherpay. In this study, the highest percentage of the age group was 4-6 years and left first primary molars were treated the maximum when compared to the right first primary molars for the same age group. The highest percentage was for the age group of 6-9 years. The total percentage of male children in this study population was 54.2% and female children was 45.8%. Generally male children were more than female children in the total sample. The higher percentage was found for pulpectomy in the primary left first molar than the primary right first molar. The limitation of the study was that it was confined to one dental college in Chennai and including primary maxillary and mandibular second molars and would have given a brief knowledge (Rawson et al., 2019; Lakshmanan et al., 2020).

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CONCLUSION

This study reveals that the age groups of 4-6 years were more prone to class 1 Caries, Male and female children had a high incidence of class 1 Caries in maxillary left first primary molars. This study will help professionals to know the incidence of pulpectomy and can explain to parents to get them a clear idea about the importance of retaining the primary tooth. Regardless of the decision concerning the primary tooth and to the different treatment modalities, attention should be directed to the prognosis of the tooth in question, by restoring its health and function.

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Conflicts of Interest: nil

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A Retrospective analysis on Oral Squamous Cell Carcinoma Patients Indicated for Chemotherapy

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ABSTRACT

Neo adjuvant chemotherapy has been studied in oral cavity with the aim of improving locoregional control and overall survival rates as an organ preservation tool in the resettable cancers. It is usually given post operative to improve the quality of life and to increase the survival rates. This study was conducted by reviewing the records of patients visiting the Oral Oncology department in Saveetha Dental College and hospitals, between 1 st June 2019 -1 st April 2020. Among 57 carcinoma patients (maxillary, mandibular, buccal carcinoma) 16 (28%) patients were treated with the chemotherapy post operatively. There was male predominance with 9 males (57%) and 7 females (43%) in this study. The mean age of the patient's undergoing chemotherapy was 40-50 years, ranging from 20 to 60 years of age. Among various sites of carcinoma patients subjected to chemotherapy, maxillary carcinoma accounted to 8 patients (50%) mandibular carcinoma- 5 patients (31.25%), buccal mucosa carcinoma- 3 patients (18.75%) Chi-square test was done on association between gender and number of patients with carcinoma in different sites and found not statistically significant [chi square value-0.2320, p value- 0.314 (p>0.05)]. Chi-square test was done to find the association between age and type of carcinoma and was found to be statistically not significant [chi square value-0.529, p value- 0.612(p>0.05)]. From this study we can conclude that chemotherapy treatment was commonly undergone by men and patients in the 4th decade of life. Maxillary carcinoma patients underwent chemotherapy more commonly as compared to mandibular carcinoma patients. Association between age and incidence of chemotherapy treatment, gender and incidence of chemotherapy treatment was found statistically not significant.

KEY WORDS: CHEMOTHERAPY; BUCCAL CARCINOMA; ORAL SQUAMOUS CELL CARCINOMA; INCREASED SURVIVAL RATE.

INTRODUCTION

Chemotherapy encompasses a wide variety of treatment which uses powerful chemicals to kill fast growing cells in the body. It is used to treat cancer cells that grow and multiply more rapidly than normal cells. Drugs used in chemotherapy affect quickly dividing cells by means of interfering with cell division. Though the cells widely



vary in their susceptibility to these agents, generally these drugs are cytotoxic and thus it works against cancer cells. Chemotherapy treatment is generally given in cycles with each treatment followed by a rest period to allow body time to recover. Sometimes chemotherapy is also given along with radiation known as chemoradiation. The use of combined chemotherapy and radiation has been studied extensively for the treatment of locally advanced oral and other head and neck cancers, both as a means of organ preservation and as a primary therapy, even when organ preservation is not necessarily a goal. Notably, although oral cancers were well-represented in trials of adjuvant chemoradiation, they have typically been under-represented in trials of primary chemoradiation(Neville and Day, 2002; Kademani, 2007; Kalavrezos and Bhandari, 2010; Varghese et al., 2019; Muthukrishnan et al., 2020).





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Chemotherapeutic drugs are classified into five major categories based on the way the drugs affect cell chemistry. Drugs are classified into a specific category depending on what part of the cell cycle the drug interrupts. The categories are Alkylating Agent (Cyclophosphamide and Mechlorethamine, Cisplatin), Nitrosoureas (Carmustine, Lomustine), Antimetabolites (6-mercaptopurine and 5-fluorouracil), Antitumor Antibiotics (Doxorubicin and Mitomycin-C), Plant Alkaloids (Vincristine and Vinblastine.), and Steroid Hormones (Tamoxifen and Flutamide) of which commonly used ones are Carboplatin, 5-fluorouracil (5-FU), Paclitaxel (Taxol), Docetaxel (Taxotere), Hydroxyurea. Drug regimen is chosen depending on what type of cancer to be treated and which stage of the cell's life cycle the drugs affect (Nagesh Rao, 2017; Varghese et al., 2019; Muthukrishnan et al., 2020).

In the battle against cancer, one of the main multimodality methods used for reducing morbidity and mortality is surgical therapy in conjunction with radiation and chemotherapy. What makes chemotherapy very effective, is that it has the ability to treat widespread (metastatic) cancer, that is in more than one location in your body and thereby reducing the incidence of metastatic recurrence. When these three treatments are used in conjunction, their complimentary avenues of attacking the disease frequently offer the patient the best chance to reduce psychological anxiety as well physiological stress and beat cancer. Chemotherapy is advocated in certain benign lesions of the jaw which can sometimes cause significant erosion of bone leading to pathological bone fracture and proliferate into soft tissue areas mimicking oral soft tissue pathologies (Ma et al., 2013; Abhinav et al., 2019; Packiri, 2017; Kumar, 2017a; Packiri et al., 2017; Christabel et al., 2016; Jain et al., 2019; Samuel et al., 2020).

Previously our team has a rich experience in working on various research projects across multiple disciplines (Gheena and Ezhilarasan, 2019; Ke et al., 2019; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Sharma et al., 2019; Varghese et al., 2019; Venu et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project.

MATERIAL AND METHODS

Subjects were the patients who visited Saveetha dental college and hospitals. They are grouped accordingly to the gender. This study was approved by the ethical committee for research at saveetha dental College. SDC/SIHEC/2020/DIASDATA/0619-0320. Data according to the patient were collected by reviewing the case records of 86,000 overall patients in the lapse of 1 st june 2019 -1 st april 2020. The patients intra oral photos, history of presenting illness, systemic disease, treatment given were accessed.

Statistics Analysis: The data was tabulated and analysed using IBM SPSS version 2.0. Non-parametric data were analysed using descriptive statistics measuring percentage

and frequency. The association between Incidence of Postoperative Chemotherapy in OSCC, age, types of carcinoma and gender was done with Pearson's Chi-square test

Inclusion Criteria: Carcinoma including

- Maxilla
- Squamous cell carcinoma
- Adenoid cystic carcinoma
- Adenocarcinoma
- Mucoepidermoid carcinoma
- Malignant melanoma

Mandible

- Squamous cell carcinoma
- Osteosarcoma
- Giant cell tumour
- Ewing tumour
- Multiple myeloma

Exclusion Criteria

- Physically challenged
- Patient under 18 years age
- Patient underwent radiotherapy

In regards to the site of the oral carcinoma, we adhered to the site of occurrence, gender, age group affected and the treatment modality used for management of oral squamous cell carcinoma in the post-surgical phase.

Figure 1: Figure shows Age wise distribution of patients who underwent chemotherapy. X axis denotes age of patients and Y axis denotes the number of the patients. 21-30 years(turquoise)-1 patient;31-40 years (light green)-6 patients;41-50 years (pale pink)-7 patients; 51-60 years(sandal)-2 patients. Age distribution was found and 41-50 years age group was commonly treated by chemotherapy. SPSS analysis was used.



RESULTS AND DISCUSSION

The data was recorded from the oral oncology department patient records. Out of 57 carcinoma patients 16 (28%) patients underwent the postoperative chemotherapy. The mean age of the patient's undergoing chemotherapy was 40-50 years ranging from 20 to 60 years of age (Figure 1). Based on the site of carcinoma - maxillary carcinoma accounts to 8 patients (50%), mandibular carcinoma- 5 patients (31.25%), buccal mucosa carcinoma- 3 patients

(18.75%) (Figure 2). There was male predominance with 9 males (57%) and 7 females (43%) in this study (Figure 3). Chi-square test was done on association between gender and number of patients with carcinoma in different sites and found not statistically significant [chi square value-0.2320, p value- 0.314(p>0.05)] (Figure 4, Table 1). Chi-square test was done to find the association between age and type of carcinoma and was found to be statistically not significant [chi square value-0.529, p value- 0.612(p>0.05)] (Figure 5, Table 2).

Figure 2: Figure shows prevalence of chemotherapy treatment offered to patients with different sites of carcinoma. X axis represents various sites of carcinoma and Y axis denotes the number of patients treated with chemotherapy. Maxillary carcinoma (green)- 8 patients; Mandibular carcinoma(brown)- 5 patients; Buccal carcinoma (light orange)- 3 patients; maxillary carcinoma patients are treated majorly with chemotherapy. SPSS analysis was used.



Figure 3: Figure denotes distribution of patients treated with chemotherapy across the gender. X axis corresponds to the gender distribution and Y axis denotes the number of patients. Males(blue)-9 patients; Females(pink)- 7 patients. SPSS analysis was used and male predominance was found.



From this study we infer that 28% of patients in the sample were subjected to chemotherapy. Patients were predominantly in their fourth decade, with a male predominance. The association between the type of tumour treated post-operatively with age and gender is statistically not significant. This correlates with the study done by Pathak et al which showed a male predominance of 88%. He concluded by stating that this is due to the high usage

Figure 4: Figure showing the association between the site of carcinoma and gender of the study population. X axis corresponds to the gender affected and Y axis corresponds to the number of patients with carcinoma in different sites. Orange denotes buccal carcinoma; brown denotes mandibular carcinoma and green denotes maxillary carcinoma. Chi-square test was done on association between gender and number of patients with carcinoma in different sites and found not statistically significant [chi square value-0.2320, p value- 0.314(p>0.05)].



Table 1. Shows association between gender and type of carcinoma treated post operatively affected. There was no significance between the two parameters (p value = 0.314).

Chi-square tests	value	df	Asymptotic significance (2-sided)
Pearson chi-square	2.320	2	0.314
Likelihood ratio	2.383	2	0.304
N.of valid cases	16		

Figure 5- Figure showing the association between type of carcinoma and age of the study population. X axis corresponds to the age group affected and Y axis corresponds to the number of patients with carcinoma in different sites. Orange denotes buccal carcinoma; brown denotes mandibular carcinoma and green denotes maxillary carcinoma. Chi-square test was done to find the association between age and type of carcinoma and was found to be statistically not significant [chi square value-0.529, p value-0.612(p>0.05)]



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of the tobacco products among the male populations. The mean age group treated with chemotherapy was 41 - 50years though the study conducted by Pignon et.al, mentioned that chemotherapy treatment was given according to the TNM staging of cancer rather than the basis of age. In this sample majority patients were operated for maxillary oral squamous cell carcinoma (50%) (Pathak et al., 2005; Pignon et al., 2009; Varghese et al., 2019; Muthukrishnan et al., 2020).

Stenson et al stated that adjuvant chemotherapy will be used after all known and the visible cancer was removed either surgically or with the help of radiation. High recurrence rate of certain carcinomatous lesions could be attributed to modified or defective cellular signaling pathways, altering physiological cell cycles to be pathological. Fabio et al, mentioned that 80-98% of the patients treated with chemotherapy postoperatively had highly recurrent OSCC lesions and only 2% that had low recurrence rate lesions. Chemotherapy was given where the oncologist considers there was a higher chance of recurrence (Okura et al., 1998; Cohen et al., 2014; Kumar, 2017b).

Table 2. Shows association between age group and type of carcinoma treated post operatively affected. There was no significance between the two parameters (p value = 0.529).

Chi-square tests	value	df	Asymptotic significance (2-sided)
Pearson chi-square	5.117	6	0.529
Likelihood ratio	4.476	6	0.612
N.of valid cases	16		

Various combinations of drugs have been used in the treatment modality of oral squamous cell carcinoma. Multiple studies have been done to prove the efficiency of a regimen over another. Addition of docetaxel to cisplatin and 5-FU induction chemotherapy had been shown to improve survival compared with cisplatin and 5-FU, it was also associated with a significant increase in toxicity, including some treatment-related deaths(). Okura et al. in 1998 published a retrospective single institution review of Neoadjuvant Chemo Therapy (NACT) in patients with 141 operable oral cavity cancers. The post operative chemotherapy consisting of two cycles of cisplatin, vincristine, and peplomycin, with or without mitomycin C showed an overall response rate of 51.5%, and there was a documented decrease in the rates of distant metastases though there was no decrease in overall or disease-free survival when all 141 patients were compared (Jesudasan et al., 2015; Jain et al., 2019; Mathew et al., 2020).

Patients undergoing surgical therapy are generally performed with mandibular or maxillary resection, which can cause significant facial deformity, dysphagia, pain, dyspnea, difficulty in airway maintenance reintubation challenges and reconstruction of post resective cervicofacial defects using local or distant vascular flaps. In addition to these problems, chemotherapy and radiotherapy can leave the healing mechanisms impaired leading to osteo-necrosis causing severe destruction of osseous and soft tissue structures which can be treated by following thorough debridement protocol 21. Hence it is crucial to plan for any dental treatment before planning for chemotherapy. If a patient undergoes extraction during chemotherapy treatment that can further lead to alveolar osteitis, osteomyelitis or even osteonecrosis. In order to prevent serious illness in chemotherapy planned patients who are generally immunocompromised due to post-surgical complications, an antibiotic prophylaxis is mandatory before any invasive dental procedure (Siegel, Naishadham and Jemal, 2012; Ma et al., 2013; Zhong et al., 2013; Cohen et al., 2014; Jesudasan et al., 2015; Jesudasan et al., 2015; Kumar and Sneha, 2016; Varghese et al., 2019; Muthukrishnan et al., 2020).

Evidence from literature proves significant proportion of patients exhibit response to neoadjuvant chemotherapy. These patients have been shown to have better locoregional control, disease-free survival. In addition, unresectable oral cavity cancers may be considered resectable after neoadjuvant chemotherapy. The identification of tumor response predictors may allow a more rational selection of therapeutic strategies, sparing unnecessary toxicities to patients who would not benefit from neoadjuvant chemotherapy. It could further lead to the development of new drug regimens to overcome primary resistance to postoperative chemotherapy.

No study falls short of drawbacks and our study's drawbacks are this is a single institution retrospective study within a shorter time span. Hence randomised clinical trials with long term follow ups using multiple combinations of drugs have to be conducted in a larger population to derive a more affirmative result. Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020).

CONCLUSION

Within the limitations of this study, we can conclude that chemotherapy treatment was commonly undergone by men and patients in the 4th decade of life. Maxillary carcinoma patients underwent chemotherapy more commonly as compared to mandibular carcinoma patients or buccal carcinoma patients. Association between age and incidence of chemotherapy treatment, gender and incidence of chemotherapy treatment was found statistically not significant.

Conflict of Interest: There are no conflicts of interest

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Differences on the Obturating Quality in Primary Teeth Between Undergraduate and Postgraduate Students - A Comparative Study

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ABSTRACT

Early childhood caries is one of the most common serious public health diseases in most of the countries across the globe. When left untreated dental caries will progress into the dentin followed by pulpal inflammation. In primary teeth, when the pulpal tissue is irreversibly inflamed or necrotic, pulpectomy is the treatment of choice where the primary root canals are debrided off the infected tissues and shaped to receive a suitable obturation material. Managing dental caries successfully in a pediatric population involves many challenges and requires efficient skills and knowledge in framing a treatment plan with good prognosis. The purpose of this study was to determine the differences in the clinical skill and efficiency in primary teeth root canal obturation between undergraduate and postgraduate students. This comparative study was carried out retrospectively by verifying the case reports and post-operative radiographs for pulpectomy procedures in primary teeth done by the undergraduate and postgraduate students. 50% of the cases done by the postgraduate students. In conclusion the Obturation quality was found to be better in the procedures done by the postgraduate students. In conclusion the Obturation quality was found to be better in the procedures done by the postgraduate students, when compared with that of undergraduates

KEY WORDS: PULPECTOMY, PEDIATRIC ENDODONTICS, OBTURATION QUALITY.

INTRODUCTION

Early childhood caries is one of the most common serious public health diseases in most of the countries across the globe. When left untreated dental caries will progress into the dentin followed by pulpal inflammation. In primary teeth, when the pulpal tissue is irreversibly inflamed or necrotic, pulpectomy is the treatment of choice where the primary root canals are debrided off the infected tissues and shaped to receive a suitable obturation material. In recent times, a new pediatric rotary file system was introduced which extended



the purview of pediatric endodontics (Thomas et al., 1994; Jeevanandan, 2017; Jain et al., 2019; Jose et al., 2020;).

Regarding obturation materials in primary teeth, zinc oxide eugenol was commonly used despite its failure to fulfill the requirements of an ideal obturation material from primary teeth. A combination of zinc oxide eugenol, calcium hydroxide and iodoform had gained popularity as a successful obturating material in primary teeth. This combined material is referred to as endoflas and the disadvantage one material will be compensated with the advantage of the other. The success of the pulpectomy procedures in necrotic teeth is determined by the aseptic root canal preparation and the hermetic seal obtained (Kindelan et al., 2008; Rewal et al., 2014; Samuel et al., 2019; Sathish and Karthick, 2020).

For an effective obturation, the technique of obturation plays a very influential role. Various obturation techniques have been described in the pediatric endodontic literature such as incremental filling technique and lentulo spiral technique



which are hand held or motor driven. The syringe technique involves injection of the material into the root canals. In literature, syringe techniques such as mechanical syringe, tuberculin syringe, insulin syringe, local anaesthetic syringe and navitip syringe have been used with zinc oxide eugenol with not much reports with the use of endoflas with this technique. All these syringe techniques make use of a metal needle which may instill anxiety in a child thus altering the chair-side behaviour and questioning the success of the procedure. Premixed syringe containing a mix of calcium hydroxide and iodoform paste is presently available in the market with the commercial name of vitapex or metapex (Dandashi et al., 1993; Nurko et al., 2000; Bawazir and Salama, 2006; Memarpour et al., 2013; Sharma et al., 2019; Samuel et al., 2020;).

Pre mixed syringe has a viscous mix of iodoform and calcium hydroxide that are available with disposable tips. Since the paste is already available in a certain consistency, the operator cannot alter it to suit his or her needs or replace the material with one having different antibacterial efficacy. The objective of this present study is to compare the obturation quality in primary teeth between the procedures done by undergraduate students and postgraduate students in a dental hospital. Previously our team has a rich experience in working on various research projects across multiple disciplines (Gheena and Ezhilarasan, 2019; Ke et al., 2019; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Sharma et al., 2019; Varghese et al., 2019; Venu et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project.

MATERIAL AND METHODS

The study was conducted as a retrospective study in a university setting in the department of Pediatric and preventive dentistry. Ethical approval was obtained from the institutional ethical committee (ethical approval number: SDC/SIHEC/2020/DIASDATA/0619-0320). The study was conducted retrospectively using the patient record software. The procedures included were carried out in the year June 2019 to March 2020. Data collection and analysis was done by a single person. A total of 50 postgraduate cases and 50 undergraduate cases were reviewed for pulpectomy obturation and cross verification was done by postoperative radiographs. Sampling bias was minimized by simple random sampling. The number of visits for the procedures were randomly included as 25 single visit cases and 25 multi visit cases in each group. In single visit pulpectomy procedure, local anaesthesia was achieved followed by rubber dam isolation. Access opening was done using number 4 round bur, working length determination was done using preoperative radiographs and the pulp canals were shaped and cleaned using hand H and K-files (Mani, Inc, Tochigi, Japan) by undergraduates and pediatric rotary endodontic files, Kedo-SG (Reeganz Dental Care Pvt. Ltd. India) by postgraduates. Obturation was done using Metapex followed by placement of stainless-steel crown in the same visit. In multi visit pulpectomy, the same steps

were followed with placement of intracanal medicament for one week. Patient was recalled after one week followed by obturation and stainless-steel crown. Post obturation radiographs were taken to check obturation quality.

The obturation quality was analysed by using the coll and sadrian criteria - optimal, over and under obturation. According to coll and sadrian, optimal obturation is where the obturation material is at the radiographic apex of the root or up to 2mm short of the apex; over filling is where the obturation material is extending beyond the radiographic apex and under filling is where the obturation material is more than 2mm short of the apex. Examples for the levels of obturation were shown in Fig.1. Statistical analysis was done using SPSS software version 23. Descriptive statistics was done for both the groups for age and gender. All the findings and analysis of the data are reported by means of bar charts and pie charts. Chi-square test was used to analyse the significance of difference between the two groups.

RESULTS AND DISCUSSION

Among the procedures done by undergraduates, 50% were under obturated; 20% were optimally obturated and 30% were over obturated. Among the procedures done by postgraduates, 20% were under obturated; 50% were optimally obturated and 30% were over obturated (p value = 0.18) (Figure 2). Majority of the cases treated by the undergraduates were 7 to 9 years old (Figure 3). Majority of the cases treated by the postgraduates were 4 to 6 years old (Figure 4). Optimal obturation and under obturation were more commonly seen in multi visit procedures done by the undergraduates (p value= 0.09) (Figure 5). Optimal obturation and over obturation are encountered more in single visit procedures done by postgraduates (p value = 0.24) (Figure 6).

Figure 1: According to coll and sadrian, under filling (a) is where the obturation material is more than 2mm short of the apex; optimal obturation(b) is where the obturation material is at the radiographic apex of the root or upto 2mm short of the apex; over filling(c) is where the obturation material is extending beyond the radiographic apex



In this present study, the obturation quality was assessed using coll and sadrian criteria using post operative radiographs. Under obturation was the most common error done by undergraduates and over obturation is the commonly encountered error done by post graduates. All the cases that were included in this study were obturated using metapex and the root canal preparation was done using rotary endodontic files for primary teeth. When compared

with that of hand files, these rotary files for primary teeth have proved to be efficient in reducing the instrumentation time for canal preparation. They are used similarly like an adult endodontic rotary file using an endo motor and along with suitable root canal irrigant. The root canal irrigants used in all the cases included in this present study was EDTA and saline. These files have also proved to be effective in improving the obturation quality when contrasted with that while using hand files (Coll and Sadrian, 1996; Govindaraju et al.,2017a; Govindaraju et al., 2017; Jeevanandan and Govindaraju, 2018; Panchal et al., 2019; Samuel et al., 2019; Sathish and Karthick, 2020).

Figure 2: Figure representing Percentage of various levels of obturation comparing Undergraduates and Postgraduates; X axis represents the students (undergraduates and postgraduates), Y axis represents the percentage of the observations; Blue represents under obturation, Green represents optimal obturation, Beige represents over obturation; The Obturation quality was found to be better in the procedures done by the postgraduates; No statistically significant difference obtained between the obturation quality of postgraduates and undergraduates (p-value = 0.18)



This proven fact supports our present study as the majority of the cases were found to be optimally obturated using this exclusive rotary file system for pediatric endodontics. Reciprocating files when compared to these pediatric rotary files were found to involve more instrumentation time and an inferior obturation quality. Many general dentists and especially pediatric dental practitioners are well equipped with the technique and knowledge of these rotary files for primary teeth. Early Childhood caries ought to be forestalled no matter what and that ought to be the main goal of each pediatric dental specialist and the parent thereby preventing numerous negative conditions in the essential dentition and furthermore saving numerous horrible and obtrusive treatment systems in kids (Govindaraju et al., 2017b; Nair et al., 2018; Lakshmanan et al., 2020).

Fluoride is the most regularly utilized preventive methodology against dental caries, particularly in kids. School water fluoridation, community water fluoridation, topical application of fluoride over the teeth regularly were Figure 3: PIE CHART Representing various age groups treated by Undergraduates; Blue represents the patients who are 6 years old, Green represents 7 years old, Grey represents 8 years old, Violet represents 9 years old, Yellow represents 10 years old, Red represents 11 years old; Figure 3 shows majority of the cases treated by the undergraduates were 7 to 9 years old. No statistical test was carried out to analyse the age of the patients.



Figure 4: PIE CHART – Representing the age groups treated by Postgraduates; Dark Blue represents the patients who are 3 years old, Green represents 4 years old, Beige represents 5 years old, Violet represents 6 years old, yellow represents 7 years old, Red represents 8 years old, Light blue represents 9 years old, Grey represents 10 years old; Figure 4 shows that majority of the cases treated by the postgraduates were 4 to 6 years old. No statistical test was carried out to analyse the age of the patients.



the proven techniques to prevent dental caries using positive effects of fluoride. Effectiveness of fluoridated toothpastes have been concentrated throughout the years and it has been demonstrated to be a viable and effectively available preventive methodology. As the dispersion of packaged drinking water is expanding over the world, the fluoride substance of such packaged drinking waters has been concentrated to improve the preventive arrangement against dental caries (Somasundaram et al., 2015; Ramakrishnan and Bhukri, 2018).

Youngsters normally think that it's troublesome and exhausting to follow oral cleanliness rehearses like brushing twice every day and flossing routinely, and consequently another innovative examination utilizing chewable toothbrush was completed to decide its adequacy in keeping up their oral cleanliness. Deciding biochemical markers in

the salivation at an early age, clears approach to consider the hereditary framework of the kid and furthermore in rendering a preventive arrangement against early childhood caries (Govindaraju and Gurunathan, 2017; Subramanyam et al., 2018).

Figure 5: FIGURE – Showing the levels of obturation done by Undergraduates comparing single and multivisits; X-axis represents the number of visits taken for the procedure, Y-axis represents the number of procedures; Blue represents under obturation, Green represents optimal obturation, Beige represents over obturation; Figure 5 shows that Optimal obturation and under obturation were more commonly seen in muti visit procedures done by Undergraduates. However, no statistically significant difference obtained between the optimal obturation done in single and multiple visits by undergraduates (p-value = 0.09)



Figure 6: Showing the levels of obturation done by Postgraduates comparing single and multi-visits; X-axis represents the number of visits taken for the procedure, Y-axis represents the number of procedures; Blue represents under obturation, Green represents optimal obturation, Beige represents over obturation; Figure 6 shows that Optimal obturation and over obturation are encountered more in single visit procedures done by postgraduates. However,No statistically significant difference obtained between the optimal obturation done in single and multiple visits by postgraduates(p-value = 0.24)



In a study by Geulmann et al, the premixed vitapex syringe used showed good results. He reported 66% of optimal fillings in primary incisors. Authors have also reported that thick consistency of the paste could not be expressed through a narrow lumen. In this study, a similar plastic dispensable tip used showed 66.7% of optimal fillings in the curved root canals of primary molar teeth. Other studies by Bhandari and Prajapathi reported the use of a local anaesthetic syringe with a 25/26-gauge needle. This method was described as simple, economical, easy to master and can be used with almost all obturating materials. However, according to memarpour et al, the quality of root canal filling with the local anaesthetic syringe was inferior to that of the lentulo spiral and navi tip (Guelmann et al., 2004; Bhandari et al., 2012; Memarpour et al., 2013; Vijayashree, 2019; Mathew et al., 2020).

Handled lentulo spiral showed good results in terms of quality of obturation in their study. Bawazir and Salama in 2006, evaluated mounted lentulo spiral and handheld lentulo spiral in primary teeth and concluded that there were no statistically significant differences between the two techniques in terms of quality of root canal filling. Sigurdsson et al reported that lentulo spiral presented best results when comparison of endodontic file, syringe and lentulo spiral was made. In an in-vivo study by Vashista et al, the hand held lentulo spiral technique performed better in terms of optimally filled canals (Sigurdsson et al., 1992; Bawazir and Salama, 2006; Vashista et al., 2015; Hiremath and Srivastava, 2016; Vijayashree, 2019; Mathew et al., 2020).

In a study by Hiremath and Srivatsava, local anaesthetic syringe and insulin syringe showed the presence of voids. In the present study, presence or absence of voids in obturation were not taken into consideration but only the level of obturation was studied. The presence of voids in both the apical and coronal parts of the root filling may provide pathways for leakage allowing bacterial regrowth and re-infection leading to post treatment disease. In the procedures done by postgraduates, lots of over obturation were noted. Evaluation of the amount if apical or coronal leakage in a root-filled teeth determines the quality of the treatment.

In a study done by Nagarathna et al, a modified disposable syringe was used. There were several benefits with the use of the modified disposable syringe. The operator can check the flow of the material owing to the translucency of the tip, and there is no tendency for fracture. The disposable tip can be cut to a desirable length for obturating the root canals. Another advantage associated with the modified disposable syringe is that there is no doubt of cross contamination as the syringes and tips are safely discarded. The reasons for underfilling are due to limited flexibility of the plastic tip and lack of operator experience. All these pulpal treatments are rendered to preserve the natural tooth till its natural exfoliation. This thereby prevents the space loss that occurs due to premature extraction of the tooth and also to spare the child from the getting a space maintaining appliance. Anyhow, interdental spacings in permanent dentition because of formative distortions like high frenum connection must be rectified through careful intercession (Christabel and Gurunathan, 2015; Nagarathna et al., 2018; Vijayashree, 2019; Mathew et al., 2020).

Not just pediatric dental patients are experienced with dental caries and pulpal irritation vet in addition, with much more awful pathology like dental abscess, cysts and tumors and also traumatic dental injuries. There were many case reports and research papers distributed with respect to surgeries done in the field of pediatric dentistry. Rewarding a kid subsequent to securing dental caries is basic in forestalling further hindering movements however forestalling early childhood caries must be the primary objective for the guardians, pedodontists and furthermore the overseers of the youngsters. Since, dental caries are not considered as a genuine medical problem by numerous guardians till they are asymptomatic which will in the end lead to a suggestive issue. Dental disregard is a significant issue and more mindfulness is required among indian guardians in regards to the dental strength of their kids (Gurunathan and Shanmugaavel, 2016; Ravikumar et al., 2017; Packiri et al., 2017; Vijayashree, 2019; Mathew et al., 2020)

The advantages of this study were that the efficacy and skills of the undergraduates and postgraduates has been analysed thereby helping in improvisation of the same. The limitations of this present study were that a very low sample size was included; the efficiency of the students, both undergraduates and postgraduates could not be judged by limited procedures. Another major drawback in this study is the age group of the patients. The wide difference in the patient age group treated by two groups acts as a confounding factor as the elder children treated by the undergraduates would have been more co-operative than those who were treated by postgraduates. Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020).

CONCLUSION

The Obturation quality was found to be better in the procedures done by the postgraduate students, when compared with that of undergraduates. Under obturation was the most common error done by undergraduates. Over obturation was the most common error done by the post graduates.

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Clinical Periodontal Parameters Associated with Diabetes Mellitus in Patients Attending a Private Dental Hospital in Chennai

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ABSTRACT

Chronic periodontitis is an inflammatory condition that affects oral tissues surrounding the teeth, guided mainly by host immune inflammatory reaction. It is widely accepted that chronic periodontitis is one of the classical complications of diabetes. Therefore, the aim of the study was to assess the clinical periodontal parameters associated with diabetes mellitus. A hospital setting based study where case record data of total 80 study participants, 40 diabetics and 40 healthy participants were examined using Russell's Periodontal Index and CPITN Index and Descriptive statistics, Chi-square were used to analyse the data. The mean age of the study population was 56.1 ± 13.4 years. No statistical significance found between Russell's periodontal index scores and diabetes, CPITN scores and diabetes in our study population. From the results of the study, it can be concluded that, clinical periodontal parameters though slightly severe among diabetic patients, no statistical significance was found when compared with the healthy patients. The periodontal parameters showed a moderate severity among diabetic patients compared to non-diabetic patients, even though no statistical difference was observed. As dental health professionals, our focus should be on improvising the oral hygiene of the diabetic patients to limit the progression of the disease.

KEY WORDS: BLEEDING ON PROBING; BONE LOSS; DIABETES; PERIODONTAL POCKET; RUSSELL'S PERIODONTAL INDEX.

INTRODUCTION

Periodontal disease is a chronic inflammatory disease of periodontium and is characterized by periodontal ligament loss and destruction of surrounding alveolar bone. It is the main cause of tooth loss among adults and is responsible for the global burden of disease. According to the National Oral Health Survey, the prevalence of periodontitis in India was 57%, 67.7%, 89.6%, 79.9%, in the age groups 12, 15, 35 - 44, 65 - 74 years respectively. Periodontitis leads to negative impacts and poor oral health related quality of life. Among various risk factors, diabetes has been confirmed as a major risk factor. Many studies have demonstrated the influence of diabetes on oral health conditions. Prevalence of severe



periodontitis in diabetics as compared to non-diabetics has been found to be 59.6% and 39%. The explanation for this was stated as, chronic hyperglycemia increases the expression of toll like receptors and pro inflammatory cytokines in periodontal tissue, thus augmenting periodontal inflammation (Kinane, 2001; Esa et al., 2001; Mathur et al., 2004; Al-Harthi et al., 2013; Huang et al., 2016; Nazir, 2017; Pavithra and Jayashri, 2019; Samuel et al., 2020).

Periodontal disease other than being the sixth complication of diabetes, also leads to an array of other oral health related problems such as heavy plaque accumulation leading to increased microbial concentration causing gingival diseases and dental caries, salivary gland dysfunction, may give rise to lesions in oral cavity which may cause nutritional problems (Saini et al., Saini and Sugandha, 2011; Prabakar et al., 2018b; Mebin et al., 2020; Neralla et al., 2019; Prabakar et al., 2016; Prabakar et al., 2018a; Prabakar et al., 2018; Mohapatra et al., 2019; Pratha and Prabakar, 2019; Pavithra and Jayashri, 2019; Samuel et al., 2020).

Another main factor influencing the severity of periodontitis is smoking where studies have shown moderate smokers





have a 1.32 times higher risk of periodontal disease and heavy smokers have a 2.33 times higher risk. Also, there have been studies showing association of fluorosis with periodontal diseases which states fluoride could play a role as an environmental factor in causing periodontitis through its effect on hard and soft tissues of the periodontium. Therefore, it can be concluded that periodontal disease also depends on a number of factors (Vandana, 2014; Jang et al., 2016; Kumar and Preethi, 2017; Kumar and Vijayalakshmi, 2017; Khatri et al., 2019; Leelavathi and Others, 2019; Sathish and Karthick, 2020).

There are studies that report abnormal collagen metabolism, abnormal polymorphonuclear cell (PMN) function and altered microbial flora are found in close association with severity of periodontitis in diabetic patients, whereas other studies suggest there is no relationship between diabetes and periodontal disease there is no relationship between diabetes and periodontal disease and when these two conditions exist together, it is a coincidence rather than a specific cause and effect relationship. There is a difference of opinion regarding the relationship between periodontitis and diabetes, this study was conducted to assess clinical periodontal parameters associated with diabetes mellitus among the adult population visiting a private dental college in Chennai (Bernick et al., 1975; Ervasti et al., 1985; Hayden and Buckley, 1989; Grossi et al., 1996; Pavithra and Jayashri, 2019; Samuel et al., 2020).

Previously our team has a rich experience in working on various research projects across multiple disciplines (Gheena and Ezhilarasan, 2019; Ke et al., 2019; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Sharma et al., 2019; Varghese et al., 2019; Venu et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project.

MATERIAL AND METHODS

A retrospective study was conducted among patients reporting to the OPD of Saveetha Dental College with periodontal problems. The study was conducted between August 2019 - January 2020. Simple Random Sampling was carried out to select a total case record of 80 patients, out of which 40 were diabetic and 40 were healthy patients. Prior to the start of the study, ethical approval (SDC/SIHEC/2020/DIASDATA/0619-0320) was obtained from Scientific Review Board, Saveetha Dental College, SIMATS University. Data consisting of age, disease status, periodontal health status was retrieved from records of patients who visited the dental college. The periodontal status was quantified using Russell's Periodontal Index and CPITN Index. The oral examination was done using a mouth mirror, William's probe and WHO probe under bright light and dental chair by trained examiners. To measure CPITN Index, the WHO probe with working tip of 0.5mm in diameter and markings at 3.5 mm, 5.5 mm, 8.5 mm and 11.5 mm was used as it reduces the chances of false measurement of the pocket depth.

The index teeth 17/16, 11, 26/27, 37/36, 21, 46/47 were examined and a code was given to each extant, but only the highest code was recorded among the examined teeth in individual sextant. After evaluating the periodontal status, Treatment Needs (TN) for each subject was categorized on the basis of highest code recorded during the examination of all sextants in the subject. While recording Russell's Periodontal Index, all teeth present were subjected to examination. Scoring values of 1, 2, 4, 6, 8 were given and cumulative score was obtained to elucidate the final periodontal status score and patients were categorized based on that. The findings were recorded according to the criteria's provided by the author and entered into the digital system.

Statistical Analysis: Data was analyzed using SPSS Version 23.0. Descriptive statistics, Chi square were used to analyse the parameters among the two groups. Statistical significance was set at p < 0.05.

RESULTS AND DISCUSSION

The study consists of case records of 80 participants out of which 52.50% were males and 47.50% were females as seen in Figure 1. The mean age of the participants was 56.1 ± 13.4 overall, for diabetics it was 61.4 ± 8.2 and for healthy patients, 50.8 ± 15.4 (Table 1) Figure 2 shows the distribution of participants based on Russell's Periodontal Score, 48.75% had "Established Destructive Periodontal Tissue", followed by 32.50% experiencing "Beginning of Destructive Periodontal Tissue", out of the total study population, 10.0% has "Terminal Disease", 7.50% has "Simple Gingivitis" and 1.25% has "Clinically Normal Supportive Tissue".

Figure 1: The pie chart represents the distribution of study population based on gender, where 67.69% were males (denoted by colour blue) and 32.31% were females (denoted by colour red), thus showing a male predilection in the study population.



The participants were also categorised based on their CPITN Score, which revealed 61.25% had Supra/Subgingival calculus, indicating need for professional cleaning of teeth and removal of plaque retentive factors, 27.50% had periodontal pockets with 4-5 mm depth indicating treatment need for scaling and root planing, 6.25% of the participants had gingival bleeding on probing, indicating a need for improving their personal hygiene, whereas the 5.0% of participants who had periodontal pocket depth more than 6 mm depth needed to undergo complex procedures involving deep scaling, root planing and further surgical treatments (Figure 3). The comparison of Russell's Periodontal score among diabetics and non-diabetics did not produce a statistically significant value (p = 0.3) even though the severity of periodontal disease was higher in diabetic patients as shown in Figure 4. Similarly, no statistical significance was seen among the two groups in terms of CPITN score (p = 0.6) as given in Figure 5.

Table 1. Mean Age of study participants			
Variable	N	Mean	Standard Deviation
Overall	80	56.1 years	13.4
Diabetic	40	50.8 years	15.4
Non-diabetic	40	61.4 years	8.2

Figure 2: The bar graph represents the distribution of the study population based on Russell's periodontal score. X axis represents Russell's periodontal score and Y axis represents the distribution of study participants based on Russell's periodontal score. Among the study population, 48.8% of all participants had established destructive periodontal tissue.



The current study was based on the alternate hypothesis that periodontal parameters are worse in diabetic patients than in non-diabetic patients. The results of this study support the hypothesis, however no statistically significant difference was observed in Russell's periodontal scoring and CPITN scoring when periodontal health of diabetic patients was compared to periodontal health of non-diabetic patients. One possible explanation for this could be that risk factors for periodontitis includes genetic, ethnicity, advancing age, smoking and not just presence or absence of systemic disease. There are reports of statistically significant relationship between the duration of hyperglycemia and severity of periodontal inflammation. In the current study, the duration of diabetes among the diabetic patients was approximately 3-4 years, therefore it could have resulted in the limited effect of hyperglycemia. Similar findings were reported in studies conducted by Shammari et al., Mohammed et al (Goldin et al., 2006; Al-Shammari et al.,

2006; Javed et al., 2014; Alasqah et al., 2018; Vijayashree, 2019; Mathew et al., 2020).

Figure 3: represents the distribution of CPITN scores among the study population. X axis represents the CPITN score and Y axis represents the distribution of the study population based on CPITN score. Among the study population, the majority of the participants (61.3%) had supra/subgingival calculus.



Figure 4: Represents the association between the diabetics, non-diabetics and Russell's Periodontal score. X axis represents the disease status, i.e diabetics and non-diabetics and Y axis represents the distribution of study population based on Russell's periodontal score. Chi square test was used and prevalence of destructive periodontal tissue was more in diabetics (26.2%) than in non-diabetics (22.5%), however no statistical significance was observed. $\chi 2 = 4.051$, df = 4, p value = 0.3; hence, statistically not significant.



However, studies have also reported statistical significance between Russell's periodontal score and duration of diabetes. The present study shows majority of the participants (61.2%) had supra/subgingival calculus, which coincides with the findings of other studies where removal of calculus was intended for majority of the study population, in a study conducted by Dan et al among patients of Rheumatoid arthritis, a study done among Intellectually Disabled patients contrasting results were found in other studies. The distribution of participants with pocket depth

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more than 6 mm was around 5%, similar to other study by Dan et al., which could be explained by the fact that the less severity of periodontitis among this set of study participants could be attributed to the age group of the participants as, the present study had participants below 60 years of age, the studies with opposing results had participants over 65 years of age (Bretz et al., 2005; Kim et al., 2013; Piperea-Sianu et al., 2013; Piperea-Sianu et al., 2013; Diab et al., 2017; Vijayashree, 2019; Mathew et al., 2020).

Figure 5: Represents the association between diabetics, non-diabetics and CPITN score. X axis represents disease status and Y axis represents the distribution of study population based on CPITN score. Chi square test was used, and periodontal pocket depths were more severe in diabetics (15.0%) than in non-diabetics (12.5%), however no statistical significance was observed. χ^2 value = 1.565, df = 3, p value = 0.6; hence, statistically not significant



Periodontal conditions begin to undergo a faster destruction among diabetic patients aged 35 years and above as reported by Bacic et al. The odds of having severe periodontitis according to Russell's Periodontal scoring was slightly more in diabetic patients as to non-diabetics, as also seen in previous studies. As clinicians and public health professionals, it is necessary to evaluate the progression of periodontal disease among diabetic patients' early diagnosis and treatment could result in a better oral health related quality of life and decrease the burden of disease (Bacić et al., 1988; Brown et al., 1990; Torrungruang et al., 2005; Kannan et al., 2017).

Limitations: The study was conducted in a hospital setting, so patients seeking treatment have only been included, also the sample size being small, the results cannot be generalised. Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020). We hope this study adds to this rich legacy.

CONCLUSION

The periodontal parameters showed a moderate severity among diabetic patients compared to non-diabetic patients, even though no statistical difference was observed. As dental health professionals, our focus should be on improvising the oral hygiene of the diabetic patients to limit the progression of the disease.

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Prevalence of Caries in Permanent First Molars Among Children with and Without Caries on Primary Teeth-A Retrospective Study

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ABSTRACT

Dental caries in the form of early childhood caries is more prevalent in children. Severe form of caries extending throughout the coronal structure in the root can result in tooth pain. Children presenting with class II caries have been exposed to caries involving the pulp. Early childhood caries is one of the most infectious diseases of childhood having a chronic progression rate resulting in the destruction of tooth structure. Permanent first molars are the first permanent teeth to erupt in the oral cavity at 6 years of age and have a higher rate of caries pattern than other teeth. This is associated with unusual dietary patterns and improper feeding patterns in children with prolonged use of baby bottles for milk feeding. Caries in children was mainly caused by the bacteria Streptococcus mutans. The aim of this study was to assess the prevalence of caries in permanent teeth in children with and without caries in primary teeth. A retrospective study was carried out using digital records of 875 subjects, irrespective of the gender. These data were collected from DIAS and coded in MS Excel sheets. The collected data was analysed by computer software SPSS version 21 using Chi square test and graphical illustration was done. From the above study, it was found that the high caries prevalence was seen in permanent teeth without caries in the primary teeth in males (52.33%) and predominantly in the 6-9 years age group. Therefore, it can be concluded that permanent molars in children are a source of caries than the primary teeth and awareness should be created on dental caries among school children and parents.

KEY WORDS: CHILDREN, DENTAL CARIES, PERMANENT FIRST MOLARS, PRIMARY TEETH.

INTRODUCTION

Dental caries is seen worldwide affecting both the primary and permanent dentition in children. Permanent first molars are important for their morphological and functional characteristics. This is a multifactorial disease. Prevalence for forts molars is seen with all ages, in which the occlusal areas are commonly affected. Permanent first molars are the



key to occlusion in the oral cavity. Loss of this can result in malocclusion and can have an impact on the future dental health. Permanent firs pt molars are the first permanent teeth to develop in the oral cavity around 6 years of age. They control the eruption of other teeth in the oral cavity. Mandibular first permanent molars have a greater number of pits and supplementary grooves; hence caries prevalence is more in such areas. Dental neglect and stress levels can result in less salivary secretion leading to caries formation. Studies have shown that malondialdehyde levels are at a high level in saliva which increases the risk for development of ECC (World Health Organization WHO., 1997; McDonald



and Sheiham, 1992; Taani and Quteish, 2004; Gurunathan and Shanmugaavel, 2016; Aishwarya and Gurunathan, 2017; Subramanyam et al., 2018; Ivanova et al., 2018; Krishnaswamy et al., 2020).

Maxillary permanent first molars erupt after the mandibular molars and hence caries prevalence is comparatively less in the maxillary arch. According to the DMFT index, D component is more common. Teeth in the posterior region are more prone for caries than the anteriors. Caries assessment is seen more for proximal and occlusal caries in the permanent molars. Mesial surface caries has increased incidence followed by proximal surface caries. This is due to the food lodgement and class II caries seen on the proximal surfaces and improper tooth brushing. Among the growing children, frenal attachment plays a major role as it can result in midline diastema, and can result in spacing. Age and site of the tooth also plays a major role in caries prevalence. Occlusal caries was seen among young children and proximal caries among older children. Traumatic injuries can also result in fractured teeth and infections that can lead to caries formation (Edward, 1997; Lith et al., 2002; Hopcraft and Morgan, 2006; Christabel and Gurunathan, 2015; Packiri et al., 2017; Ravikumar et al., 2017; Ivanova et al., 2018; Venu et al., 2019; Krishnaswamy et al., 2020).

Treatment modalities for children with carious teeth are numerous. Caries extending to the pulp can be painful to the children and may require pulpectomy in primary teeth and root canal treatment for the permanent teeth. These are the various endodontic treatments carried out for the primary teeth in children. Pulpectomy is an endodontic procedure done in primary teeth which involves the removal of the pulpal tissue and retaining the tooth which forms a guidance for the eruption of permanent teeth. This procedure involves the instrumentation using files such as Kedo-S files which are the recent advances gaining importance in pulpectomy Techniques and quality of obturation differ on the type of files and the method used. Optimal fluoride content in the drinking water and usage of fluoridated toothpaste can prevent caries formation and progression. They form a protective layer on the tooth surface (Somasundaram et al., 2015; Jeevanandan, 2017; Jeevanandan and Govindaraju, 2018; Panchal et al., 2019)]. Mahesh, 2018; Nair et al., 2018; Govindaraju et al., 2017a, 2017b; Govindaraju et al., 2017; Panchal et al., 2019; Samuel et al., 2020)

Previously our team has a rich experience in working on various research projects across multiple disciplines (Gheena and Ezhilarasan, 2019; Ke et al., 2019; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Sharma et al., 2019; Varghese et al., 2019; Venu et al., 2019; Venu et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project. Therefore the aim of this study was to determine the prevalence of caries in permanent first molars in children with and without caries in primary teeth.

MATERIAL AND METHODS

Study Design: This was a cross sectional study conducted at a university setting, Chennai. The data was collected from a digital case sheet record. The sample size of the study was 105 subjects from a total of 875 case sheet records of children of 6-13 years, irrespective of their gender. The pros of the study were similar ethnicity and cons were geographic limitations. The ethical approval was given by the ethics board of the university and data was reviewed by 2 viewers. 875 case sheets were reviewed. Simple random technique was used to minimise sampling bias. The internal validity was that data can be generalizable.

Figure 1: Representing the percentage of subjects treated based on age, with X-axis representing the age and Y-axis representing the percentage of subjects treated. Majority of the subjects (84.8%) belonged to the 10-13 years age group, whereas 15.2% belonged to the 6-9 years age group.



Figure 2: Representing the percentage of subjects treated based on gender, with X-axis representing the gender and Y-axis representing the percentage of subjects treated. Majority of the subjects were males 52.4%, whereas 47.6% of subjects were females.



Data Collection/ Tabulation: Data was collected from a digital case sheet record using a software and was then transferred to MS Excel Sheet. Coding of data was done and tabulation was done in MS Excel spreadsheet. Data was then imported to SPSS by variable definition process.

Analytics: Data was analysed using SPSS IBM version 20.0. Descriptive and inferential statistics was used. List of

dependent variables were caries in anterior teeth and those of independent variables were age and gender. Chi- square test was followed and data transferred to the host computer and graphical illustration was done.

RESULTS AND DISCUSSION

In the present study, from Figure 1, 84.8% belonged to the 10-13 years age group and 15.2% belonged to the 6-9 years age group. From Figure 2, 52.4% were males and 47.6% were females. From Figure 3, distribution of subjects with and without caries ,71.4% of subjects had caries along with permanent teeth and 28.6% of subjects had no caries in primary teeth. From Figure 4, with caries in first molars, 52.4% had caries in mandibular first molars and 18.1% in maxillary first molars whereas 29.5% had caries in both. From Figure 5, on comparison of caries in primary teeth with age, prevalence was more in the 10-13 years age group (90.7%) with mean value of 1.2, SD of 0.42 and p value of 0.007 which is a statistically significant association. From Figure 6, on comparison of caries in primary teeth with gender, prevalence was more in males (53.3%) with mean value of 1.2, SD of 0.44 and p value of 0.76 which is a statistically insignificant association.

Figure 3: Representing the percentage of subjects treated based on caries in primary teeth, with X-axis representing the caries in primary teeth and Y-axis representing the percentage of subjects treated. 71.4% of the subjects had caries in primary teeth whereas 28.6% had no caries in primary teeth.



From Figure 7, on comparison of caries in permanent first molars with age, prevalence was more for the 10-13 years age group in the mandibular first molars (92.7%) years with mean value of 1.9, SD of 0.65 and p value of 0.014 which is a statistically insignificant association. From Figure 8, on comparison of caries in permanent first molars with gender, prevalence was more in males in both maxillary and mandibular first molars (61.3%) with mean value of 1.8, SD of 0.69 and p value of 0.291 which is a statistically insignificant association. From Figure 9, on association between caries in primary teeth and permanent first molars based on Pearson Chi square test, the results were statistically significant at p < 0.001.

It is very important to understand the various effects of caries in first permanent molars in children. Caries prevalence, as seen from the above study, distal surface Figure 4: Representing the percentage of subjects treated based on caries in permanent first molars, with X-axis representing the caries in permanent first molars and Y-axis representing the percentage of subjects treated. 52.4% of the subjects had caries in mandibular first molars (red), 18.1% had caries in maxillary first molars (blue), whereas 29.5% had caries in both maxillary and mandibular first molars (green).



Figure 5: Representing the association between caries in primary teeth and age in subjects treated for caries, with X-axis representing the age and Y-axis representing the percentage of patients treated. 6-9 years age group had a mean value of (1.5 ± 0.51) in which 30% of the subjects were without caries in primary teeth (red), whereas 10-13 years age group had a mean value of (1.2 ± 0.42) in which 90.7% of subjects were with caries in primary teeth(blue), with a p-value of 0.007 (<0.05) which is statistically significant, which means there is a significant association between the age and the presence of caries in primary teeth.



caries is less prominent which can be due to late formation of the contact with second molar. One of the reasons is lack of oral health maintenance. Several studies have been reported with similar concordance with the findings. A study in Jeddah showed the prevalence of caries in the first permanent molar was between 6 to 9 years. Another study showed a mean of 1.19 for caries prevalence in the molar whereas another study in Jeddah said caries prevalence was more for 6-12 years children with mean of 6.3 One of the recent advances is the chewable toothbrush that has been known to reduce the caries formation (Nordblad and Larmas, 1986; Al-Khateeb et al., 1991; Warren et al., 1997; Alamoudi et al., 2009; Govindaraju and Gurunathan, 2017; Krishnaswamy et al., 2020). Figure 6: Representing the association between caries in primary teeth and gender in subjects treated for caries, with X-axis representing the gender and Y-axis representing the percentage of patients treated. Females had a mean value of (1.3 ± 0.46) in which 50% of subjects were without caries in primary teeth (red), whereas males had a mean value of (1.2 ± 0.44) in which 53.3% of subjects were with caries in primary teeth (blue) with a p-value of 0.760 (>0.05) which is statistically not significant which means there is no significant association between the gender and the presence of caries in primary teeth.



Figure 8: Representing the association between caries in permanent first molars and gender in subjects treated for caries, with X-axis representing the gender and Y-axis representing the percentage of patients treated. Females had a mean value of (1.9 ± 0.66) in which 52.6% of subjects had caries in maxillary first molars (blue), whereas males had a mean value of (1.8 ± 0.69) in which 61.3% of subjects had caries in both maxillary and mandibular first molars (green) and a p-value of 0.291 (>0.05) which is statistically not significant which means there is no significant association between the gender and the presence of caries in permanent first molars.



Cavitated lesions were more prone to be in primary teeth rather than the molar of permanent teeth. This can be due to the improper feeding practices. Studies contrary with the findings said caries prevalence was more for second primary molars. Some studies have reported decreased levels of caries both in primary and permanent teeth The present study has its own limitations such as the geographic limitation. A study performed in North Palestine said the caries prevalence is more for primary dentition with mean Figure 7: Representing the association between caries in permanent first molars and age in subjects treated for caries, with X-axis representing the age and Y-axis representing the percentage of patients treated. 6-9 years age group had a mean value of (1.5 ± 0.73) in which 32.3% of subjects had caries in both maxillary and mandibular first molars (green), whereas 10-13 years age group had a mean value of (1.9 ± 0.65) in which 92.7% had caries in mandibular first molars molars and a p-value of 0.01 (<0.05) which is statistically significant, which means there is a significant association between the age and the presence of caries in permanent first molars.



Figure 9: Represent the association between caries in primary teeth and permanent first molars based on Pearson Chi square test; the results were statistically significant at p < 0.001.



of 4.34 The future scope of the study is to create awareness in dental caries among children and parents providing oral health maintenance progress (Wyne, 2008; Wyne et al., 2002; Khan, 2014; Nair et al., 2018; Ke et al., 2019; Krishnaswamy et al., 2020).

Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020). We hope this study adds to this rich legacy.

CONCLUSION

In conclusion, high prevalence of caries in permanent mandibular first molars was seen along with caries in the primary teeth in the age group of 10-13 years.

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Awareness and Knowledge on Blood / Body Fluid Spill Management Among Health Care Providers

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ABSTRACT

Blood/ body fluid spill management is the standard principle application, which includes the use of personal protective equipment (PPE) as applicable, spills should be cleared up before the area is cleaned. Adding cleaning liquid to spills increases the size of the spill and it should be avoided effectively. Health care services should have management systems in place for dealing with blood and body substance spills. A descriptive cross-sectional study was conducted among healthcare providers to access their knowledge and awareness on blood/body fluid spill management. The total number of people involved was 119. Self-administered questionnaire of close ended questions was prepared and distributed through the online survey "GOOGLE FORMS ". In the present study about 58% of the population know about the steps followed in the blood/body fluid spill management, and 42% of the population don't know the steps followed in the blood/body fluid spill management, and 9.2% of them said it is not very important as well as not less important, and 9.2% of them said it is not at all important. In the present study, knowledge and awareness on blood/body fluid spill management is moderate among health care providers. For further augmentation, awareness should be created through various programs about the risk factors of blood/body fluid spill management.

KEY WORDS: SPILL MANAGEMENT, BLOOD OR BODY FLUID, AWARENESS, PROTOCOL, HEALTH CARE PROVIDERS.

INTRODUCTION

Blood/ body fluid spill management is the standard principle application, which includes the use of personal protective equipment (PPE) as applicable, spills should be cleared up before the area is cleaned. Adding cleaning liquid to spills increases the size of the spill and it should be avoided effectively. Health care services should have management systems in place for dealing with blood and body substance spills. The type of spills is sputum, vomit, faeces, urine,

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blood or laboratory culture. The pathogens are more likely to be involved in these different types of spills for example, stool samples may contain viruses, bacteria or protozoan pathogens, whereas sputum may contain mycobacterium tuberculosis. It is used to dispose of the properly absorbed body fluids, and wipes area water detergent until it is visibly clean, washing hands with soap and water with single use towels is always recommended. Body fluids are a global issue today.

The defined solid fluid is a liquid waste intermediate product generated through diagnosis treatment. Dental offices generate a number of hazardous wastes which determines the environment is not properly managed. Training problems which were launched, increases the capacity of occupational health nurses which was designed in implant work places. Increased risk factor, epidermally analysis the immobility labour increased in temperature excessive moisture during birth. Disposable absorb sheets must comfort and not restrict.



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Use of a mask, gown to clear the spilled blood screening is considered to be non-infectious (Martin et al., 2004; Wu et al., 2007; Nkoko et al., 2014; Nkoko et al., 2014; Ranjan et al., 2016).

Previous research on various aspects like nano technology (Wu et al., 2019; Ke et al., 2019) phytochemistry (Chen et al., 2019; Li et al., 2020), pharmacology (Rengasamy et al., 2016; Shukri et al., 2016), cancer technology (Menon et al., 2016; Jainu et al., 2018; Rengasamy et al., 2018; Ramya et al., 2018; Wang et al., 2019), biotechnology (Ma et al., 2019; Mohan et al., 2015) as well as biochemical and molecular toxicology (Gan et al., 2019; Ponnulakshmi et al., 2019) were conducted by our team.

Figure 1: This pie chart represents the percentage distribution of knowledge and awareness on the steps in blood/ body fluid spill management. Blue color represents yes and red color represents no. Majority of the participants (58.18%) were aware.



Figure 2: This pie chart represents the percentage distribution of knowledge and awareness about spill management as important for infection control. Blue color represents yes and red color represents no. Majority of the respondents (58.18%) were not aware of infection control.



Previously our team has a rich experience in working on various research projects across multiple disciplines (Gheena and Ezhilarasan, 2019; Ke et al., 2019; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Sharma et al., 2019; Varghese et al., 2019; Venu et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project. The aim of the present study was to assess and create awareness on the blood/body fluid spill management.

Figure 3: This pie chart represents the percentage distribution on the blood/body fluid carried out by whom. Blue color represents nurses and red color represents housekeeping. Majority of the respondents (55.45%) think that nurses carry out blood/body fluid spill management.



Figure 4: This pie chart graph represents the percentage distribution on the use of disinfectant before or after spill management. Blue color represents after cleaning the floor with disinfectant and red color represents before cleaning the floor with disinfectant. Majority of the respondents (60.91 %) responded as disinfectant is used after spill management.



Figure 5: This pie chart represents the percentage distribution on the usage of sodium hypochlorite. Blue color represents freshly prepared and red color represents an already prepared solution. Majority of the respondents (60%) used freshly prepared sodium hypochlorite solution.



MATERIAL AND METHODS

A descriptive cross-sectional study was conducted among healthcare providers to access their knowledge and awareness on blood/body fluid spill management. Approval was obtained from the institutional review board. Simple convenient random sampling was done. The total number of people were involved 100. Self-administered questionnaire of close ended questions was prepared related to blood/body fluid spill management among health care providers through the online survey "Google Forms". The total number of questions was 15, the type of questions was closed by last questions, yes or no type. The data were manipulated and cleared in the excel sheet. Data were of represented by pie chart and bar graph table. The statistical analysis was done by SPSS software, and chi square test. The independent variables were age and gender. The dependent variables were knowledge, awareness and procedures. Type of analytics was used here which was percentage analysis. Step were followed here software analysis, data collection analysis and interpretation.

Figure 6: This pie chart represents the percentage distributions of the biochemical waste bin used. Blue color represents yellow and red color represents black. Majority of the respondents (54.55%) responded as black biochemical waste bins.



Figure 7: This pie chart represents the percentage distribution regarding washing the hands with soap and water for 20-30 seconds is the first step. Blue colour represents true and red colour represents false. Majority of the respondents (55.45%) first wash their hands with soap and water for 20-30 seconds.



Figure 8: This pie chart represents the percentage distribution on the importance of blood/body fluid spill management. Blue colour represents extremely important and red colour represents not at all important. Majority of the respondents (52.73%) felt it is not at all important.



Figure 9: This pie chart represents the percentage distribution of the incident reported to infection control nurses. Blue colour represents yes and red colour represents no. Majority of the respondents (50.91%) report incidents to infection control disease.



Figure 10: This pie chart represents the percentage distribution on wearing gloves. Blue colour represents true and red colour represents false. Majority of the respondents (53.64%) do not wear gloves during blood/body fluid spill management.



RESULTS AND DISCUSSION

The study population included the health care providers. In the present study, (figure 1) showed 58.18% know the steps in blood/body fluid spill management and 41.82% don't know the steps. 41.82% of the participants was aware and 58.1% were not aware that spill management is important for infection control (figure 2). Figure 3 showed that 55.45

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% were responded as blood/ body fluid spill management was carried out by nurses and 44.55 % as carried out by housekeeping. 60.91 % of the health care providers responded that blood body fluid spill management was carried after cleaning the floor with disinfectant, 39.09% responded as before cleaning the floor with disinfectant (figure 4). In figure 5, 60% of the respondents said that they use freshly prepared solution. Sata et al, 2004 also had a similar result (Sata et al., 1996). 54.55 % agreed that yellow biochemical waste bin was used in blood body fluid spill management and 45.45% said that it is black biochemical waste bin (figure 6). Figure 7 showed that 51.82% are aware that washing the hands with soap and water is the first step and 48.18% of them are not aware of it.

Figure 11: This pie chart represents the percentage distribution on the protocol training in blood/body fluid spill management. Blue colour represents yes and red colour represents no. Majority of the respondents (66.36%) were not trained for the protocol.



Figure 12: Figure showing the association of responses based on age to the steps involved in the blood/ body fluid management. X axis represents the age group and Y axis represents the number of participants of which blue colour indicates yes and red colour indicates no. Majority of the participants in the age group of less than 20 years (40 participants) were aware of the steps in blood/body fluid spill management. However, the difference among the age groups is statistically not significant (Chi square value-2.788, p value-0.594 (>0.05) hence not significant)



Figure 8 showed that 39.09% of the population believed that blood /body fluid spill management is extremely important, 51.82% felt it is not very important and 9.09%

felt it is not at all important. Figure 9 showed that 46.36% of them said wearing gloves is the first step and 53.64% of them said wearing gloves is not the first step during the spill management. Figure 10 showed that 59.09% of the respondents follow the procedures in blood/body fluid spill management and 40.91% of them don't follow the procedure in blood/body fluid spill management. 66.36% of the respondents are not trained for the protocol and 33.64% of them are trained for the protocol (figure 11).

Figure 13: showing the association of responses based on age to the blood/body fluid spill management importance to infection control. X axis represents the age group and Y axis represents the number of participants of which blue colour indicates yes and red colour indicated no. Majority of the participants in the age group of less than 20 years (38 participants) were not aware of blood/body fluid spill management importance to infection control. (Chi-square value-10.727, p-value-0.030(<0.05) hence significant).



Figure 14: showing the association of responses based on age to the steps sodium hypochlorite used in the blood/ body fluid management. X axis represents the age group and Y axis represents the number of participants of which blue colour indicates freshly prepared and red colour indicates already prepared solution. Majority of the participants in the age group of less than 20 years (46 participants) used freshly prepared sodium hypochlorite solution. However, the difference is statistically not significant (Chi-square value-4.058, p-value-0.398 (>0.05) hence not significant)



Pearson Chi square test was done in association with the age of the respondents (Figure 12-16). 58.18% of the people are of the steps involved in spill management, of which 36.36% constitutes people less than 20 years (P value-0.594

(>0.05) which is statistically insignificant) (figure 12). Out of the 58.18 % of the participants who said that blood/body fluid spill management was important for infection control, 34.55% constituted people who belong to less than 20 years (P value-0.030 (-<0.05) which is statistically significant) (figure 13).

Figure 15: showing the association of responses based on age to the procedures in the blood/ body fluid management. X axis represents the age group and Y axis represents the number of participants of which blue colour indicates true and red colour indicates false. Majority of the participants in the age group of less than 20 years (41 participants) do not follow the procedures in blood/body fluid spill management. However, the difference is statistically not significant (Chi- square value-6.401, p-value-0.171(>0.05) hence not significant).



Figure 16: Bar chart showing the association of responses based on age to the protocol training in the blood/ body fluid management. X axis represents the age group and Y axis represents the number of participants of which blue colour indicates yes and red colour indicates no. Majority of the participants in the age group of less than 20 years (50 participants) were not trained for any protocol in blood/ body fluid spill management. However, the difference is statistically not significant (Chi-square value-1.718, p-value-0.787(>0.05) hence not significant)



This study was showed that there is a significant association between age and the awareness on the fact that spill management is important for infection control. Out of the 58% of the participants who said sodium hypochlorite used in blood/ body fluid spill management is freshly prepared, 41.82% of the people belong to less than 20 years (P value0.398 (->0.05) which is statistically insignificant) (figure 14). 59.09% of the participants said that they follow the procedures in blood/body fluid spill management (p value-0.171 (->0.05) which is statistically insignificant) (figure 15). 65.5% of the participants said that they are not trained for any protocol in blood/body fluid spill management, of which 45.45% of the people belong to less than 20 years (P value-0.787 (>0.05) which was statistically insignificant) (figure16). The limitations of this study are less sample size, and inclusion of only one type population.

Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020). We hope this study adds to this rich legacy.

CONCLUSION

In the present study, knowledge and awareness on blood/ body fluid spill management is moderate among health care providers. For further augmentation, awareness should be created through various programs about the risk factors of blood/body fluid spill management.

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Association of Age and Gender Distribution of Patients Undergoing Root Canal Treatment in Maxillary Anteriors

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ABSTRACT

Aim of the study was to find the association of age, gender and teeth distribution in patients undergoing root canal treatment in maxillary anteriors. This study was conducted at a private dental institute between June 2019 to March 2020. 86000 patient records were analysed. A total of 988 patients who underwent root canal treatment in 1753 maxillary anteriors were evaluated. Data collection was done and the results were tabulated in excel sheet. Obtained results were statistically analysed with SPSS software. From the results it was observed that, Maximum number of maxillary anterior root canal treatments was done in the age group of below 30 years (51%) and the least being patients above 60 years (6%). Male patients (52.94%) and female patients (47.06%) had undergone root canal treatment for maxillary anteriors. Maximum number of root canal treatment was done in 11 (23.5%) and the least was 13 (10.33%). Association between age of the patients and number of patients undergoing root canal treatment in maxillary anteriors, revealed that most of the root canal treatment was done in the age group of below 30 years was patients above 60 years in 21 (0.91%)(p <0.05) hence statistically significant. Association between gender of the patient in maxillary anteriors revealed that most of the root canal treatment in maxillary anteriors revealed that most of the root canal treatment in maxillary anteriors revealed that most of the root canal treatment was done in the age group of below 30 years, teeth commonly involved was 11 and the least was patients undergoing root canal treatment in maxillary anteriors revealed that most of the root canal treatment in maxillary anteriors revealed that most of the root canal treatment was done in the age group of below 30 years, teeth commonly involved was 11 and the least was patients pertaining to tooth number 21(13.94%) and the least being 23 in male patients (4.16%) (p<0.05) hence statistically significant.

KEY WORDS: AGE, GENDER, ROOT CANAL TREATMENT, MAXILLARY ANTERIORS.

INTRODUCTION

Dental caries is the most common cause for the loss of enamel in a clinical situation. Dental caries is easily detectable and reversible at an early stage Root canal treatment is an endodontic treatment which is used to save a tooth that has been infected due to caries. The main objective of performing root canal therapy was to eliminate bacteria from the infected root canal system or remove inflamed pulp tissue and close it with a biologically acceptable filling material. The reasons for undergoing root canal treatment in maxillary anteriors are generally tooth with dental caries



with pulpal involvement, non-vital teeth, trauma, ellis class III fracture, non-carious lesions. Intentional root canal treatments are also performed in the anteriors as there is a high chance of pulpal exposure due to excessive tooth preparation.

The steps in root canal treatment involve access cavity preparation, cleaning and shaping, biomechanical preparation, obturation, coronal seal, crown cementation. One important step in root canal treatment is to find, clean and disinfect all root canals. Knowledge about variations of the root canal system of all teeth directly affects the outcome of endodontic treatment. Reasons that leading to endodontic failure involves diagnostic errors, persistence of the infection, errors in debridement, cleaning and shaping of root canal systems, instruments fractures and poor restorations (Setzer et al., 2011; Al-Rahabi and Abdulkhayum, 2012; Arya et al., 2018; Rajendran et al., 2019).

Pulp vitality tests are the valuable diagnostic tool which aids the clinician towards the accurate diagnosis and appropriate



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treatment planning. Diagnosing the exact pulpal status by direct examination is uncertain due to the fact that the pulp is enclosed within a hard tissue. Once proper diagnosis is done, the tooth is prepared for root canal treatment. The first step is to provide local anesthesia to the affected tooth and the next step will be isolating the affected tooth with a rubber dam. Then the access cavity is prepared. The diseased pulp is removed by practitioners through access cavity preparation and with stainless instruments like K- files,H-files. Removal of the microbial organisms from the root canal system is a prerequisite for successful outcome of any root canal treatment (Levine, 1988; Janani et al., 2020).

Use of an effective intracanal medicament will assist in the disinfection of the root canal system. Various chemical agents are incorporated into the root canal for cleaning and shaping the canal which is known as "Biomechanical preparation". The major hurdle in root canal disinfection is the removal of the bacterial biofilm. The only way to achieve optimal removal is by following a proper irrigation protocol and final irrigant activation. Sodium hypochlorite (NaOCl), the most commonly used antibacterial irrigant, in spite of its stupendous tissue dissolving properties, is said to be ineffective against specific bacteria at lower concentrations.

Chlorhexidine (CHX) on the other hand is a broad-spectrum antimicrobial agent, widely used in endodontics for root canal disinfection. Chlorhexidine can be applied during all phases of the root canal preparation, including the disinfection of the operatory field; enlargement of the canals orifices; removal of necrotic tissues before working length determination; in the chemo mechanical preparation prior to the foraminal patency and enlargement; as an intracanal medicament; in the disinfection of obturation cones; for modeling the main gutta-percha cone; in the removal of gutta-percha cones during retreatment; in the disinfection of prosthetic space; among others. (Seltzer, 1978; Leonardo et al., 1999; Noor, 2016; Manohar and Sharma, 2018; Teja and Ramesh, 2019; Siddique et al., 2019).

Once canals are cleaned and shaped, the canals are sealed with gutta percha which is known as obturation. After obturation is completed, coronal seal is done, then tooth preparation and crown cementation are done. In cases with minimal tooth structure loss, veneers can also be used, A veneer is a thin sheet of material placed on the front surface of the tooth, used for aesthetic purposes and protection. It is usually a thin layer of restorative material replacing the enamel (Ravinthar and Jayalakshmi, 2018; Rajakeerthi et al., 2019; Jose and Subbaiyan, 2020). Various clinical trials (Ramamoorthi et al., 2015; Ramanathan et al., 2015; Kumar et al., 2018) and surveys (Nasim and Nandakumar, 2018; Teja et al., 2018; Hussainy et al., 2018) and in vitro studies (Rajakeerthi et al., 2019; Jose and Subbaiyan, 2020) have been conducted by our team in the field of conservative dentistry. Now we are focusing more on retrospective studies. Aim of the study is to find the association of age, gender and teeth distribution in patients undergoing root canal treatment in maxillary anteriors.

MATERIAL AND METHODS

The study setting was university-based single centered study. A retrospective study was conducted on 988 patients who visited a Private Dental College with complaint of pulpitis who required root canal treatment in maxillary anteriors. Thus, the population includes patients who underwent root canal treatment for 1753 teeth. The advantage of this study was the flexible data that could be obtained immediately and less expensively. The drawback of this study is that there were geographic limitations and the people involved were from an isolated population. The internal validity of the study was carried out by analysing the age and gender of patients who had undergone root canal treatment in maxillary anteriors.

The inclusion criteria were patients requiring root canal treatment in maxillary anteriors. The patient records were reviewed and analysed between June 2019 and March 2020 and the details of patients who had undergone root canal treatment in maxillary anteriors was noted. All available data was included to minimise sampling bias. Cross verification of details was done with the help of photographs and radiographs. Patients of all age groups were included in this study. The data of age and gender of patients who underwent root canal treatment in maxillary anteriors was tabulated. Incomplete and censored data was excluded. Data was entered in a methodical manner. Data was recorded and tabulated on Excel.

Figure 1: The bar graph represents the age distribution of patients. X axis represents the age of the patient and Y axis represents the number of patients. Maximum number of maxillary anterior root canal treatment was done in the age group of below 30 years (51 %) (green bar) and the least being patients above 60 years (6 %) (red bar).



After Excel tabulation, the data was exported to IBM SPSS software [Version 20: IBM Corporation NY USA]. Descriptive statistics were used to calculate correlation between age and gender of patients who underwent root canal treatment in maxillary anteriors. The dependent variable was the treatment done which is root canal treatment in maxillary anteriors. The independent variables were age and gender. Pearson chi square test was done to statistically analyze the data. Pearson chi square test

was used to identify any significant level of variation of association the significance level was set at 0.05

Ethical Approval: The ethical approval for the retrospective study was obtained from the university (SDC/SIHEC/2020/DIASDATA/0619-0320).

Figure 2: Bar graph represents the distribution of patients based on gender. X axis represents the gender of patients and Y axis represents the number of patients. Male patients (52.94%) (green bar) and female patients (47.06%) (blue bar) had undergone root canal treatment in maxillary anteriors



Figure 3: Bar graph represents the teeth distribution of various maxillary anteriors undergoing RCT. X axis represents the tooth number and Y axis represents the number of patients. Maximum number of maxillary anterior root canal treatment was done in 11 (23.56%) (blue bar) and the least being done in 13 (10.33%) (pink bar).



RESULTS AND DISCUSSION

The study included 988 patients and 1753 root canal treatments in maxillary anteriors. Maximum number of maxillary anterior root canal treatments was done in the age group of below 30 years (51%) and the least being patients above 60 years (6%) (Figure 1). Male patients (52.94%) and female patients (47.06%) had undergone root canal treatment for mandibular premolars (Figure 2). Maximum number of maxillary anterior root canal treatment was done

in 11 (23.5%) and the least being done in 13 (10.33%) (Figure 3).

Figure 4: Bar graph represents association between age and tooth number. X axis represents age and Y axis represents number of patients. Most of the RCT was done in the age group of below 30 years, teeth commonly involved was 11(14.49%) (blue bar) and least was patient above 60 years in 11 (0.91%) (blue bar). Association was found to be statistically significant. Pearson's Chi-square value = 134.015, df = 10, p value 0.00(<0.05).



Figure 5: Bar graph showing the association between gender and number of patients undergoing root canal treatment in maxillary anteriors. X axis represents gender and Y axis represents number of patients. Most of the RCT was done in male patients in 21(13.92%) (red bar) and the least being 23 in male patients (4.16%) (pink bar). Association was statistically significant. Pearson's Chi-square value = 33.990, df = 5, p value 0.01(p<0.05)



Association between age of the patients and number of patients undergoing root canal treatment in maxillary anteriors, revealed that most of the root canal treatment was done in the age group of below 30 years, teeth commonly involved was 11 and the least was patients above 60 years in 21 (0.91%), hence statistically significant (p<0.05) (Figure 4). Association between gender of the patient and number of patients undergoing root canal treatment in maxillary anteriors revealed that most of the root canal treatment

was done in male patients pertaining to tooth number 21(13.94%) (red bar) and the least being 23 in male patients (4.16%)(p<0.05),hence statistically significant (Figure 5).

Our study assessed the association of age, gender and tooth number of maxillary anteriors. The study group was divided into age groups of below 30 years, 30-60 years and above 60 years. Age group below 30 years had the highest incidence of root canal treatment in maxillary anteriors while the age group above 60 years had the least incidence for root canal treatment in maxillary anteriors.

More males had reported for root canal treatment in maxillary anteriors than females, this is because young males were more prone to dental disease like dental caries, pulpitis and dental trauma. Similar to our study, Osama et al reported that there was higher incidence in males more than females in his study. In contrast to our study, Augusto et al, reported that the majority of the patients in the study were females when compared to males. And also, Umana et al, the study reported that about half of the patients encountered in the study were females. Ismail et al reported that a total of 2996 RCT cases were seen and 59.8% of patients were females (Hollanda et al., 2008; Ismail et al., 2008; Osama et al., 2009; Umanah et al., 2012; Rajakeerthi et al., 2019; Jose and Subbaiyan, 2020).

The root canal treatment was more common in the age group below 30 years. Similar to our study, Farret et al reported that the highest incidence of endodontic treatment was performed among patients between 21-29 years age group. Umana et al reported that the highest incidence of root canal disease (42.7 %) was found in the 20-29 years age group. In contrast to our study, Omitola et al, the study reported that patients in their third and fourth decade have been more commonly observed for dental treatment (Farrell and Burke, 1989; Omitola et al., 2011; Rajakeerthi et al., 2019; Jose and Subbaiyan, 2020).

The root canal treatment was more commonly performed in 11 in our study. Maxillary anteriors are more prone to dental trauma because of its location. Similar to our study, Peak et al reported that of the 406 teeth included in the study, 59% (n=241) were maxillary teeth and 41% (n=165) were mandibular teeth. Thirty-two per cent (n=129) were maxillary anterior teeth, 15% (n=63) were maxillary premolars and 12% (n=49) were maxillary molars. Maxillary anterior teeth had higher success rates than other tooth types. Ismail et al reported that the maxillary anterior teeth were most commonly treated (52.6%). Scavo et al and Al-negrish et al reported that 55.7% and 77% of root canal treatment were performed in maxillary teeth respectively (Farrell and Burke, 1989; Al-Negrish, 2002; Peak et al., 2009; Scavo et al., 2011; Rajakeerthi et al., 2019; Jose and Subbaiyan, 2020).

The reason that could have accounted for more root canal treatments being performed in the anterior teeth is the fact that the aesthetic appearance of a patient is influenced at a higher rate by the smile of the patient where there is maximum visibility of the anteriors. It is seen that the anteriors are more prone to dental caries and most importantly trauma. Extraction is not generally preferred by the patient because of the high preference of esthetics among all age groups thus majority of them go in for a root canal treatment. The advantages of the study were availability of data and history of the patients who had reported. The limitations of the study were that the data available was not location specific and the patients belonged to different ethnic populations.

CONCLUSION

Within the limitations of study, it was found that maximum number of root canal treatment in maxillary anteriors was done in the age group below 30 years (51%), with male predominance (52.94%) and teeth commonly involved was 11(23.56%). Association between age of the patient and number of patients undergoing root canal treatment in maxillary anteriors was significant which revealed that most of the root canal treatment was done in the age group of below 30 years and the teeth commonly involved was 11. Association between gender of the patient and number of patients undergoing root canal treatment in maxillary anteriors revealed that most of the root canal treatment was done in male patients pertaining to tooth number 21(13.92%) which is statistically significant.

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Incidence of Plate Removal in Maxillofacial Region: A Single Centred Retrospective Study

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ABSTRACT

The long-term management of miniplate fixation osteosynthesis remains debatable and controversial with few authors advocating routine removal of the miniplates after 3-6 months of placement, while others recommend retention of the miniplates unless their removal is clinically indicated. The aim was to study the incidence, indications, time gap, role of metallic composition and site of removal of miniplates in operated cases of maxillofacial region over a one-year period. Patients undergoing removal of miniplates over a one-year period were studied and evaluated regarding the number of miniplates removed, time gap present between fixation and removal of miniplates, indications for removal, metallic composition of miniplates removed, sites of removal and complications. Correlations between indications for miniplate removal based upon time gap, metallic composition, age of patients undergoing plate removal and number of miniplates present were determined using Chi-square test. Correlation between metallic composition of miniplate and time gap was also determined using Chi-square test. The miniplates were removed in 31 patients (26 males and 5 females). Most common indication for removal was infection (45%). Forty-five percent of the patients underwent miniplate removal within 1 year of placement. The correlation between indications for miniplate removal and time gap was found to be statistically significant (P = 0.04). Most of the hardware removal is performed subsequent to complications associated with hardware and local factors. There is no significant association between the composition of the hardware and pate removal. However there is a significant association between the time gap and indication for plate. Miniplate removal should be performed when hardware is causing various complications and physical symptoms. Infection, miniplate exposure, pain, palpability or any other morbidity that appears after bony union should be treated by miniplate removal

KEY WORDS: PLATE FIXATION, FRACTURE, INFECTION, MINIPLATE, TRAUMA.

INTRODUCTION

In the era of increasing auto mobilization, industrialization and technology, the treatment of maxillofacial injuries has attained a prominent position. Road traffic accidents, which are becoming more and more frequent, particularly have brought about an increase in maxillofacial injuries. The highest number of trauma occurred in the age group of



20–29 years constituting 44.5% of all trauma cases seen over a 9-year period. The male-to-female ratio in this study was found to be 6.2:1, which is lower compared to other studies. The other causes of maxillofacial injuries are interpersonal violence, falls, sporting injury and industrial trauma the most common bone involved was the mandible (64.4%), and the most common site in the mandible was the parasymphysis (25.3%), followed by the angle (16.2%). Champys described the ideal lines of the osteosynthesis on which plates have to be applied to miniplates are small size and easily adapted monocortically on bone (Abhinav et al., 2019).

They provide functional stability since the system is biomechanically balanced. But one of the most significant drawbacks was the phenomenon of stress shielding atrophy of the bone under the rigid plate which makes the bone vulnerable to refracture once the plates were removed.


Although gold, silver, copper and its alloys lead and aluminium and its alloys were tested. Stainless steel emerged through the era as the new corrosion resistant material. At about the same time or later on the other metals or alloy like titanium were introduced with claims of advantages over the classic stainless steel. Stainless steel and titanium plates are also being used in lefort osteotomies. The management of disposal of bio wastes also has to be done to prevent iatrogenic injuries (Christabel et al., 2016; Kumar and Rahman, 2017; Jain et al., 2019).

The most commonly reported indications for maxillofacial hardware removal include infection at the site of surgery and/or hardware extrusion or exposure. Murthy and Lehman reported that most infections after fixation surgery for maxillofacial trauma occur in the mandible and are the major cause of miniplate removal. Studies have reported various values for the removal rate of miniplates, ranging from 7% to 33.8%. Some researchers recommend removal unless clinical symptoms or complications occur. Clear evidence for such a recommendation has not yet been established (Murthy and Lehman, 2005).

This study analysed the incidence, indications, time gap, metallic composition of miniplates removed and site of removal of miniplates in one year study period in operated cases of maxillofacial region .Previously our team had conducted numerous clinical trials (Jesudasan et al., 2015; Christabel et al., 2016; Mp, 2017a; Mp and Rahman, 2017; Packiri et al., 2017; Patil et al., 2017; Marimuthu et al., 2018) and lab animal studies (Kumar and Sneha, 2016; Kumar, 2017; Mp, 2017b; Rao and Kumar, 2018; Abhinav et al., 2019) and in-vitro studies (Patturaja and Pradeep, 2016; Abhinav et al., 2019) over the past 5 years. Now we are focussing on epidemiological surveys and retrospective studies. The idea for this retrospective study stemmed from the current interest in our community.

MATERIAL AND METHODS

Sample size: This retrospective study was conducted in the university setting. Data chosen for evaluation were patients who reported to a private dental college for the removal of plates fixed in maxillofacial region. The details of the patients were obtained from analysis of 86,000 patients from June 2019 to March 2020 from patient dental records. The study was conducted after getting ethical approval from the Institutional Ethical Committee (Ethical Approval Number: SDC/SIHEC/2020/DIASDATA/0619-0320). Cross verification was done with the help of patient dental records data. To minimise sampling bias all data were included.

Study design: Data collected comprised age, gender, reason for removal of miniplates, site of removal, length of time between surgery and removal of the miniplate, number of miniplates removed, metallic composition of miniplates and intra-operative and post-operative complications following miniplate removal. The reasons for removal were classified into the following categories: patient's request for removal; infection; pain without signs of infection; asymptomatic miniplate exposure; pediatric trauma; prosthetic rehabilitation; and others.

Statistics: The site of miniplate removal included mandible and midface. Correlations between indications for miniplate removal based upon time gap, metallic composition, age group and number of miniplates present were determined using Chi-square test. Correlation between metallic composition of miniplate and time gap for removal was also determined using Chi-square test.

RESULTS AND DISCUSSION

31 patients underwent miniplate removal. There were 26 males (80%) and 5 females (20%), with an average age of approximately 32.5 years (range, 4 - 65 years). Miniplates were removed in 16 cases (80%) from mandible and four cases (20%) from the midface region. In the mandible (16 cases), body and symphysis region were most commonly involved (5 cases each -31.25%) followed by angle region (18.75%), and condyle (6.25%). However, multiple sites were involved in only 2 cases (12.5%).

Out of miniplates removed, stainless steel and titanium material shared an equal percentage (17 miniplates in 10 patients in each category). Out of 118 screws, 62 (52.54%) were stainless steel and 56 (47.46%) were titanium. There were 9 cases (45%) in which the miniplates were removed due to infection and in 6 cases (30%), miniplates were removed due to complaint of pain without any sign of infection. Prosthetic rehabilitation, asymptomatic miniplate exposure and patient request needed miniplate removal in 1 case each (5%). One patient was a 4 years old child and, in another patient, malunion subsequent to inadequate reduction led to deranged occlusion requiring miniplate removal.

Figure 1: This pie chart represents the different sites from which the miniplates were removed. The blue colour represents Angle of the mandible from which 13.33% of plates were removed. The green colour represents Body of the mandible with 33.33%, Grey colour represents condyle with 6.67%, Yellow represents the symphysis with 33.33% and violet represents Multiple sites with 13.3%.





was performed after more than 2 years of first surgery. There was a higher incidence of miniplate removal (9 cases – 45%) within one year of first surgery. Removal of miniplate was performed within 3 months in three cases because of infection involving bone, pediatric care which requires removal of the hardware as it can hinder the growth of the bone, and malunion subsequent to inadequate reduction in one case each, respectively. One case was an operated case of orthognathic surgery in which miniplate from zygomatic buttress was removed due to pain subsequent to miniplate exposure at the site. Among these 20 cases, there were 9 cases in which miniplate fixation was done at other sites also but were not indicated for removal.

Figure 2: This pie diagram represents indication for the plate removal. Blue represents infection ,green represents pain , grey represents patients demand and violet indicates pediatric trauma.55.56 % of cases are due to infection , 33.3% due to pain.



Figure 3: This chart represents the association between the type of material and the indication for plate removal. X- axis represents the Reason for plate removal and Y- axis represents the frequencies of plate removal in the different type of material used. Chi square was done and association was found to be statistically not significant; p value:0.85(>0.05) proving that there was no association between indication for plate removal and type of plate material



Several metals have been used since the 1920's for manufacturing hardware for fixation of maxillofacial trauma. Although gold, silver, copper, lead and aluminium were tested, stainless steel emerged through the era as the corrosion resistant material. Later on, at about the same time, titanium gained popularity with advantages over the traditional stainless steel. Titanium was first reportedly used around 1940's and was not only biocompatible metal, it also had a tendency for osseointegration and had excellent corrosion resistance. It also had excellent ductility and tensile strength and was totally non-toxic. Removal of miniplates has remained controversial. According to researchers, who oppose removal of an asymptomatic miniplate, biocompatibility of material, low incidence of complications, the risks of general anesthesia during removal, possible damage to adjacent anatomical structures and the expense of removal contraindicate removal of asymptomatic miniplate. On the contrary, authors who favor removal argue that the miniplate can possibly act as a foreign object with the potential to cause complications, and also miniplates generate growth restrictions among pediatric patients (Deepak et al., 2011; Park et al., 2016; Kumar and Rahman, 2017; Jain et al., 2019).

Champy recommended routine removal of all miniplates after 3 months of fixation and this concept became standard. Later, Vitallium gained acceptance as a more inert implant material and authors advocated retention of vitallium miniplates. Frost et al. (1983) studied the fate of vitallium miniplates and reported 18% removal rate on clinical grounds. Around the same time, it was shown that titanium (Ti) has startling success in many surgical procedures. According to Meningaud et al., almost 100% of Ti is released at local sites during the osteosynthesis, however, Ti levels remain constant and stable in the surrounding tissues and remain clinically inert. Removal of Ti miniplates was not accepted as routine procedure except in the case of infection, dehiscence, hypersensitivity or screw loosening (Michelet et al., 1973; Frost, El-Attar and Moos, 1983; Brown et al., 1989; Meningaud et al., 2001; Rao and Kumar, 2018; Abhinav et al., 2019).

Matthew et al. concluded that removal of miniplates and screws should be performed mainly to treat symptoms caused by the implants. advocated routine removal of stainless steel miniplates after 3 months to prevent interference with jaw function, as miniplates prevent transmission of functional stress to the site, subsequently leading to osteoporosis and weakening of bone. also recommended routine removal of miniplates due to stress shielding effect. In a retrospective study of 279 Champy stainless steel miniplates fixed as permanent implants, Brown et al. challenged this practice of routine removal of stainless steel miniplates 3 or 4 months after insertion. The main reason for the removal of the miniplate in our study was infection at the surgical site. In literature also, the most common indication reported for miniplate removal is infection involving the site. However patient demand is the most common indication as cited in a study (Kennady et al., 1989; Meningaud et al., 2001; Park et al., 2016; Kumar and Rahman, 2017; Jain et al., 2019).

Miniplates are often located in thin submucosa, which results in exposure to traumatic environmental effects. The masticatory forces acting on the miniplates or screws may compromise interfragmentary stability and consequently, screws may loosen resulting in inflammation which increases the possibility of infection. Poor suturing techniques and inadequate bone cooling during the screw hole preparation have also been suggested as causes of miniplate failure due to infection. Patients receiving injuries in road traffic accidents often have contaminated wounds which increases the incidence for miniplate removal in future. The infective course associated with miniplates is normally a well localised reaction within the bone and does not develop osteomyelitis or delayed union. Within the first 6 weeks after fixation, the infection can be managed conservatively by draining the pus out and antibiotic therapy (local as well as systemic) (Islamoglu et al., 2002; Rao and Kumar, 2018; Abhinav et al., 2019).

Table 1. Pearson correlation between parameters (variables).			
S. No.	Variables	Pearson Chi Square value	Sig.
a.	Time gap and indication for removal	9.69	0.04*
b.	Metallic composition and indication for removal	0.31	0.85
с.	Age of patient and indication for removal	4.48	0.61
d.	Number of hardware present	3.06	0.80
	and indication for removal		
e.	Metallic composition and time gap	0.31	0.85

This permits fracture to heal while the bone remains splinted and fixed. Once the fracture is clinically stable and healed, the miniplate may then be removed. If the infection does not involve underlying operated bone, the existing miniplates can generally be preserved by antibiotics, irrigation, debridement and removal of the nidus, such as a necrotic tooth or soft tissue. However, if infection involves bone and bony union has also not occurred, miniplate removal is indicated which may be followed by external fixation and bone grafting. Tooth damage during fixation surgery or involvement of tooth or teeth in the line of fracture at time of trauma led to subsequent development of infection in 4 out of 9 infection-related cases. In 4 infection cases, screw loosening led to infection. Impaired healing due to compromised blood supply. 14% incidence of pain after surgery at or around the site of fixation, whereas reported pain in 24% cases (Bhatt et al., 2005; Rosa et al., 2016; Rao and Kumar, 2018; Abhinav et al., 2019).

In our study, pain was reported to be the cause of miniplate removal in 6 patients (30%). Pain was subsequent to nerve compression by miniplate in two cases; tooth damage, miniplate palpability, malunited condylar fracture and miniplate exposure in one case each. Other symptoms or conditions contributing for miniplate removal include patient request, pediatric growth restriction, prosthetic rehabilitation, miniplate exposure, deformities due to malunion or non-union, tooth extraction, screw loosening, wound dehiscence, palpability, nerve damage, cold intolerance, etc. In our study, only one patient requested asymptomatic miniplate removal and rest of the hardware removal were performed subsequent to associated hardware complications.

In pediatric patients, miniplates should be removed within two to three months after fracture surgery due to the potential of growth restriction. In a four-year retrospective study 912 pediatric patients underwent treatment by conventional methods using metal fixation for maxillofacial fractures. All patients underwent a second surgery to remove the nonresorbable materials 6 - 8 months after the first surgery to prevent long-term growth disturbance. With regard to the length of time from first surgery to miniplate removal, most cases (45%) involved removal within one year. Majority of the miniplate removal, as reported in the literature, occurred within 6 months to 1 year of fixation. A few authors even reported miniplate removal at less than 3 months of fixation. Routine removal of the miniplates should be performed after confirmation of bone healing and principally should be performed between 6 months and a year (Haug et al., 2003; Yamamoto et al., 2015; Conti et al., 2016; Rao and Kumar, 2018; Abhinav et al., 2019).

Most of the miniplates (80%) were removed from mandible. Removal of the miniplate from the mandible was most often performed at the mandibular body and symphysis region. concluded that mandibular angle region is most common site for miniplate removal (39.5%). Author reported 62.85% incidence of involvement of mandible for hardware removal in maxillofacial region. conducted low-vacuum scanning electron microscopy (SEM) and concluded that no distinguishable difference exists in the surface characteristics of either stainless steel or titanium miniplates removed at 4, 12 and 24 weeks after surgery. Energy-dispersive X-ray (EDX) identified aluminium and silicon deposits over the flat surfaces of these miniplates. Hence, it was not evident to support the routine removal of either titanium or stainless steel miniplates subsequent to surface corrosion up to 6 months after implantation (Matthew et al., 1996; Islamoglu et al., 2002; Yamamoto et al., 2015; Park et al., 2016).

In the biologic environment, stainless steel degrades by combination of electrochemical corrosion and wear and titanium degrades mainly due to wear and particle release. Corrosion and wear products (metal ions or particles) may lead to changes in the surrounding tissues, ranging from fibrosis to infection and necrosis. Because of associated complications like corrosion, toxicity, hypersensitivity and stress protection, stainless steel should not be considered as a permanent fixation device in maxillofacial region. However, due to the absence of any untoward reaction of bone and soft tissues, superior corrosion resistance, noncarcinogenicity, hyposensitivity, nontoxicity and excellent tissue compatibility, the removal of titanium hardware, subsequent to their fixation, can be harmlessly avoided and can be retained as permanent implants in maxillofacial region also reported osteolysis and necrosis around stainless steel implants due to electrolysis.

However, we found that the role of metallic composition (either stainless steel or titanium) is negligible as the number of miniplates removed were equal for stainless steel and titanium metal. Intraoperatively, we encountered osseointegration of screws in three cases wherein the metallic composition of hardware was titanium. Linder and Lundskog found that the bone formed around the titanium screws was dense, which might cause difficulty in retrieving the titanium screws being firmly adherent. We found co-relations between indications for miniplate removal based upon time gap, metallic composition, age group and number of miniplates present; and correlation between metallic composition of miniplate and time gap for removal was also determined using Chisquare test (Venable et al., 1937; Linder and Lundskog, 1975; Torgersen and Gjerdet, 1994; Haug, 1996; Rao and Kumar, 2018; Abhinav et al., 2019).

The association between indications for miniplate removal and time gap was found to be statistically not significant. Chi square value was 0.31 and the significance was 0.85(>0.05 time gap had a major role in development of specific symptoms, it was found to be statistically significant. Infection was the common indication for miniplate removal within a time gap of 1 - 2 years. After two years of miniplate fixation, pain and infection led to miniplate removal. Within one year of miniplate placement, other factors were prevalent which led to miniplate removal. However, association between indications for miniplate removal and metallic composition; age group; and number of miniplates present were non-significant. Metallic composition of miniplate, age of patient and number of hardware fixed in first surgery had no role in development of causative factors like pain, infection, etc. Correlation between metallic composition of miniplate and time gap for removal was also determined using Chi-square test and found to be non-significant.

CONCLUSION

Most of the hardware removal is performed subsequent to complications associated with hardware and local factors. There is no significant association between the composition of the hardware and pate removal. However, there is a significant association between the time gap and indication for plate. Miniplate removal should be performed when hardware is causing various complications and physical symptoms. Infection, miniplate exposure, pain, palpability or any other morbidity that appears after bony union should be treated by miniplate removals.

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Assessment of Periodontal Status in Patients with Dental Fluorosis - A Retrospective Hospital Based Study

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ABSTRACT

Dental fluorosis is a defect caused in the enamel of the tooth structure due to more fluoride intake during the developmental stages of teeth. The effect of fluoride on the periodontal tissues remains obscure. Thus, the aim of the study was to retrospectively assess the periodontal status of patients with dental fluorosis who had reported to a private dental hospital. A total of 378 patients who had dental fluorosis were included in the study. Periodontal status, Dean's fluorosis index, oral hygiene index values for all the patients were recorded. The required data was collected and SPSS Software was used to assess the data. Among the study population, 71% of them were males and 29% of them were females. According to the Deans fluorosis index, among the study population, a total of 1.6% of subjects had a score of questionable, 21% of subjects had very mild, 37% of subjects has mild fluorosis, 31% had moderate and around 9% of the patients had severe form of fluorosis. There was no statistically significant association seen between age and the degree of dental fluorosis (p value 0.602). The association between Dean's fluorosis index and periodontal status was found to be statistically not significant. (p value-0.300). The severity of dental fluorosis was more in the gingivitis patients than periodontil significant. Within the limitations of the present retrospective analysis, a possible relationship exists between periodontal disease and degree of dental fluorosis with a male prevalence for dental fluorosis. A mild to moderate degree of dental fluorosis was seen in the majority of the study subjects. The severity of dental fluorosis was more in the gingivitis patients than periodontitis patients, however the results were not statistically significant.

KEY WORDS: FLUOROSIS; GINGIVITIS; ORAL HYGIENE INDEX; PERIODONTITIS.

INTRODUCTION

Periodontitis is a chronic inflammatory disease resulting in the loss of supporting tissues of the teeth. The increase in the various pro-inflammatory cytokines levels have been associated with the etiopathogenesis of the disease. Many local and systemic factors play a significant role in modulating the severity of periodontal disease. One such attributing factor is fluoride. "Dental fluorosis," a specific disturbance in tooth formation and an esthetic condition, is defined as a chronic, fluoride-induced condition, in which enamel development is disrupted and the enamel is hypo mineralized. The dental fluorosis is mainly associated with the defects in the formation of enamel during its

developmental stage. The severity of the porosity on the enamel surface is highly dependent on the concentration of the fluoride in the tissue fluids during tooth formation. Clinically fluorosis appears as whitish spots, or opaque lines or as some striations on the surface of teeth. The brown stains are evident in cases of moderate to severe fluorosis, due to the uptake of extrinsic stains mainly from the diet. The severity of fluorosis also varies from one tooth to another depending on its time of eruption in the oral cavity (Zimmermann et al., 1955; Englander et al., 1963; DenBesten et al., 2011; Khalid, 2017; Varghese et al., 2015; Mootha et al., 2016; Khalid et al., 2016; Singh et al., 2018).

The effect of fluoride on dental caries has been well established. Various human studies which have analysed the effect of elevated fluoride in drinking water on gingivitis and periodontitis have shown inconsistent results. The effects of fluoride on periodontal tissues have also been controversial, Studies to assess the periodontal status in fluorosis subjects have been done in few parts of the country. Vandhana et al conducted a study at high fluoride belts of Davangere District, Karnataka State, India, they showed a strong association between periodontal diseases with high



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fluoride water in a population of 15-74 years (Massler et al 1951; Drummond et al., 1993; Grembowski et al., 1993; Bergstrom, 2003; Vandana et al., 2007; Molina-Frechero et al., 2012; Chopra et al 2016; Pritma et al 2020).

Previously our team has a rich experience in working on various research projects across multiple disciplines (Gheena and Ezhilarasan, 2019; Ke et al., 2019; Malli et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Sharma et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project. Pritma et al clearly stated that although the effect of fluoride on caries has been extensively discussed but the effect of fluorosis on the periodontium yet remains unclear (Pritma et al 2020). The exact mechanism and the relationship between dental fluorosis and periodontal disease remains obscure, thus the present study aims to assess the periodontal status of dental fluorosis patients retrospectively.

MATERIAL AND METHODS

The retrospective study was carried out by the analysis of the patients records from June 2019-March 2020. The study design was reviewed and approved by the ethical committee of Saveetha Institute of Medical and Technical Sciences (SIMATS). Prior permission to utilize the data from the university and ethical board number was obtained from the institution. The data from 378 patients who were diagnosed with Dental Fluorosis at SIMATS were included in this study. Case sheets with incomplete data were excluded from the study. Demographic details such as patient identity number (PID. No), age and sex were recorded. Periodontal parameters such as bleeding on probing, probing pocket depth, clinical attachment level was obtained from the patient records.

The oral hygiene status was assessed using the simplified - oral hygiene index (Greene and Vermillion 1964). The severity of fluorosis was assessed by Dean's fluorosis index (Trendley Dean 1942). Patients with Aggressive periodontitis, smoking, those with previous history of periodontal surgery, and presence of any other systemic disease were excluded from the study. Based on the severity of the periodontal disease the patients were categorised into those who had generalised chronic gingivitis, patients with localised chronic periodontitis. The data obtained analysed using statistical software SPSS version 23.0 (Statistical Package for The Social Sciences). Chi-square test was used to study association between the parameters. The results were considered to be of statistical significance if p < 0.05.

RESULTS AND DISCUSSION

A total of 378 patients with dental fluorosis was included in this retrospective analysis. Majority of the subjects (84%) were in the age group of 14 to 34 years, whereas the remaining 15% of patients were in the age group of 35 to 50 years and only 1 % of the subjects were within the age group of 50- 55 years (Figure 1). Among the study population, 71% of them were males and 29% of them were females (Figure 2). The oral hygiene status of the study subjects was analysed using the OHI index. 45% of patients had good oral hygiene, 47% of patients had a score of fair and the remaining 8% of patients had poor oral hygiene (Figure 3). Based on the periodontal diagnosis, the majority (73%) of the subjects had generalised chronic gingivitis, 20 % had localised chronic periodontitis and the remaining 7 % of patients were diagnosed with generalised chronic periodontitis (Figure 4).

Figure 1: This graph represents the percentage distribution of different age groups of the study subjects, where X axis denotes age and Y axis denotes number of patients. Grey colour denotes age distribution of 14-34 years of age, Blue colour denotes age distribution of 35-55 years of age and Green colour denotes age distribution of 55-80 years of age. Majority of patients are in the age group of 14-34 years of age (83.86%) followed by 35-55 years of age (14.81%) and 55-80 years of age (1.32%).



Figure 2: This graph represents the percentage of gender distribution among the study population, where X axis denotes Gender criteria and Y axis denotes number of patients. Grey colour denotes Male and Blue colour denotes Female. There were more number of male subjects (71.43%) than females (28.57%).



According to the Deans fluorosis index, among the study population, only 1.6 % of subjects had a score of questionable, 21% of subjects had very mild,37% of subjects had mild Fluorosis, 31%had moderate fluorosis and around 9% of the patients had severe form of fluorosis

(Figure 5). The association between age and periodontal status was found to be statistically significant. (p value-0.000) Thus patients in the younger age group (14-34 years) had predominantly generalised chronic gingivitis whereas the older age group (55-80 years) had generalised chronic periodontitis (Figure 6).

Figure 3: This graph represents Oral hygiene index score values among the study population, where X axis denotes oral hygiene index and Y axis denotes total number of patients. Grey colour denotes Good, Blue colour denotes Fair and Green colour denotes Poor. The oral hygiene status was good in 45.77% of patients, fair in 47.35% of patients, whereas only a smaller percentage of 6.88% had poor oral hygiene.



Figure 4: This graph represents Periodontal status of the study subjects, where X axis denotes Periodontal diagnosis and Y axis denotes number of patients. Grey colour denotes Generalised chronic gingivitis, Blue colour denotes Generalised chronic gingivitis with localised chronic Periodontitis and Green colour denotes Generalised chronic Periodontitis. Generalised chronic gingivitis (73.81%) was predominantly seen among the subjects with lesser percentage of Generalised chronic gingivitis with localised chronic Periodontitis (20.63%) and Generalised chronic Periodontitis (5.56%)



There was no association seen between age and the degree of dental fluorosis. (p value 0.602). However, people in the age group of 14-34 years were predominantly diagnosed with dental Fluorosis when compared with the other age groups (Figure 7). The association was found between Dean's fluorosis index and oral hygiene index was not

statistically significant (p value-0.051). The subjects with good oral hygiene had very mild forms of fluorosis followed by subjects with fair oral hygiene had moderate type of dental fluorosis and those who had poor oral hygiene had severe forms of dental fluorosis (Figure8).

Figure 5: This graph represents the distribution of Dean's Fluorosis index among the subjects, where X axis denotes Dean's Fluorosis index and Y axis denotes number of patients. Grey colour denotes Questionable, Blue colour denotes Very Mild, Green colour denotes Mild, Red colour denotes moderate and Orange denotes severe. From this figure we can infer that mild (37.30%) and moderate (30.95%) degrees of dental fluorosis were predominantly seen among the study subjects.



Figure 6: This bar graph depicts the relationship between age and periodontal status of the study population, where X axis denotes age groups and Y axis denotes the number of patients. Grey colour denotes Generalised chronic gingivitis, Blue colour denotes Generalised chronic gingivitis with localised chronic Periodontitis and Green colour denotes Generalised chronic Periodontitis. Chi square test was done and the association between age and periodontal status was found to be statistically significant. (Pearson's Chi square value: 43.33, df - 4, p value-0.000) Thus patients in the younger age group (14-34 years) had predominantly generalised chronic gingivitis whereas the older age group (55-80 years) had generalised chronic periodontitis (p value less than 0.05).



Figure 7: This graph represents the relationship between age and Dean's Fluorosis index among the subjects, where X axis denotes age groups and Y axis denotes number of patients. Grey colour denotes Questionable, Blue colour denotes Very Mild, Green colour denotes Mild, Red colour denotes Moderate and Orange colour denotes Severe. Chi square test was done and the association between age and dental fluorosis was found to be statistically not significant. (Pearson's Chi square value:6.408, df - 8, p value-0.602) Thus there is no association seen between age and the degree of dental fluorosis.(p value not less than 0.05). However, subjects in the age group of 14-34 years were predominantly diagnosed with dental Fluorosis when compared with the other age groups.



Figure 8: This graph represents the relationship between Dean's fluorosis index and Oral hygiene index (OHI) among the subjects, where X axis denotes Oral hygiene index and Y axis denotes number of patients. Grey colour denotes Questionable, Blue colour denotes Very Mild, Green colour denotes Mild, Red colour denotes Moderate and Orange colour denotes Severe. Chi square test was done and the association between Dean's fluorosis index and Oral hygiene index was not found to be statistically significant. (Pearson's Chi square value: 15.466, df - 8, p value-0.051). Majority of patients with dental fluorosis had good to fair oral hygiene index values and only a small percentage had poor oral hygiene maintenance, however the results were not statistically significant. (p value not less than 0.05)



Figure 9: This graph represents the relationship between Dean's fluorosis index and periodontal status among the subjects, where X axis denotes periodontal status and Y axis denotes number of patients. Grey colour denotes Questionable, Blue colour denotes Very Mild, Green colour denotes Mild, Red colour denotes Moderate and Orange colour denotes Severe. Chi square test was done and the association between Dean's fluorosis index and periodontal status was found to be not statistically significant (Pearson's Chi square value:9.520, df - 8, p value-0.300). Thus, the severity of dental fluorosis was more in the gingivitis patients than periodontitis patients however, the results were not statistically significant. (p value not less than 0.05)



The association between Dean's fluorosis index and periodontal status was found to be statistically not significant.(p value-0.300). The severity of dental fluorosis was more in the gingivitis patients than periodontitis patients, however the results were not statistically significant (Figure 9).

In the present study the prevalence of dental fluorosis was higher in males (71%) than females. This was in accordance with the study done by Vandhana et al and Kumar et al. In the present study majority of the study subjects had only gingivitis (73%), similar observations were concluded by few other authors. The prevalence of periodontitis was low in the present study, with about 20 % of subjects having localised chronic periodontitis and the only 7% of patients had generalised chronic periodontitis. Our findings are similar to the study done by Kumar et al with an overall lesser prevalence (12.3%) of periodontitis in dental fluorosis patients (Haikel et al., 1989; Kumar et al., 2007; Vandana et al., 2007; Chopra et al 2016; Pritma et al 2020).

Age is considered to be an important risk factor for periodontitis. In the present study, the majority of the patients who had fluorosis were in the age group of 14-34 years. Drummond et al conducted a study on the age group of 15-65 years, found that gingivitis and gingival recession to be more prevalent in high-fluoride areas than low-fluoride areas. Grembowski et al suggested that fluoridation has minimal beneficial effects on periodontal health when compared with adults who had no exposure. In the present study both males and females had been affected with gingivitis and periodontitis. There was a male predilection for periodontitis than females, as observed by Kumar et al. However, Vandana et al reported that females predominantly had periodontitis than males. Murray et al found gingivitis to be more prevalent in high-fluoride areas despite good oral hygiene. (Murray et al., 1972; Drummond, 1993; (Grembowski et al., 1993; Kumar et al., 2007; Vandana et al., 2007; Chopra et al 2016; Pritma et al 2020).

Although the role of dental plaque as a causative factor remains undoubted, the susceptibility of patients to develop periodontitis depends on many factors. The effect of fluoride on the periodontal tissues remains controversial. Possible reasons for fluorine being a contributing factor for the development of periodontitis have been reported in few animal studies. An animal study on cattle revealed that fluoride intoxication resulted in hypercementosis. The toxic effect of fluoride results in cementum necrosis and also to cyst formation. Osteonecrosis of the alveolar bone and recession of gingiva has been observed due to fluoride intoxication. Gross examination of teeth with mottled enamel, revealed that the root surfaces were irregular, with heavy deposits of calcified marks in the form of excessive amounts of fluoride or osteo cementum at the apical region of the teeth. A scanning electron microscopic study of human fluorosed and non fluorosed teeth reported partial mineralization of connecting tissue fibers and also presence of globular mineralized deposits in the healthy fluorosed teeth (Maylin and Krook, 1982; Maylin and Krook, 1982; Singh et al., 1962; Singh et al., 2018).

When comparing the periodontal status with dental fluorosis, the results did not show a statistically significant association. This could be attributed to the smaller sample size of the study population. However, the severity of dental fluorosis was more in the gingivitis patients than periodontitis. Kumar et al concluded that the severity of periodontal disease decreased as the degree of fluorosis increased, suggesting that when the fluoride level in the drinking water ranges from 1.83 to 2.01 ppm, fluoride in water is beneficial to the periodontal tissues. On the contrary, Vandana et al found that as the degree of fluorosis increased, severity of gingivitis reduced and periodontitis increased, suggesting a strong association between dental fluorosis and periodontitis. Our institution is passionate about high quality evidence based research and has excelled in various fields (Vandana et al 2007; Kumar et al., 2007; Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020). We hope this study adds to this rich legacy.

Thus, from various literature evidence high-fluoride water levels can result in cemental necrosis, osteosclerosis and calcification of periodontal ligaments. Contrary to this, fluoride has some antibacterial effects on microorganisms and also has a role in the treatment of periodontal disease. Thus it still remains controversial whether fluorosis is a boon or bane to periodontitis. Further longitudinal studies assessing the effects of fluorosis on periodontitis patients is needed. The periodontal status of patients in various high fluoride different parts of India should be carried out in future. This might help understand the disease and aid its management as a large part of world including India millions are still affected with fluorosis (Massler and Schour, 1951; Ranade, 1981).

CONCLUSION

Within the limitations of the present retrospective analysis, a possible relationship exists between periodontal disease and degree of dental fluorosis. Based on our study observations, a male prevalence was seen and people in the age group of 14-34 years were predominantly diagnosed with dental fluorosis when compared with the other age groups. A mild to moderate degree of dental fluorosis was seen in the majority of the study subjects. The severity of dental fluorosis was more in the generalised chronic gingivitis patients than generalised chronic periodontitis patients, however the results were not statistically significant.

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Pulpectomy In Mandibular Ist and IInd Primary Molars with Distal Caries

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ABSTRACT

Pulpectomy is a root canal procedure for pulp tissue which is irreversibly inflamed or necrotic. The root canals are debried, cleaned and shaped and obturated with resorbable materials. It prevents the premature loss of primary teeth. The aim of this study is to evaluate the pulpectomy procedure done in mandibular primary molars with distal caries who visited Department of Pedodontics. A retrospective study was carried out in patients who visited Saveetha Dental College. The data were collected from patients records between July 2019-March 2020. The collected data were entered in an Excel sheet and subjected to statistical analysis using SPSS software. The results has shown that 4&6 years old children (35% and 40%) have highly undergone pulpectomy procedures. About 55% mandibular second primary molars are mostly affected with distal caries and underwent pulpectomy. The study concludes that mandibular 2nd primary molars are highly affected with distal caries. Early detection of caries can prevent premature loss of teeth and provide excellent prognosis

KEY WORDS: DENTAL CARIES; MANDIBULAR PRIMARY MOLAR; NECROTIC PULP; ORAL HEALTH; PULPECTOMY.

INTRODUCTION

Oral health plays an important role in the general wellbeing of individuals and parents behaviour and attitude influences the oral health of their children. Dental caries is a complex process of demineralisation and dissolution of the substance of the teeth leading to cavitation. It is a multifactorial disease with Streptococcus mutans is the major contributor in the development of dental caries. Use of fluoride toothpaste reduces dental caries in school aged children and also associated with dental fluorosis (Wright et al., 2014; Somasundaram et al., 2015; Gurunathan and Shanmugaavel, 2016; Subramanyam et al., 2018; Joshi and Dixit, 2018; Nikita et al., 2021).

Pediatric endodontics is an important part in dental practice which aims to preserve the function of primary teeth. Pulp therapy in primary dentition is complex and



challenging topic which involves numerous procedures and use of different materials. An efficient chemomechanical preparation is essential for effective canal disinfection and contributes to the success of the endodontic procedure. The goal of root canal therapy is the elimination of infected tissue and prevention of apical tissue. The Main objective of pulp therapy in the primary dentition is retain every primary tooth as fully functional component in dental arch. This helps in proper mastication, phonetion, swallowing, preserving space for permanent teeth and prevents the psychological effects due to tooth loss. Two types of pulp therapy are pulpotomy and pulpectomy. Pulpotomy means surgical removal of the entire coronal inflammation of pulp and leaving vital radicular pulp intact within the canal. In case of irreversibly inflamed and necrotic radicular canals, pulpotomy procedures cannot be done (Razi, 1999; Dummett, 2002; Ounsi et al., ;2009; Govindaraju, 2017a; Govindaraju, 2017; Nagaveni et al., 2018; Panchal et al., 2019; lakhsmi et al., 2021)

Pulpectomy is a conservative treatment approach to preventing the premature loss of primary teeth that can result in loss of arc length, insufficient space for erupting permanent teeth, impaction of premolars and mesial tipping of molar teeth. The retained molar can act as functional components in dental arch. An appropriate pulpectomy of primary molars rather than extraction is reasonable treatment



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option to ensure either normal shedding, eruption of the successor or long-term survival. The premature loss of each primary tooth led to an 18% increase in the orthodontic treatment need in the permanent dentition (Berk and Krakow, 1972; Ahmed, 2013; AL-Attiya et al., 2021).

Primary teeth play an imperative role in the self-esteem of the pre-school children and also plays a pivotal role in speech development, esthetics and function. Primary mandibular first molars usually have two roots and three root canals and the format of accessory roots is uncommon sometimes. It has four root canals. Primary mandibular second molars have two roots and three root canals with formation of accessory roots is uncommon. The occurrence of an extra distal root in these molars in rather considered a racial characteristic of certain native Indian and mongoloid population. Untreated carious teeth, carious pulp involvement, pulpotomy, pulpectomy lead to higher occurrence of IRR in primary teeth (Liu et al., 2010 Mokhtari et al., 2013; Ravikumar et al., 2017; Musale et al.,2021).

Previously our team has a rich experience in working on various research projects across multiple disciplines (Gheena and Ezhilarasan, 2019; Ke et al., 2019; Malli et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Varghese et al., 2019; Venu et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project. The aim of this study is to evaluate the pulpectomy procedure done in mandibular primary molars with distal caries. Accumulation of fat in the arterial walls also leads to atherosclerosis (Khalil et al., 2018, Al Amri et al., 2019, Alasnag et al., 2020).

MATERIAL AND METHODS

A retrospective study was carried out among young children reporting to the Department of Pedodontics. The study was conducted between July 2019-March 2020. The study population consists of young children who had distal caries in mandibular primary molars and underwent pulpectomy. Inclusion criteria includes patients underwent pulpectomy procedures in mandibular primary molars and distal caries. Exclusion criteria includes patients underwent pulpectomy procedures other than mandibular primary molars and class 1 caries, mesial caries and mesiodistal caries.

Ethical approval was obtained from the Institutional Ethical Committee and Scientific Review Board of Saveetha University SDC/SIHEC/2020/DIASDATA/0619-0320. The data were collected from patients records between July 2019-March 2020. The data comprises 20 patients who were reported with distal caries in mandibular primary molars and undergone pulpectomy. The data includes patient's age, gender, tooth number. The data collected were entered in an Excel sheet and defined for statistical analysis using SPSS software. A chi square test was between age and gender, age and tooth number and gender and tooth number. Independent variables

are age and gender while dependent variables are teeth numbers. The results were formulated in graphs.

RESULTS AND DISCUSSION

Controlling patient's anxiety adequately is an integral part in the practice of dentistry. Dental students aggravate patient's distress during dental procedures. Pulpectomy is procedure to preserve the primary teeth in symptom free state until they are replaced by successor naturally during transition period. It re-establishes the masticatory function, esthetics and also prevent the harmful tongue habits and speech alterations. Our aim in this study was to find out no of patients undergone pulpectomy in mandibular primary molars with distal caries.Out of 20 patients,13 were males (65%) and 7 were females(35%) (figure1). About 35 % and 40% were 4- and 6-years old patients were highly affected with distal caries and underwent pulpectomy (figure 2) (Aishwarya and Gurunathan, 2017).

Figure 1: Pie chart depicts the distribution of study population based on gender. It shows that more number of male patients (purple) (65.00%) were diagnosed with distal caries and underwent pulpectomy.



Based on age and tooth number distribution, pulpectomy undergone age is 4 & 6 years (35% and 40%) followed by 7 year (10%) and 3,5,8 years (5%). Among 4& 6 years old patients, mandibular second primary molars (75-25%, 85-30%) are mostly affected and least affected is mandibular first primary molars. Association between age and teeth number found be statistically insignificant (figure 3).

Based on gender and tooth number distribution, most commonly undergone gender group is male about 65%. Among male patients, mandibular 2nd primary molars (75-25%, 85-15%) are most commonly affected with distal caries which was statistically insignificant (figure 4).

There are no previous studies for specific surface and specific teeth affected by dental caries. Another reliable research is included. A study done by Nagarathna et al concludes that both the hand held lentulosprial and modified disposable syringe technique are effective in obturation of primary molars root canals. A study done by Divya et al concludes that Kedo-S pediatric rotary file system shows considerably better quality of obturation when compared to that of K3 rotary and hand K file systems. A study done by Ahsana et al concludes that Hand files produced more apical debris extrusion than ProTaper and Kedo-S files. A study done by Lavanya et al concludes that about 50% of the practitioners used rotary instrumentation of root canals in primary teeth . ProTaper was the commonly used rotary system in primary teeth CS-B (calcium silicone based) biomaterial, can be a reliable approach for the treatment of irreversible pulpitis of vital primary molars (Subramanian, 2017b; Vishwanathan et al., 2018; Divya et al., 2019; Asif et al., 2019; Asgary et al.,2021)

Figure 2: Bar chart showing the distribution of study population based on gender. X-axis represents age and Y-axis represents number of patients. From the graph we found that 4 & 6 (green colour denotes 4 and red colour denote 6) year old patients (35.00% & 40.00%) were highly diagnosed with distal caries and underwent pulpectomy.



Figure 3: This bar graph represents the association between age and teeth number among the study population. X-axis shows the age distribution and Y-axis shows the number of patients. Association between age and teeth number was done using Chi-square test (p value=0.474) and was found to be statistically insignificant. It shows that 4- & 6-years old patients had undergone pulpectomy mostly in mandibular second primary molars 75 (red colour-25%) & 85 (orange colour-30%) and least affected is mandibular first primary molars 74(blue colour-10.00%) and 84 (green colour-10.00%).



A study done by Mebin et al concludes that the total occurrence of three rooted primary mandibular first molars is about 1.3%, most frequently supernumerary root located histologically. A study done by Ganesh et al concludes that The Kedo-S rotary file system and Kedo-S hand file system can be used as an effective tool for root canal preparation in primary teeth. A study done by Pramila et al concludes that RC Fill, Vitapex and Pulpdent were found to be effective root filling materials for primary molars with necrotic pulps and irreversible pulpitis. A study done by Dhanalakshmi et al., concludes that the prevalence of early loss of primary teeth was present predominantly in male children (54.64%) in comparison to female children (43.35%) which was statistically significant (P = 0.03). The most commonly affected were the mandibular teeth (58.63%), the most common tooth being the first molar (44%) followed by second molar (33%) (Pramila et al., 2016; Mathew and Soni, 2019; Jayachandar et al., 2019; Jeevanandan et al., 2019; Nikita et al.,2021).

Figure 4: This bar graph represents the association between gender and teeth number among the study population. X-axis shows the gender distribution and Y-axis shows the number of patients. It shows that male patients had undergone pulpectomy mostly in mandibular second primary molars 75 (red colour-25%) and 85 (orange colour-15%) are mostly affected and least affected is mandibular first primary molars 74(blue colour-10.00%) and 84(green colour-15.00%). Association between gender and teeth number was done using Chi-square test (p value=0.319) and was found to be statistically insignificant.



A study done by Ganesh et al concludes that Kedo -s rotary files was effective during root canal preparation of primary teeth with reduction in instrumentation time and better quality of obturation. A study done by Manisha et al concludes that least post-operative pain was found in Mtwo group followed by Kedo-s group and K-fle group. in her study states that the most predominant pulp therapy procedure done was found to be the pulpectomy with a percentage of 90%. Failures reasons for failures of pulp treated primary teeth include: The incomplete coronal pulp tissue removal and in particular the poor seal at the proximal step by the final restoration whether it be an amalgam, composite resin or a stainless steel crown restoration (Nair et al., 2018;

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Jeevanandan and Govindaraju, 2018; Kiran et al.,2021; Nikita et al.,2021).

Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020). We hope this study adds to this rich legacy. The main limitation of this study is limited geographic location and confined to limited sample size. This can be corrected by conducting the study in different states, different universities.

CONCLUSION

Within the limitations of the current study, 4 & 6-yearold patients are highly affected with distal caries which leads to pulpectomy treatment. Mandibular second molar are most commonly affected. Early detection of caries can prevent premature loss of teeth and provide excellent prognosis. Adequate knowledge on root anatomical variations, usage of instruments, obturation techniques are essential prior to doing pulpectomy procedures in exfoliating or retained primary molars.

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Malocclusion in Children With and Without Cleft Lip - A Case Control Study

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ABSTRACT

There is a principle agreement that malocclusion is a major health concern as it is the third most common oral disease, next only to dental caries and periodontal disease. As it is a major challenge for even normally abled children to handle these problems, questions arise as to the difference in the extent or severity of manifestation of malocclusion in the oral cavity of patients with cleft lip. The aim of the study was to determine the prevalence of malocclusion in children with and without cleft lip. A total of 89000 cases were reviewed between June 2019 to March 2020 for incidence of malocclusion in individuals with and without cleft lip only. A sample size of 3 case sheets were reviewed for malocclusion in children with cleft lip only. The data was obtained from dental treatment records of a private dental institute. Data was analysed using SPSS software and Mann-Whitney was done. The results showed that children with cleft lip showed higher incidence of malocclusion (100%) when compared to children without cleft lip (67%). Higher prevalence of malocclusion was noticed in the case group (children with cleft lip) when compared to the control group (children without cleft lip) (p = 0.18). Within the limitations of the present study, children with cleft lip showed higher incidence of malocclusion that he control group.

KEY WORDS: CLEFT LIP; MALOCCLUSION; ORAL HEALTH; PREVALENCE.

INTRODUCTION

Malocclusion is a problem affecting the teeth where there is misalignment of those teeth in relative to a normal alignment. Some of the most common dental malocclusion includes crowding, overbite, underbite, open bite, crossbite, malocclusion of the anteroposterior plane which are Class II and III, and skeletal malocclusion. These are the most commonly occurring deviations of the teeth from the ideal occlusion. Malocclusion has been identified as the third most common dental health problem, following dental caries and periodontal disease with a global prevalence that varies from 20 to 80 percent. A study conducted in Rajasthan, India reported prevalence rate of 36.42 percent and another in



the state of Tamil Nadu, India showed a prevalence rate of 15 percent. In this existing study, alteration to the shape of jaw that is also a reason for malocclusion was focused on, in a particular cleft lip case (Dhar et al., 2007; Mtaya et al., 2009; Shivakumar et al., 2010).

Orofacial clefts or cleft lip and/or palate are opening or splits in the upper lip, roof of the mouth (palate) or both. Orofacial clefts are oral and facial malformations that occur very early in pregnancy, during the development phase inside the uterus. The lip forms between the fourth and seventh weeks of pregnancy. A cleft lip can be on one or both sides of the lip or in the middle of the lip, which occurs very rarely. Children with a cleft lip also can have a cleft palate. They are grouped into unilateral or bilateral and occur when tissues of the face and mouth fail to fuse with each other. The cause is believed to be an interaction of genetic and environmental factors, though in many cases, a definite cause is yet to be established.

Cleft lip and/or palate is a crucial public health problem affecting 1 in every 500 to 1000 births worldwide according to a World Health Organization study conducted back in 2001.



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The number of children born every year with cleft lip and/or palate is 28 000 approximately in India alone, amounting up to a significant number of 78 births per day of babies with some form of cleft. Children's with cleft, amongst social and psychological problems, also face physical difficulties in the form of function, feeding, dental problems, speech, and aesthetics. Among these complications, dental problems, in particular malocclusion, is a major drawback. Previous studies, regarding malocclusion in patients with cleft lip and/ or palate reported that they were more prevalent and severe in cleft lip and/or palate patients when compared to noncleft lip and/or palate patients. In a study by Akshay et al., reported that prevalence of Class II and III, a malocclusion along the horizontal plane, was more prevalent in cleft lip and/or palate patients when compared to non-cleft lip and/ or palate patients (Vettore et al., 2011; Gupta et al., 2016; Heliövaara et al., 2021; Kalaskar et al., 2021).

Due to malocclusion, there will be higher chances of dental caries which eventually lead to pulpal involvement, there by leading to treatment such as extractions or rotary endodontics To reduce the incidence of dental caries ,proper oral hygiene measures like proper tooth brushing ,frequent application of topical fluoride will help in reducing dental caries in such patients. (Somasundaram et al., 2015; Gurunathan and Shanmugaavel, 2016; Ravikumar et al., 2017; Subramanyam et al., 2018; Lakshmanan et al., 2020; Govindaraju et al., 2017; Govindaraju et al., 2017; Jeevanandan and Govindaraju, 2018; Govindaraju and Gurunathan, 2017; Jeevanandan, 2017; Ramakrishnan and Bhurki, 2018).

Previously our team has a rich experience in working on various research projects across multiple disciplines (Gheena and Ezhilarasan, 2019; Ke et al., 2019; Malli et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Varghese et al., 2019; Venu et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project.

This study was aimed to determine the prevalence of malocclusion in children with cleft palate only and to establish if there is a positive association between the patients with cleft palate and occurrence of malocclusion. This knowledge can be used to educate the parents of cleft patients so that they can be better prepared to provide proper care for their children and also to prompt dentists to consider malocclusion as a plausible complication in the future, thus being able to procure a more efficient treatment plan.

MATERIAL AND METHODS

Study setting for the current retrospective study was a hospital-based University setting. Institute's ethical committee provided the ethical approval for this study (ethical approval number: SDC/SIHEC/2020/DIASDATA/0619-0320). Consent were obtained from patients/guardians to use treatment records for research purposes at the time of patient entry. 89000 dental case records were collected from the university from June 2019 to March 2020. The inclusion criteria for the current study were 3-17-year-old children with cleft lip, complete intraoral examination data including the case sheet and photographs of the patient. Age and gender matched controls were taken according to the obtained cases in the study group. Incomplete and/or censored dental records and missing photographic evidence of cleft lip and clinical findings were excluded.

A reviewer, a guide and a researcher examined ad reviewed the collected data from case sheets. An additional reviewer cross checked the data. To minimise sampling bias, simple random sampling was done for data collection. The examiner was trained to assess and add data of malocclusion as present or absent for both case and control group by tabulation using excel software and even the type of malocclusion was noted. Data analysis was done using SPSS PC Version 23.0 (IBM;2016) software for statistics. The incidence of malocclusion for both case and control group were compared by Mann-Whitney U Test.

RESULTS AND DISCUSSION

Study population consisted of 6 children totally, divided equally into case and control group (Figure 1). In the case group, the case sheet of all 3 children were reviewed, in which 2(33.3%) were males and 1(16.67%) was a female. In the control group, there were also 2(33.3%) males and 1 (16.67%) female. The gender distribution in the control group was age and gender matched to the case group (Figure 2). Children in the control group had 2 children with malocclusion, in which, 1 (16.6% of the total samples) patient had crowding, 1 (16.6% of the total samples) had scissors-bite, while 1 (16.6% of the total samples) had normal occlusion. In the case group, all 3 children (50% of the total samples) had scissor-bite (Figure 3). Case group had a higher prevalence of malocclusion when compared to the control group, which was not statistically significant (p-value = 0.18).

Figure 1: The graph bar shows case distribution in the case group and the control group. (X-axis represents presence or absence of cleft lip; Y-axis represents number of cases) Notice the equal distribution of cases for both the case group and control group.



Figure 2: Bar graph representing gender distribution in the case group and the control group. (Y-axis represents number of cases; X-axis represents presence or absence of cleft lip; lighter grey represents males and darker grey represents females) Notice the equal distribution of cases based on gender in both the case and control groups.



Figure 2: Bar graph shows the comparison of type of malocclusion in the case group and the control group. (Y-axis represents a number of cases; X-axis represents the presence or absence of cleft lip; Blue color represents absence of malocclusion; green color represents cross bite; yellow color represents crowding; violet color represents spacing). Children in the control group had two children with malocclusion, in which one patient had crowding, one had crossbite, while one child did not have malocclusion. In the case group, all three children had crossbite. Higher prevalence of malocclusion was noticed in the case group when compared to the control group. (Mann-Whitney U-Test; p-value = 0.18 - not significant)



The importance of identifying these malocclusion in children cannot be emphasized enough as they do not only have aesthetic concerns but also function and oral health. (Panchal et al., 2019) This is an added disadvantage for cleft lip patients due to their variation in jaw shape and size as reported in a study. There were no significant differences in gender between groups, though more females were recruited in both the sample groups; 56 percent, as opposed to findings that documented more male predilection for cleft lip and/ or palate. This might be due to the small sample size of this study. The present study data supports that children with cleft palate have a higher incidence of malocclusion compared to the non-cleft palate group. The mean rank for malocclusion in the case group was 12.17 and 24.83 in the control group with a Mann-Whitney test value of 48.00. A supportive study (Maciel, Costa and Gomide, 2005; Akcam et al., 2008; Vettore and Sousa Campos, 2011; Ramakrishnan and Bhurki, 2018).

In 2011 on 117 subject samples reported that individuals with cleft lip and/or palate had higher incidence and more severe form of malocclusion as compared to non-cleft lip and/or palate. As theorised in a study prior, alteration in the dimensions of the jaw may be a Possible explanation as to why malocclusion is more prevalent in cleft lip and/or palate group. Sometimes, due to the poor oral health condition of cleft patients, the children develop dental caries which leads to loss of tooth structure followed by drifting of teeth eventually ending in malocclusion. The unusual tongue placement/movement which also leads to altered pattern of swallowing or poor swallow reflex has also been theorized as a major factor for malocclusion as the tongue plays an important role in guiding the teeth into occlusion. (Chopra et al., 2014; Vignesh and Sharmin, 2018; Hou, 2020)

Malocclusion like crowding and spacing due to alteration in the dimensions of the jaw, making them relatively larger or smaller as compared to the teeth size, as we know, also supports this fact. The study done by Baek et al. also revealed an affinity between the varying types of orofacial clefts and malocclusion. Hopefully more studies are employed in the future to determine or correlate the types of malocclusion in variation of cleft lip and/or palate groups. As mentioned by Zhou et al., genetic disturbances in the embryonic period, along with genetic interactive pathways could be another explanation as to why malocclusion is more prevalent in cleft lip and/or palate group, as it is already theorised for being a factor that causes cleft lip and/or palate, thus making it a possibility (Baek, 2002; Zhou et al., 2016).

Malocclusion, besides being a major concern by itself, is also a catalytic factor for the development of dental caries due to presence of areas prone for accommodating dental plaque. Our institution is passionate about high quality evidence based research and has excelled in various fields (Ranta, 1986; Subramanyam et al., 2018; Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020). We hope this study adds to this rich legacy.

This study will help to provide knowledge for better educating the people, especially the parents of children with cleft, on malocclusion and the need for seeking treatment. Studies like this could aid dentists who are predominantly handling cleft lip and/or individuals, to predict malocclusion that may occur along the course of treatment so that they may be able to prepare themselves or incorporate minor prophylaxis treatment also in the treatment plan for these

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patients which could prove to be cost and time efficient. To procure a more efficient treatment plan, this knowledge could help dentists to achieve an accurate diagnosis (Christabel and Gurunathan, 2015; Packiri et al., 2017).

The limitation of this study was that it is a unicentric study which is limited to only one population visiting the private institute. Besides that, the geographic restrictions and lower external validity were also another drawback of this study. The advantage of this study is that we get to collect reasonable data as it is a case control study, with high internal validity. However, this study can be improved by making it a multicentric study with different parameters to measure which will improvise future studies.

CONCLUSION

Within the limitations of the present study, the incidence of malocclusion was found to be higher in cleft patients when compared to non-cleft palate patients. Based on the findings of the study, there is a significant difference on malocclusion incidence between cleft palate and non-cleft palate patients.

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Assessment of Association Between Arch Shape and Dental Malocclusion Among Out Patients in A Private Dental Setup- A Retrospective Study

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ABSTRACT

Arch shape reflects the underlying shape of the basal bone, which is predetermined for every individual. It cannot be altered unless a surgical procedure is performed to permanently change the size and shape of jaws. Deviation from the ideal features of occlusion results in malocclusion in the dental arches. The purpose of the present study was to evaluate the relationship between the arch shape and dental malocclusion classified based on angles classification of malocclusion. Samples in the age group of 18-50 years were collected from among the out-patient records. Similar number of samples (100) were chosen in each of the subgroups based on the angle classification. Arch shape in each of the samples were analysed and tabulated. Patient intraoral pictures were used for this purpose. Pearson's Chi square test was done to find the association between the type of dental malocclusion and arch shape. Results of the study revealed that class I and class II Division malocclusion was predominantly associated with U shaped arches, whereas Class II division 1 malocclusion was associated with V shaped arches and Class III malocclusion with square shaped dental arches. The results showed that there is an association between the type of malocclusion and shape of the dental arches and hence planning for correction of any malocclusion should be made unique specifying the shape of the dental arches.

KEY WORDS: ANOMALIES, ARCH SHAPES, MALOCCLUSION, MAL RELATIONSHIP.

INTRODUCTION

Deviation from the ideal features of occlusion results in malocclusion in the dental arches. Dental malocclusion was originally classified by many authors, of which the Angles classification is the most accepted. Based on the angle's classification, inter-arch relationship can be broadly classified as Class I, Class II Division 1 and 2 and class III. Numerous experts for more than a hundred years now have offered descriptions of the shapes and the sizes of maxillary dental arches. The first classification for dental arch forms proposed three main forms – narrowed, square and oval. At the same time, research data and clinical observations suggest that maxillary dental arch forms in humans can



be described with considerable diversity (Dunn, 1937; Weinstein and Zientz, 2016; Ke et al., 2019; Sathish and Karthick, 2020).

The dental arch, an important element in orthodontics, is a fundamental principle in orthodontic planning and therapy. A dental arch form is initially established by the configuration of the bony ridge and then by tooth eruption, perioral muscles, and intraoral functional forces. Even though most patients with a malocclusion have an altered dental arch form, the alterations achieved with mechanics during orthodontic treatment should not affect the balance between bone and dental and muscular structures; the arrangement of these structures adjacent to teeth and jaws should be considered the limit for orthodontic movement (Strang, 1946). It cannot be altered unless a surgical procedure is performed to permanently change the size and shape of jaws. Altering arch shape during the shape of the arches, results in loss of stability of the treatment results achieved during orthodontic treatment (Jain et al., 2019; Jose et al., 2020).



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Previously our team has a rich experience in working on various research projects across multiple disciplines (Gheena and Ezhilarasan, 2019; Ke et al., 2019; Malli et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Sharma et al., 2019; Varghese et al., 2019; Venu et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project. The purpose of the present study was to evaluate the relationship between the arch shape and dental malocclusion classified based on angles classification of malocclusion.

MATERIAL AND METHODS

This was a retrospective study planned in a university set up among the patients under the age group of 18 to 50 years who visited Saveetha Dental College for dental check-up. Ethical approval was obtained from the Institutional ethical committee (SDC/SIHEC/2020/DIAS DATA/0619-0320). A total of 400 patients were selected with a simple random sampling technique with 100 cases in each sub group segregated based on the dental malocclusion classified with Angles classification of malocclusion. Parameters tabulated include type of dental malocclusion and shape of the dental arch. The Inclusion criteria included high quality and clear pictures of patients that were between the age group of 18 to 50 years consisting of full set permanent dentition, exclusion criteria which includes incomplete dental records, and among those who previously underwent orthodontic treatment. The data was tabulated in excel sheets. Statistical analysis was done with IBM SPSS (version 26.0). Descriptive statistics was done to analyse distribution of various arch shapes in each malocclusion. Inferential statistics using Pearson's chi-square test was done to find the association between the different arch shapes and dental malocclusion.

RESULTS AND DISCUSSION

A total of 400 patients were selected and sorted based on age (18-50 years) and were divided into 4 groups based on their malocclusions. 100 patients from the overall population were selected randomly from each group. Patients having incomplete case sheets records were excluded from the study. With an overall population count of 400 patients Majority of patients (215 patients) had U-shaped arch, 82 patients had V-shaped arch, 65 of them square shaped arch and 38 of them had oval shaped arch. Out of 100 patients with class 1 malocclusion, 72% of the patients had U-shaped arch, 13% of the patients had V-shaped arch, 10% of the patients had oval shaped arch and whereas 5% of the patients had square shaped arch. Out of 100 patients with class 2 div 1 malocclusion 38% of the patients had U-shaped arch, 50% of the patients had V-shaped arch, 5% of the patients had square shaped arch and whereas 7% of the patients had oval shaped arch.

Out of 100 patients with class 2 div 2 malocclusion 76.2% of the patients had U-shaped arch, 5.9% of the patients had V-shaped arch, 5.9% of the patients had square shaped arch and whereas 7.9% of the patients had oval shaped arch.

Out of 100 patients with class 3 malocclusion, 28.2% of the patients had U-shaped arch, 14% of the patients had V Shape arch, 13.8% of the patients had oval shaped arch 46% of the patients had square shaped arch. On association between various arch shapes and malocclusion it is inferred that u-shape arch is more prevalent in class 1 and class 2 div 2 malocclusions, whereas v-shaped arch is more prevalent in class 2 div 1 and class 3 malocclusion has a maximum number of square shaped arch, with a p value of 0.03 (<0.05, hence statistically significant) (Figure 1).

Figure 1: The bar graph depicts association between dental malocclusion (classified based on angles classification) and presence of different arch shapes. X-axis shows different malocclusion and y-axis shows the number of patients with various malocclusion. (Chi square test p value- 0.03 (<0.05, hence statistically significant). From the above graph it is inferred that U shape arch is more prevalent in class 1 and class 2 div 2 malocclusions, whereas V shape arch is more prevalent in class 2 div 1 and class 3 malocclusion has a maximum number of square shaped arch, and difference was found to be statistically significant.



Significant differences were identified between Class II forms (increased projection of upper arch relative to the lower arch) and Class III forms (lower arch projection beyond the upper arch) in symmetrical shape variation, including anteroposterior arch discrepancies and abnormal anterior arch divergence or convergence. Staley et al, who suggested that the narrow widths of the dental arch in Class II patients appeared to be caused by palatally tipped teeth and also by narrow bony bases of the dental arch, our results showed that transverse discrepancy in Class II, division 1 patients originated from upper posterior teeth and not from the maxillary alveolar base (Staley et al., 1985; (Mehta et al., 2015; Ramadurai et al., 2019; Mathew et al., 2020).

Maxillary inter premolar, intermolar widths and all maxillary alveolar width measurements were found to be significantly narrower in the Class III group than in the normal occlusion sample. When the corresponding inter arch widths were matched correctly, the maxillary arch widths were usually narrower than the mandible arch widths. Our institution is passionate about high quality evidence-based research and has excelled in various fields. We hope this study adds to this rich legacy. Similarly, in a study they indicated that almost all the upper dental and alveolar width measurements were narrower in patients with Class III malocclusion when compared with the normal occlusion sample. In addition, the mandibular dental width measurements were larger in the Class III group (Uysal et al., 2005; Mehta et al., 2015; Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020). Limitations of the study was the sample included in the study. Larger sample size including a heterogenous population can be done.

CONCLUSION

Within the limitations of the study, it is concluded that U-shaped arch was most commonly seen in class 1 and class 2 division 2 malocclusion, whereas V-shaped arch is more prevalent in class 2 division 1 malocclusion and square shaped arch in class III malocclusion. Knowledge regarding arch forms and dental malocclusion would hence enhance the clinical judgement regarding the planning for orthodontic treatment.

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Pulpectomy in Maxillary 1st Primary Molars with Mesial Caries - A Retrospective Analysis

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ABSTRACT

Pulpectomy is a root canal procedure in which irreversibly infected, or necrotic pulp tissue are debrided and root canals are shaped, dried and obturated with a material. Primary 1st molar which is infected due to caries reaches its pulp tissues, pulp therapy is indicated in most of the cases rather than the extraction to preserve the integrity of primary dentition. Hence, aim of the study was to assess the pulpectomy cases in maxillary primary molars with mesial caries among 4 to 10 years old children. The present study consisted of 87 patients from the OP of a private dental instituti

on, Chennai were randomly selected. Retrospective data collected from 89,000 case records from June 2019 to March 2020 were taken for the study. They were segregated according to their age and gender and this data was entered into excel sheets and transferred into SPSS software for statistical analysis and chi square test was performed. Age group of 4 to 6 had high frequency of pulpectomy and males underwent more pulpectomy procedures in maxillary 1st molars when compared to females. Children of both genders are more prone to caries that led to pulp therapy at a very young age.

INTRODUCTION

The main goal of modern dentistry for children is to maintain the integrity of the primary dentition until normal exfoliation because retaining primary tooth is important because it is a functional component in the dental arch which allows proper mastication, speech, swallowing and preservation of the space which is required for eruption of permanent teeth. The treatment of severely infected primary teeth can be challenging and there are few options for treating such teeth and Subramanian, 2017. American Academy of Pediatric Dentistry (AAPD) defines pulpectomy as a procedure which



involves removal of the roof of the pulp chamber in order to gain access to the root canals which are debrided, enlarged, disinfected and filled later with a resorbable material. Consequently, the tooth can be maintained in the arch without vital pulp tissue, but not compromising the function of the tooth. A high success rate of pulpectomy in primary teeth has led pediatric dentists to prefer pulpectomy over extraction and space maintainer.(Somasundaram et al., 2015; Christabel and Linda Christabel, 2015; Govindaraju et al., 2017b; Jeevanandan, 2017; Jeevanandan and Govindaraju, 2018).

The indications, and type of pulpal therapy depend on whether the pulp is vital or nonvital, based on the clinical diagnosis of normal pulp (without symptoms and normally responsive to vitality testing), reversible pulpitis (pulp is capable of healing), symptomatic or asymptomatic irreversible pulpitis (vital inflamed pulp is incapable of healing), or necrotic pulp (American Association of Endodontists. Nomenclature Committee, 1973). Pulpectomy is a root canal procedure for pulp tissue that is irreversibly



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infected or necrotic due to caries or trauma. The root canals are debrided and shaped with hand or rotary files. Since instrumentation and irrigation with an inert solution alone cannot adequately reduce the microbial population in a root canal system, disinfection with irrigants such as one percent sodium hypochlorite and/or chlorhexidine is an important step in assuring optimal bacterial decontamination of the canals (Govindaraju et al., 2017; Panchal et al., 2019; Lakshmanan et al., 2020).

Pulpectomy is a conservative treatment approach which prevents the premature loss of primary teeth that can result in loss of arch length, insufficient space for erupting permanent teeth, impaction of premolars, and mesial tipping of molar teeth adjacent to the lost primary molar. Dental caries is a chronic disease affecting the children and adults caused by genetic and environmental factors. Dental caries is a multi-factorial infectious microbial disease of the teeth which results in localised destruction and destruction of the calcified tissues which often results in cavitation. It is a dental public health problem which interferes with normal food intake, speech, self-esteem, and routine activities affecting the overall health status of the children. Good attitude of parents reflects good oral health in children and vice versa (Deeley et al., 2008; Gurunathan and Shanmugaavel, 2016; Ravikumar et al., 2017).

Grossly decayed primary teeth which are extracted before exfoliation causes space in the dental arch which causes malocclusion if space maintainer was not given. Fluoride use has been recommended to prevent the dental caries. Decreased concentration of fluoride also results in increased incidence of dental caries. Chewable toothbrushes can be used to remove dental plaque and are more effective than manual brushing in children. In children aged between 4 to 10years are highly prone to dental caries due to improper oral hygiene and dietary factors (Govindaraju, 2017; Packiri et al., 2017; 'Fluoride, Fluoridated Toothpaste Efficacy And Its Safety In Children - Review', 2018; Subramanyam et al., 2018; Panchal et al., 2019).

Hence, Previously our team has a rich experience in working on various research projects across multiple disciplines (Gheena and Ezhilarasan, 2019; Ke et al., 2019; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Samuel et al., 2019; Sharma et al., 2019; Varghese et al., 2019; Venu et al., 2019; Vignesh et al., 2019; Jain et al., 2019; Jose et al., 2020; Krishnaswamy et al., 2020; Muthukrishnan et al., 2020; Samuel et al., 2020; Sathish and Karthick, 2020). Now the growing trend in this area motivated us to pursue this project. The aim of the study was to assess the pulpectomy cases in maxillary primary molars with mesial caries among 4 to 10 years old children.

MATERIAL AND METHODS

The study was conducted with the approval of the Institutional ethical committee (SDC/SIMEC/2020/DIASDATA/0619-0320). The study consisted of one reviewer, one assessor and one guide. The study was designed to include all children aged between 4 to 10 years who underwent pulpectomy procedures in

maxillary 1st primary molars with mesial caries. Data collection was done using the patient database with the time framework of 1st June 2019 to 31st March 2020. In 280 pulpectomy cases, radiographs of the children aged from 4 to 6 years were reviewed, and those children underwent pulpectomy in maxillary 1st primary molars with mesial caries (86 children) were only included. Cross verification of data was done by a reviewer. The cross verification of data was done by a reviewer. The collected data was done by a reviewer. The collected data was tabulated on the following parameters. Patients demographic details. Tooth number (54/64). Surface involved (Mesial). The variables were coded and data was imported to SPSS software. Using the SPSS Version 20.0 categorical variables were expressed in terms of frequency and percentage and bar graphs were plotted. The statistical significance of associations was tested using the Chi-square test.

RESULTS AND DISCUSSION

A total of 86 patients were seen during the study period. Male children were more commonly affected than females and the upper right first primary molar was highly prone for mesial caries among our study population. Age group of 4-6 years had a high incidence of mesial caries that led to pulpectomy. Figure 1 represents the gender distribution in which 55 of male and 31 of female children underwent pulp therapy for mesial caries in primary maxillary first molars. Figure 2 represents 79.07% of the study population belonged to the age group of 4-6 years, 15.12% belonged to the age group of 7-8 years and 5.81% belonged to the age group of 9-10 years. The age group between 4-6 yrs being the most vulnerable for mesial caries. Figure 3 shows that 27.91% of females belonged to the age group of 4-6, 6.98% of females belonged to the age group of 7-8 and 1.16% belonged to the age group of 9-10. 51.16% of males belonged to the age group of 4-6, 8.14% of them belonged to the age group of 7-8 and 4.65% belonged to the age group of 9-10. Figure 3 shows p =0.342 (p>0.05).

Figure 4 shows that 41.86% of the study population aged between 4-6-year-old underwent pulpectomy in 54, 37.21% of the study population aged 4-6-yearold underwent pulpectomy in 64. 9.30% of the study population aged between 7-8-year-old underwent pulpectomy in 54 and 5.81% of the study population underwent pulpectomy in 64. 3.49% of the study population aged between 9-10-year-old underwent pulpectomy in 54 and 2.33% of the study population underwent pulpectomy in 64. Figure 4 shows p = 0.388(p>0.05) which shows insignificant association between age and teeth involved. Figure 5 shows that 20.93% of female and 33.72% of male study population underwent pulpectomy in 54, 15.12% of female and 30.23% of male study population underwent pulpectomy in 64. Figure 5 shows p = 0.010 (p<0.05) which shows significant association between teeth and gender.

Primary tooth pulp therapy is performed to restore the health and function of primary teeth in children with

severe caries. When caries is confirmed to approximate the pulp, any definitive treatment plan must address treatment of the pulp, directly or indirectly. In the present study, pulpectomy done in maxillary primary 1st molars with mesial caries were collected, analyzed and correlated with gender, age and tooth involved. All the pulpectomy cases done due to mesial caries occurring in right and left upper first primary molars were segregated according to age and gender. In the present study, 55 male children and 31 female children were treated for pulpectomy in maxillary 1st primary molars due to mesial caries. Study conducted by Santa Maria et al reported that 82% of male children underwent pulpectomy and 15% of female children underwent pulpectomy. This shows that a higher number of male children underwent pulpectomy when compared with female children (Caries Management Strategies for Primary Molars, 2014; Rawson et al., 2019).

Figure-1: Bar graph shows the gender wise distribution of study population. X-axis represents the gender and Y-axis represents the number of patients with mesial caries. Higher number of males (green) underwent pulpectomy procedures when compared to females (blue).



A study conducted in Alaska children aged from twoyear-old to 13-year-old reported that 52.6% of the male children underwent pulp therapy and 47.4% of the female children underwent pulp therapy. This is in accordance with our study. A study conducted by de Souza et al, single visit endodontic treatment is carried out in 59.5% of pulpectomy cases. In our study multi visit and single visit endodontic treatment was done in pulpectomy cases. A study conducted by Velvart at al., 72.53% of pulpectomy was done in periapical lesion cases. In our study, pulpectomy was carried out in cases with mesial caries (Velvart and Spoerry, 1992; (Caries Management Strategies for Primary Molars, 2014; de Souza Netto et al., 2014).

In present study, the highest percentage of the age group was 4-6 years and right first primary molars were treated the maximum when compared to the left first primary molars for the same age group. The highest percentage was for the age group of 6-10 years. The total percentage of male children in this study population was 55% male children and female children was 31%. Generally male children were more than female children in the total sample. Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc et al., 2018; Ramesh et al., 2018; Ezhilarasan et al., 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree, 2019; Mathew et al., 2020). We hope this study adds to this rich legacy.

Figure-2: Bar graph shows the age wise distribution of study population. The X-axis represents the age and Y-axis represents the number of patients with mesial caries. 79.07% belonged to the age group of 4-6 years (purple), 15.12% belonged to the age group of 7-8 years (dark pink) and 5.81% belonged to the age group of 9-10 years (dark blue).



Figure-3: This graph represents the association of age and gender. The X-axis represents the age and Y- axis represents the number of patients with mesial caries. Chi-square test was done and association was found to be statistically insignificant. P value - 0.342 (P value >0.05), which is statistically insignificant. From this graph we can infer that 51.16% of males (green) belonging to the age group of 4-6 underwent larger numbers of pulpectomy in 1st primary maxillary molars followed by 27.91% of females (blue) of the same age group



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Figure-4: This graph represents the association of age and teeth. The X-axis represents the age and Y- axis represents the number of patients with mesial caries. Chi-square test was done and association was found to be statistically insignificant. P value - 0.388 (P value >0.05), which is statistically insignificant. From this graph we can infer that 41.86% of tooth 54 (grey) belonging to the age group of 4-6 underwent larger numbers of pulpectomy in 1st primary maxillary molars followed by 37.21% of tooth 64 (orange) of the same age group



Figure-5: This graph represents the association of teeth involved and gender. The X-axis represents the gender and Y- axis represents the number of patients with mesial caries. Chi-square test was done and association was found to be statistically significant. P value - 0.010 (P value <0.05), which is statistically significant. From this graph we can infer that 33.72% of boys underwent pulpectomy in tooth 54 (grey) and 30.23% of them underwent pulpectomy in 64 (orange).



Limitations of the present study was that this was a unicentric study with geographic limitations, limited sample size and has lower external validity. Future scope for this study includes larger sample size which is not confined to a particular geographic area and direct method of clinical observation.

CONCLUSION

Children with age groups of 4-6 years were highly prone to dental caries. If dental caries is left untreated, it will progress to pulp causing reversible and irreversible pulpitis which require pulp therapy (pulpectomy/ Pulpotomy) to the children. Male children underwent higher pulpectomy procedures than female children. Maxillary right 1st primary molars (54) are highly treated with pulpectomy than maxillary left 1st primary molar (64). This study will help the pediatric dentist to know the prevalence of pulpitis among children and can explain to parents to get them a clear idea about the importance of retaining and restoring the primary tooth. Regardless of the decision concerning the primary tooth and to the different treatment modalities, attention should be directed to the prognosis of the tooth in question, by restoring its health and function.

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