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Evaluation Of Commonly Treated Maxillary Teeth With Preventive Resin Sealant Among Children With Primary Dentition

Research Article

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Abstract

Application of Pit and fissure sealants is an integral part of comprehensive caries management approach. Their role in the field of caries prophylaxis is undisputed. A Pit and fissure sealant is a clear or an opaque plastic material which when applied to the deep pit and fissure of the posterior teeth can prevent caries. The current study aims at estimating the frequency of commonly treated maxillary primary teeth with pit and fissure sealants in a dental hospital setting and also in the provision of a detailed statistical report on the same. The study was performed in the Outpatient department of saveetha dental college, under a university setting. It was a retrospective study. Data required for the study was procured by reviewing patient records dating between June 2019 and March 2021.The collected data was sorted and analysed and the results were interpreted in the form of graphs. Our results show that the majority of the preventive resin sealant procedures that is 50.51% are done on male children and children of three years of age were the frequently treated (28.06%). Primary first and second maxillary molars were more commonly treated in both male and female children, which was not statistically significant (p-value = 0.315). From our results we conclude that Primary second molars are the most commonly treated teeth with the majority of the treatment procedures done on male children and children of 3 years age.

Keywords: Maxillary Teeth; Primary Dentition; Fissure Sealant.

Introduction

The human tooth is a carefully designed structure. Teeth are very important for humans as they are an essential component of the oral cavity that helps us in Mastication, Speech and also in the maintenance of the contour of the face. Humans have two sets of dentition. The primary and the permanent dentition. The First tooth develops between 6 to 10 months of the age of the child and by 25 to 33 months the child has its complete set of Primary dentition. A good care of the primary dentition is very important as they are more susceptible to dental caries. Early Childhood Caries is still one of the major issues worldwide. It refers to one or more numbers of decayed, missing or filled teeth in the primary dentition. Dental caries in a continuous process if not intervened that eventually leads to the loss of teeth. Primary teeth have relatively faster progression of caries due to their relatively less thicker enamel and dentin layers and larger pulp chambers and the early loss of primary teeth have got its own ill effects. Studies show that Maxillary teeth are more commonly affected with 11.5% frequency percentage. Primary teeth serve as the guide to the permanent teeth. It is generally accepted that the premature loss of deciduous teeth is associated with the malocclusion of permanent dentition. The premature loss of primary teeth may reduce the arch length required for the succeeding tooth, and hence predisposes crowding, rotation, and impaction of the permanent teeth [1]. The dental pain from the cavitated lesions can lead to decreased chewing and feeding habits that can lead to malnourishment of the child. Moreover, the dental abscess and infection can cause permanent damage to the permanent teeth [1, 2]. Studies show that A child with early childhood caries has 90% chances of developing caries in the permanent teeth [3]. Also early loss of teeth can adversely affect the speech and pronuncia-

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tion of the child. Therefore a proper maintenance of caries free primary teeth is really very important. Of all the different types of carious lesions, pit and fissure caries account to 90% of dental caries in permanent teeth and 44% of caries in primary teeth [4]. Pits and Fissures are the grooves present in the occlusal surface of the posterior teeth. Comprehensive studies reveal that the potential of the dental cavities is directly related to the depth of the fissures and pits. This is due to their morphological complexity which leads to increased plaque accumulation making dental hygiene process difficult. On that note, Pit and fissure sealants are really very important. A Pit and fissure sealant is a clear or an opaque plastic material which when applied to the deep pit and fissure of the posterior teeth can prevent caries. The sealant acts as a mechanical barrier that prevents the accumulation of bacterial microorganisms and also the food debris [5].

E.I Cueto in 1966 developed the first sealant material with methyl cyanoacrylate however the material was unstable and was susceptible to easy bacterial breakdown. It was in 1970 Bunocore made further advances to the existing sealants by developing a sealant that was made of Bisphenol - A - Glycidyl Methacrylate. The material was found to be both resistant to bacterial breakdown and also bonded well to the enamel layer of the tooth. Then J.D Mclean and A.D Wilson in 1974 introduced the Glass ionomer cement sealants. Now there are different types of sealants available in the market. Based on the method of polymerisation, whether they contain fluoride or not, based on the type of resin used: filled or unfilled, there are different types of dental sealants. There are four different generations of Resin based sealants known. First generation sealants are cured with ultraviolet, second generation sealants are chemically cured, the third generation sealants are light cured whereas the fourth generation sealants release fluoride. The other type is the Glass ionomer cement based sealants [6]. Both Resin based and Glass ionomer cement based sealants are good in their own way. Resin based sealants are durable, highly adaptable and are used in areas of teeth where adequate moisture control is a matter of concern [7]. The important advantage of Glass ionomer based sealants is their fluoride releasing property. They not only act as a physical barrier but also helps in remineralising the lost tooth structure, thereby restoring the strength and function of the lost tooth structure [8]. The placement of sealant is a quite easier process and does not consume much time. A phosphoric acid tooth etchant is applied to the tooth structure that increases the surface area of the tooth structure [9]. Then the sealants are placed exactly halfway through the inclination of the cuspal ridges.

Saliva contamination is the major problem in the placement of the sealants. Therefore a good moisture control and isolation technique is important. Though dental materials wear over a period of time, Dental sealants can stay in the teeth for 5 to 10 years. However Frequent dentist visits are important in ensuring the same. In terms of Retention properties, Resin based sealants are considered superior. Dental sealants are recommended to all patients who are at the risk of developing caries [10]. They are also recommended to people who take high carbohydrate food and also in cases of enamel defects such as Amelogenesis imperfecta. Application of Pit and fissure sealants is an integral part of comprehensive caries management approach. Their role in the field of caries prophylaxis is undisputed. Our team has extensive knowledge and research experience that has translate into high quality publications [11-23, 24-30]. The current study aims at estimating the frequency of commonly treated maxillary primary teeth with pit and fissure sealants in a dental hospital setting and also in the provision of a detailed statistical report on the same.

Materials and Methods

The study was performed in the Outpatient department of a private dental college, under a university setting. It was a retrospective study. The Ethical approval was obtained from the Institutional ethical committee. Informed consent was obtained from the parents or guardian regarding usage of the clinical data for research purposes. Data required for the study was procured by reviewing 5,00,000 patient records dating between June 2019 and March 2021.

Inclusion criteria of this study was the pediatric population within the age group of 2 to 6 years who had treatment with preventive resin sealant in their maxillary arch within the time period extending from June 2019 to February 2021. The patients who had preventive resin sealant treatment in their mandibular arch as well as patients of other age groups having mixed dentition or only permanent dentition were excluded in the study.

Digital entry of clinical examination, intraoral photographs of the oral cavity and the treatment procedure were assessed. The data collected (digital entry and intraoral photographs) was verified by an external additional reviewer. The sampling bias was minimised by a simple random sampling method. A third examiner reviewed the case records of the collected data to confirm the validity of the data with post operative photographs. If any error in data entry or patient details or clinical data were noticed, that case sheet was excluded from the study.

The data collected were tabulated in MS Excel and was then analysed in SPSS software version 22 (IBM Corp, Texas, LA). The independent variable was age and the dependent variable was silver diamine fluoride application and gender. Descriptive statistics were used and comparison between groups were done by using Chi square tests.

Results

Of Reviewing patients records dating between June 2019 and March 2021, we have retrieved data for about 392 Preventive resin sealant procedures done on the Maxillary teeth of Primary dentition. Our results show that the majority of the preventive resin sealant procedures that is 50.51% are done on male children while 49.91% procedures are performed on female children (figure 1). Our results also show that children of three years of age were the frequently treated ones with 28.06% treatment frequency, with least no of procedures performed on children of two years of age (12.24%) (figure 2). The stats also show that Left primary maxillary second molars were the most commonly treated ones (figure 3). Primary first and second maxillary molars were more commonly treated in both male and female children, which was not statistically significant (figure 4)(p-value = 0.315).

Discussion

392 dental preventive resin sealant procedures were found to be performed during the time period of 22 months between June

Figure 1. Represents the Gender of the children who had undergone preventive resin sealant application in their Maxillary teeth. The x axis refers to the gender while the y axis refers to the frequency percent of the same. The Red zone represents the Male children whereas the orange zone represents the female children. The frequency percentage in male children is found to be 50.51% whereas in female children it is about 49.49%.

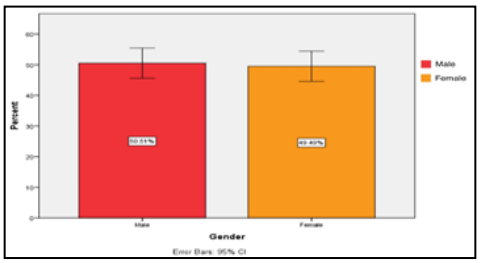


Figure 2. Represents the age of the children treated. The x axis refers to the age while the y axis refers to the frequency percent of the same The light violet zone represents the age group of two years, the light blue zone three years, the light green zone four years, the yellow zone five years and the grey zone 6 years. 12.24% procedures were found to be performed on children of 2 years age, 28.06% on 3 years of age, 21.94% on 4 years of age, 16.33% on 5 years of age and 21.17% on 6 years of age.

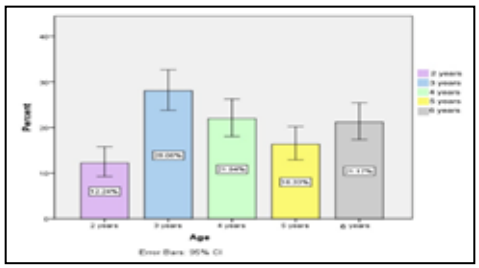


Figure 3. Represents the type of teeth treated with the preventive resin sealants. The x axis refers to the type of tooth while the y axis refers to the frequency percent of the same. The Dark blue zone refers to the maxillary right first molar (54), the dark green zone refers to the maxillary right second molar (55), the blonde yellow region refers to the maxillary left first molar (64) and the purple zone to the maxillary left second molar (65). 8.67% procedures are done on 54, 39.54% on 55, 8.67% on 64 and 43.11% on 65.

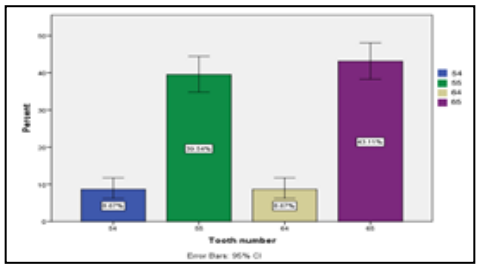
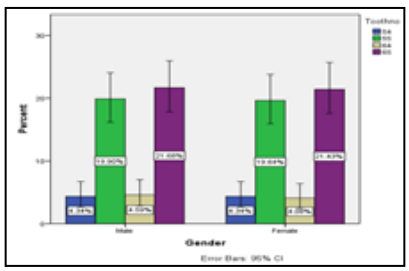


Figure 4. Shows the association between the Gender of the children and the type of the teeth treated. The x axis refers to the gender while the y axis refers to the type of tooth. The Dark blue zone refers to the maxillary right first molar, the dark green zone refers to the maxillary right second molar, The beige region refers to the maxillary left first molar and the purple zone to the maxillary left second molar. Primary first and second molars were more commonly treated in both male and female children, which was not statistically significant (chi-square value 0.979 - p-value = 0.315 - not significant).



2019 and March 2021. All these 392 procedures are found to be done on the primary maxillary dentition. 50.51% of the procedures were performed on male children while 49.49% procedures are done on female children (Figure 1). It shows that male children are more commonly treated than female children. But we can see the margin of difference between both to be really very less with 1.02%.Figure 2 shows the age of the children treated. There are no procedures done on children of 1 year age. 12.24% of procedures were found to be performed on children of 2 years of age, 28.06% procedures on children of 3 years age, 21.94% procedures on children of 4 years of age, 16.33% on children of 5 years of age and 21,17% procedures on children of 6 years old. From this, we can say that children of 3 years age are more commonly treated. Followed by children of 4 years age, 6 years age,

5 years age and 2 years age respectively. Figure 3 shows the frequency of procedures done on the basis of the type of the teeth. It shows that 8.67% procedures to be done on primary maxillary right first molars (54) and 39.54% procedures to be performed on primary maxillary right second molars (55). In the same way 8.67% procedures are done on primary maxillary left first molars (64) and 43.11% procedures are performed on primary maxillary left second molars (65). From the data, we can say that Primary maxillary second molars are the most commonly treated teeth. Left maxillary second molars are found to be more commonly treated than Right maxillary second molars. Both Maxillary left first molars are found to be equally treated.

Our research also analysed the association between the gender of the patient and the type of teeth treated. But it is found to be insignificant with a chi square value 0.979 which has been shown in Figure 4. Though there is no significance between the two, we can still analyse the type of the teeth treated separately for the different gender. In both Male and Female children, Maxillary second molars remains the commonly treated teeth which correlates with our previous data, where we had seen the frequency percentage as a whole without gender discrimination.

The role of pit and fissure sealants in preventing dental caries has been recorded in plenty of literature. Studies show that Sealants can reduce the incidence of dental caries by 76% on the sound occlusal surfaces [31]. A Cochrane review had evaluated the caries prevention effect of sealants in children which was compared with a no sealant control group. The results show moderate quality evidence that supports the sealant application [32]. Sealants provide protection against 80% of caries for the first two years of application and against 50% caries for upto 4 years, A study shows [33]. The recent evidence-based guidelines of the American Dental Association (ADA), in collaboration with the American Academy of Pediatric Dentistry (AAPD), prefers the use of sealants to fluoride varnish, though the quality of evidence is found to be low [32, 34].

The limitations of the study are minimum external validity and also the validity can be extended by encompassing subjects of a wider range. This study is retrospective and doesn't record success of sealants treatment. This study may enable the necessity for prophylactic management in mandibular molars of mixed dentition particularly in male population.

Conclusion

Within the limitations of the present study, primary second molars were the most commonly treated teeth with majority of the treatment procedures done on male children and children of 3 years age.

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