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FULL MOUTH REHABILITATION IN CHILDREN DONE UNDER GENERAL ANESTHESIA IN A DENTAL COLLEGE

Type of study – Retrospective study

Running title- Full mouth rehabilitation of children under general anesthesia

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ABSTRACT

Oral health is an essential component of total health and well-being. For most children, dental treatment under normal dental settings is difficult. This is due to the multiple treatments that are required which can take longer hours and less corporation. Children are highly anxious and uncooperative as well. Hence oral rehabilitation under general anaesthesia is highly preferred to reduce stress and increase comfort. The aim of this study is to analyse full mouth rehabilitation of children under General anaesthesia in a dental college over a period of one year.Data was collected from June 2019 to March 2020 from Saveetha dental College, Chennai. Data collected was tabulated in Excel and SPSS analysis was performed to obtain the results. A total of 84 patients reported to the dental clinic. The mean age of the participants is 4.23 years. Based on gender distribution, males were 46.2% and females contributed to 53.51%. More number of pulp therapy and crown placement was seen in children aged five years. Restorations were more common in the two year age group. Maximum number of extractions were done for children aged eight years. Within the limits of this study, full mouth restoration was done for children under general anaesthesia and the preference for treatments under general anesthesia was more for the patients in the age group 3 to 4 years.

Key words: *Oral Health; Dental Treatment; General Anesthesia; Full Mouth Restoration*

I. INTRODUCTION

Oral health is an essential component of total health and well-being. Despite increase in the availability of caries preventive measures, such as fluoride dentifrices and mouthwashes, Dental Caries still continue to be highly prevalent in the early childhood period(Holm, 1990; Subramaniam and Prashanth, 2012). It has been accepted by most panelists that use of fluoride can help in maintaining lesser incidences of dental caries in young children. Fluoridated toothpastes can be used as it is safe in children(Ramakrishnan M Shukri, 2018) .Decreased fluoride concentration leads to increased risk of caries and increased concentration can lead to Dental or Skeletal fluorosis. Hence standardization of fluoride levels in bottled waters and labelling of fluoride content should become mandatory as well(Somasundaram *et al.*, 2015). Dental plaque is one of the aetiological factors in causation of Dental Caries. Effective removal of plaque can reduce the incidence of caries.Chewable brush can be used as an effective alternative to manual brushing in children to reduce incidences of dental caries(GovinDaraju and Gurunathan, 2017).Certain studies show that salivary malondialdehyde levels are slightly higher in children with Early childhood caries (ECC), indicating the role of lipid peroxidation in the carious process(Subramanyam *et al.*, 2018). It is observed that dental neglect is present among parents and education and domicile plays an important role in the parents' attitude and knowledge towards good health care for their children(Gurunathan and Shanmugaavel, 2016). When pediatric dentistry is considered, most Dentists seem to have a preconception that it involves uncooperative and emotional children who strongly resist any dental treatment procedures. The American Academy of Pediatric Dentistry recognizes that Dental Care is medically necessary for the purpose of preventing and eliminating orofacial disease, eradicating infection, abolishing pain, restoring the form and function of dentition, and correcting any dysfunction(Fisher-Owens *et al.*, 2017) . Though various diagnostic procedures available to detect caries at earlier stages and preventive measures available,due to dental neglect by parents the treatment for caries becomes more invasive and requires management under General Anaesthesia.(Gurunathan and Shanmugaavel, 2016)

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General Anaesthesia(GA) is a medical procedure defined as a controlled state of drug induced loss of consciousness during which patients cannot be aroused, even by painful stimuli, and lose their protective reflexes(Knape *et al.*, 2007). For most children, dental treatment can be completed in the normal dental setting. However for a few children, GA may be required to provide optimal dental treatment.This could be for the management of dental traumatic injuries of primary teeth where the clinician needs to determine an appropriate treatment protocol and prognosis of traumatized primary teeth(Ravikumar, Jeevanandan and Subramanian, 2017).GA can also be given in cases of pediatric ranula which is a cystic lesion that arises in the floor of the mouth and is attributed to the traumatic rupture of the excretory salivary duct. Surgical technique for the management of ranula is the most successful(Packiri, Gurunathan and Selvarasu, 2017).Dentists should also correlate the age of the child and type of frenal attachment and morphological variations during their clinical examination to avoid misdiagnosis and unnecessary treatment(Christabel and Gurunathan, 2015). Such groups include children with extreme anxiety, young kids with extensive treatment needs, very young age, or physical/mental disabilities. Comprehensive dental rehabilitation under general anesthesia is a successful treatment option for children. There are several advantages of general anaesthesia , such as its efficiency, convenience, and high-quality restorative and preventive dental treatment in a single appointment (Thomson and Malden, 2011). Many patients elect to undergo general anaesthesia to reduce stress and increase comfort (Nick *et al.*, 2003). Some patients needed general anaesthesia because of lack of cooperation as a result of age, maturity or physical or learning disability (Albadri *et al.*, 2006). Behavior problems and inability to cooperate were the main reasons for treatment under general anaesthesia(Al-Eheideb and Herman, 2004) and also for patients that are too young to cooperate and have early childhood caries(Acs *et al.*, 2001) . Studies have shown that the quality of restoration carried out under general anaesthesia were far better than under local analgesia sincethere was a better moisture control and planned restoration placements. (Eidelman, Faibis and Peretz, 2000). In order to do multiple treatments such as pulp therapy, restorations under General anesthesia, certain techniques need to be adopted for shorter treatment durations. There is a reduction in instrumentation time during pulpectomy procedure with use of rotary file in primary molars. Therefore, a modified ProTaper or K3 rotary systems can be used as an alternative technique during root canal preparation of primary teeth(Govindaraju, Jeevanandan and Subramanian, 2017a).It is also seen that Rotary Kedo-S files shows better obturation quality and lesser instrumentation time as compared to K-file and H-file instrumentation(Govindaraju, Jeevanandan and Subramanian, 2017c; Panchal *et al.*, 2019). Hence these can be incorporated during treatments under general anesthesia for effective results.

There are a number of challenges faced by various studies that have been done on the need of a Full Mouth Rehabilitation(FMR) of paediatric patients under general anaesthesia. According to Oubenyahya H et al, GA is the most preferable option to deal with extensive early childhood caries(Oubenyahya and Bouhabba, 2019). According to Chen YP et al, 3-6-years old group has the highest number of primary teeth extractions, restorations (Chen *et al.*, 2017). According to Doneria D et al, oral rehabilitation enables improvement of general and psychological well being (Doneria *et al.*, 2017). However these previous studies show us certain challenges faced such as Consent of parents to undergo general anaesthesia, periodic review post treatment is difficult as children are not brought for review by the parents due to hectic schedule, evaluation of patient satisfaction through questionnaires is biased or there is misinformation as most of them are preschool children and lack the linguistic and cognitive maturity. The major treatments done for rehabilitation under general anesthesia Includes pulp therapy, crown placement, restoration and extraction. Patient co-operation also plays a major role, general anaesthesia for a healthy, fearful child is extremely safe and in the long run, is the best outcome for parent and patient (Wilson, 2004). However some parents are apprehensive towards FMR under general anesthesia, because of the expense and also some parents may find it hard to accept. The aim of this study is to analyse full mouth rehabilitation of children under General anaesthesia in a Dental College over a period of one year.

II. MATERIALS AND METHODS

The study was conducted as a unicentred study. The advantages of this study is the easy data retrieval and availability within a specific period. However the disadvantages included that the data is age specific and achieved only from a single institute. The study was conducted with the approval of the Institutional Ethics Committee [SDC/SIHEC/2020/DIASDATA/0619-0320].

The data is collected from June 2019 to March 2020, it included all the children who underwent FMR under general anaesthesia. Cross verification was done by two reviewers and to minimise sampling bias all the data is included and no sorting process taking place. The internal validity is the inclusion criteria that included all healthy preschool children, children undergoing Full Mouth Rehabilitation (FMR) and the use of general anaesthesia while the External validity included the results that can be generalised since samples of one ethnic group are chosen.

From 5000 patients who reported to the outpatient department, the data was collected and analyzed. Tabulation of the data is done and categorised based on age, gender and treatment. Software analysis is done to obtain results.

Incomplete/censored data is excluded and the Statistical analysis is done using SPSS software. The type of analysis used is descriptive analysis with mean, standard deviation and tables along with graphs which included the independent variables that are age and gender while the dependent variables included type of treatment procedures. The analysis done was based on correlation and association.

III. RESULTS AND DISCUSSIONS

A total of 84 patients had reported to the dental clinic for treatment. The mean age of the participants was 4.23 years. The age range varied from 1 to 14 years of age , as shown in the graph 1. Out of the 84 participants, the gender distribution for male was 46.2% and 53.57% for females as shown in figure 2. Four treatments were done under general anaesthesia namely pulp therapy, crown placement, restorations and extraction. The mean age group for each treatment is as follows, pulp therapy was most common in the age group of 5.8 years while crown placement was common in the age group of 5.3 years. Children aged 4 years underwent most number of restorations and extraction was more common in children of the age group 8 years.

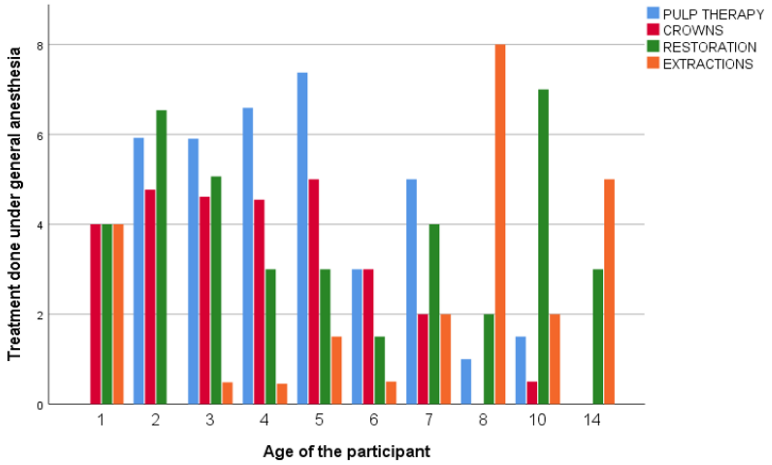

Fig 1: Graph shows association of age of the participants undergoing pulp therapy, crown placement , restorations and extraction under General anesthesia for full mouth rehabilitation. The age range varied from 1 to 14 years of age with a mean age of 4.23 years. Blue denotes pulp therapy, red denotes crown placement, green denotes restorations and orange denotes extractions. X axis represents the age of the participant and Y axis represents the treatments done. Pearson's correlation was done, the value showed, 0.000. Hence correlation is statistically significant at the level, (p<0.05)

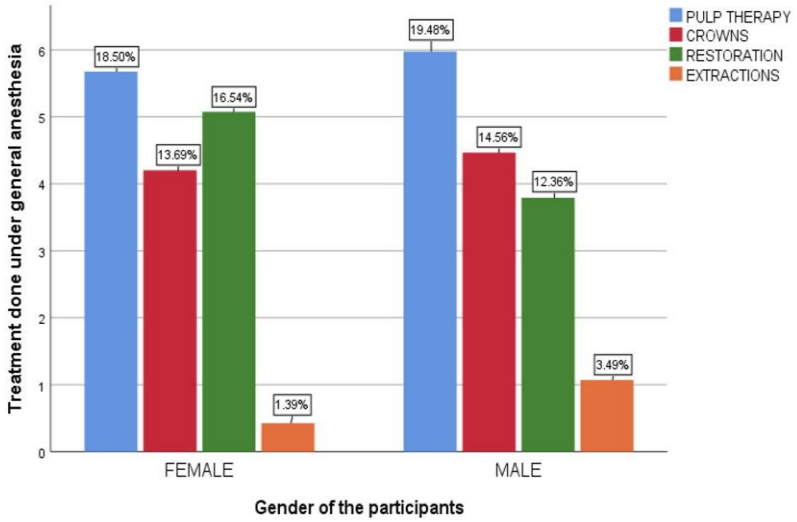

Fig 2: Graph shows association between Gender of the participants undergoing pulp therapy, crown placement , restorations and extraction under General anesthesia for full mouth rehabilitation. Blue denotes pulp therapy, red

denotes crown placement, green denotes restorations and orange denotes extractions. X axis represents the gender of the participants and Y axis represents the treatments done. Pearson's correlation test was done, the values showed, .029 (pulp therapy)(statistically significant), .002 (crown placement)(statistically significant), .106 (restorations)(statistically insignificant) and .042 (extractions)(statistically significant). Hence the correlation is significant at the level, p value ($p<0.05$) .

The incidence of treatments done under general anaesthesia vary based on the age, gender and type of treatment done. Previous studies are correlated with the study to understand the distribution of age, gender and treatments done. According to the study, the most common age group undergoing full mouth rehabilitation under general anaesthesia is 3 years. Similarly, in a study by Chen, Yung-Pan, et al., his study states that < 3-years-old group was characterized by the highest decayed, extracted, and filled surface and decayed, missing, and filled surface indices along with the highest mean number of treated teeth and the highest mean number of treated teeth by composite resin fillings. The 3–6-years old group had the highest number of primary teeth extractions (Chen et al., 2017). The reason for the highest incidence of three year old age groups is due to poor oral hygiene in young children which leads to higher caries incidence, requiring multiple treatments under GA. Early childhood caries are most prevalent in the 3 to 4 years age group as well. These multiple problems can be dealt with a single appointment under GA.

According to the study, around 57.53% females underwent dental treatment under general anaesthesia. However according to a study by Chen, Yung-Pan, et al., the group of participants consisted of approximately 70% males and 30% females (Chen et al., 2017). Another study conducted in Australia by E. Alcaino et al, showed no significant difference in the sex ratio of the participants (Alcaino, Kilpatrick and Kingsford Smith, 2001). According to Karim ZA et al., Treatment pattern revealed that 97.8% treatment consisted of extraction and 75.7% were restorations(Karim, Musa and Noor, 2008) . According to Cantekin K, et al, Restorations included almost 94.1% of all treatments done with a mean of 6.11, and 71.1% of treatments were extractions. Restorations were undergone by age group 3 to 5 years which is similar to our study where the mean age group undergoing restoration is 4.4 years(Cantekin et al., 2014) . According to A.R Tate et.al, stainless steel crown placement post pulp therapy was the most reliable for children In the age group of 4 to 5 years (Tate et al., 2002). This is because rampant caries are highly prevalent in age group 3 to 5 years due to high levels of bacterial colonisation. GA is most prevalent in 3 to 4 years children with multiple caries. Management of young patients with rampant caries include extraction of all teeth affected by caries, restoration of remaining teeth using crown along with pulp therapy for deep caries. Multiple Pulp therapies are the most common procedure done for this age group. To ensure faster treatments, rotary instruments can be used. The Kedo-S paediatric rotary file system will help the dentist in performing the pulpectomy procedure faster(Jeevanandan, 2017; Jeevanandan and Govindaraju, 2018).

The reduction in the instrumentation time significantly reduces the chairside procedural time which in turn positively influences the behavior of the child during the treatment(Govindaraju, Jeevanandan and Subramanian, 2017b). One of the many advantages is, reduction in post-operative pain with the use of rotary system(Nair et al., 2018). This age group is highly anxious and uncooperative. The limitation of this study is unequal distribution of the cases and the limited geographic data that is available to conduct the study. The future scope is that all parts of the population should be covered and all the parameters should be considered for a better scope of the study.

IV. CONCLUSION

Within limits of the study,it was observed that the children in the age group of 3 to 4 years were treated under general anaesthesia for various treatment procedures such as pulp therapy, crown placement, restorations and extractions.

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