Original Research Article

ORAL HYGIENE INDEX IN CHILDREN WITH STAINLESS STEEL CROWNS IN THE PERMANENT MOLARS.

Running title : Oral hygiene index in children with stainless steel crowns in the permanent molars.

ABSTRACT :

AIM :

The aim of this study is to assess the oral hygiene index in children with stainless steel crowns in the permanent molars.

INTRODUCTION :

Dental caries is a common disease, especially in children. Stainless steel crowns are used for the rehabilitation of carious molars to restore form and function either after root canal treatment or when caries is multisurface. Plaque and debris accumulates around these crowns if children fail to maintain it properly. Oral Hygiene Index shows patient's oral hygiene and the presence of plaque on the surface of the teeth.

MATERIALS AND METHOD :
This was a retrospective study conducted in a private dental institution in Chennai. The data was collected from the digital archives information system. 100 patients who fulfilled the inclusion and exclusion criteria were included in the study.The data analysis was performed using SPSS software .The chi square test and pearson correlation was done. p value <0.05 was considered statistically significant.

RESULT :
24 patients had the OHIS score of 1.5 ,18 patients had the OHIS score of 2, 24 patients had the OHIS score of 2.5,18 patients had the OHIS score of 3, 16 patients had the OHIS score of 1. Boys had higher OHI scores compared to girls.

CONCLUSION :
Within the limitations of the study, it can be concluded that 40% children had good oral hygiene scores. Girls had better oral hygiene scores compared to boys. Oral hygiene instructions should be given to children with stainless steel crowns to prevent the spread of caries and gingival diseases to adjacent teeth.

KEY WORDS : stainless steel crown,permanent molars, OHIS score, Innovative technology

INTRODUCTION :
Dental caries occur when bacteria, primarily Streptococcus mutans, colonise the tooth surface and metabolize dietary carbohydrates to produce lactic and other acids, leading to tooth demineralization (1). Premature loss of primary molars due to caries can cause arch space loss, leading to crowding of permanent teeth, compromising aesthetics and ultimately which will lead to orthodontic correction (2)(3).The loss of posterior teeth may also affect diet and overall growth and development of a child during the growth period. Hence saving the tooth by pulp therapy and restoring the form and function using stainless steel crowns has been advocated.

Interventions in young children at risk for dental caries focus on reducing the burden of bacteria, reducing refined sugar consumption, and increasing tooth tolerance to caries growth (4). Fluoride, maternal therapy to improve oral health, xylitol, and topical antimicrobials such as chlorhexidine or povidone-iodine are examples of bacteria-reduction strategies (5)(6).

For a long time stainless steel crowns have been a huge part of the therapeutic armamentarium in pediatric dentistry(7). The main indications for their use is in those primary and permanent teeth that are either hypocalcified or that have various and broad carious lesions and whose pulps have been removed (8). Therefore stainless steel crowns remain the treatment of choice for the restoration of primary molar teeth although it’s not much aesthetic .Shedding of the primary tooth has helped to maintain the aesthetics meanwhile it is preserved through its mixed dentition stage of development (9)(10).For permanent molar teeth, semi permanent restoration that is

stainless steel crown are useful and instead it can be used until the molars completely erupt (11).stainless steel crowns provide full coronal coverage where the recurrence of decay will not be promoted and also the smooth surface of the tooth helps to easily clean using daily oral hygiene practice (12)(13). However plaque and debris accumulates around these crowns if children fail to maintain it properly. Our team has extensive knowledge and research experience that has translate into high quality publications(14–26) (27–29)(27,28,30)

Oral Hygiene Index is a sensitive, simple method for finding group or individuals oral hygiene quantitatively (31). It is used by various people since the index helps as a tool in dental epidemiology and program evaluation(32).Oral Hygiene Index depicts a patient's oral hygiene and depicts the presence of plaque on the tooth surface(33) . OHI helps in the determination of a presence of the dental plaque and food residues(34).

MATERIALS AND METHOD :

A single centred study was done among outpatient population with stainless steel crowns visiting saveetha dental College and Hospital, chennai, India between August 2020 to January 2021

Study sample size :

A total of 500 pediatric dental patients visited the department of pediatric and preventive dentistry during August 2020 and January 2021.Inlcusion criteria included healthy children aged 6-18 years with stainless steel crowns. Children outside the age group, not having stainless steel crowns and were medically compromised. 100 patients who fulfilled the exclusion and inclusion criteria were included. Data was analysed from the patient records available in digital information archives system.The data that were collected was compiled into microsoft excel spreadsheet . The age was categorized into three groups 6-10 years , 11-15 years and 15-18 years of age respectively. It was analysed usingSPSS, IBM software version 23 with chi-square test. P value was set as 0.05 as the level of significance

Scoring criteria for OHIS :

- 0 – No debris
- *1 – Soft-tissue debris covering <1/3rd of tooth surface
- *2 – Soft-tissue debris covering >1/3rd but <2/3rd of tooth surface
- *3 – Soft-tissue debris covering >2/3rd of tooth surface.

RESULTS AND DISCUSSION :

Figure 1 : Association graph between Age and OHIS Score

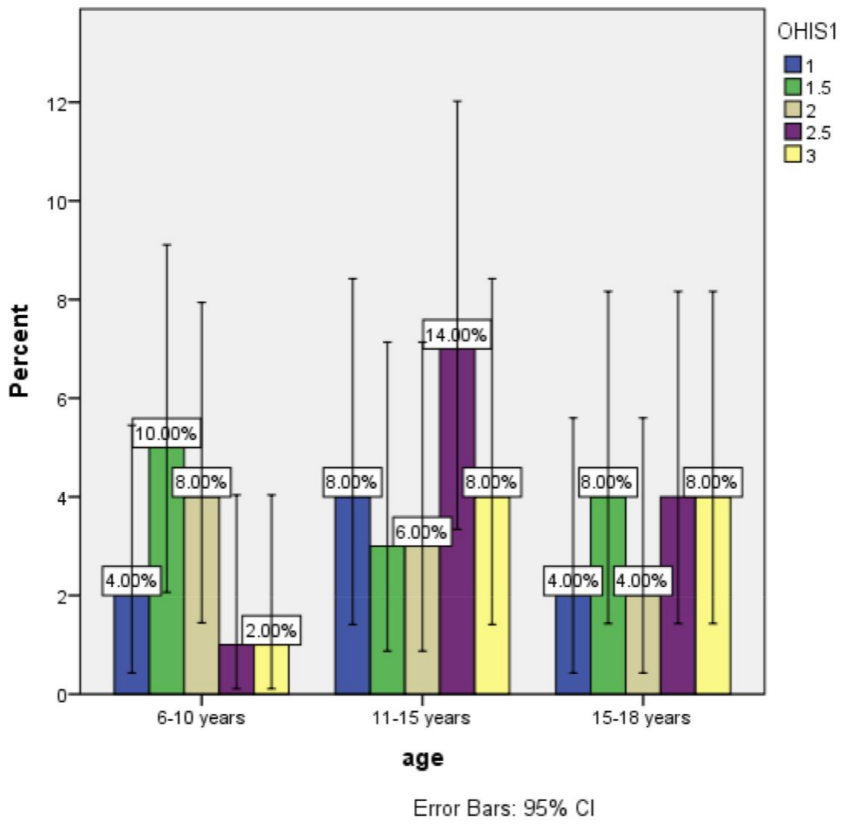

Figure 1 shows the association between age of the participants and OHIS score , x axis represents the age group distribution as 6-10 years , 11-15 years and 16-18 years respectively.y axis represents OHIS score which is measured in the patients with stainless steel crowns.
Among the age group 6 -10 years ,OHIS score 1.5 is the most common at 5%.Among the age group of 11-15 years 2 , OHIS score 2.5 is the most common at 7% and among 16-18 year ,OHIS score of 1.5,2.5,3 is common at 4%. collectively among all the study sample age groups. Among all the study sample groups, 24 patients had the OHIS score of 1.5 ,18 patients had the OHIS score of 2, 24 patients had the OHIS score of 2.5,18 patients had the OHIS score of 3, 16 patients had the OHIS score of 1. P value = 7.24(p>0.05) showing the insignificance(9) .

Figure 2 : Association between Gender and OHIS score

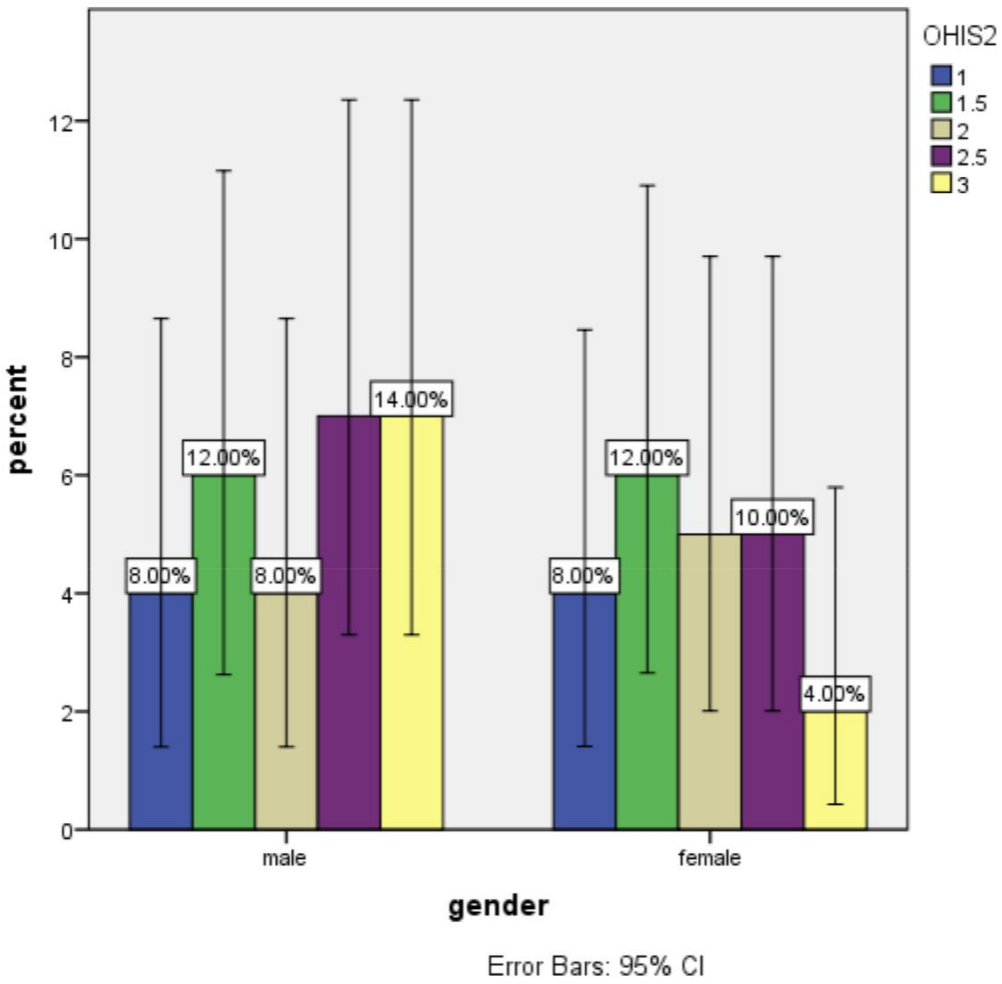

Figure 2 shows the association between the gender of the participants and OHIS score . X axis represents the gender, males and females respectively. Y axis represents the OHIS score which is measured in the patients with stainless steel crown in the permanent molars.
Among the gender, males have the OHIS score of 2.5 and 3 is most common at 14 %. Among the females OHIS score of 1.5 is the most common at 12%. P value = 2.53 ($p>0.05$) showing the insignificance(35) .

Stainless steel crowns have been used for over 70 years for the rehabilitation of primary and permanent molars which are either carious or have developmental defects.(36) The full coverage restoration of stainless steel crowns has made it the most successful restoration of choice for children with multi surface carious lesions in both primary and permanent molars. The longevity and durability of these crowns has not been matched till date by any other crown(9). Despite these advantages, a major disadvantage is the metallic appearance of the crown which has been

considered anesthetic. However plaque has been found to accumulate more on stainless steel crowns compared to natural teeth which allows patient education about their oral hygiene(12). In the present study 40% children had good oral hygiene scores. This is similar to previous studies. In the present study, 14% children aged 11-15 showed a score of 2 indicating moderate oral hygiene. This could be due to the fact that children in this age group are teenagers and have a slight aversion to what they are told. In contrast, children aged 15-18 showed better OHI scores. This could be due to the fact that teenagers have matured and understood the consequences of their actions.(37) Oral hygiene instructions should be given to all children with crowns. This is because crowns can act as a foci of infection for future caries and periodontal diseases. (38)Our study has a few limitations. The study that is conducted includes a very small sample size and the outcome depends on the age of the patients visiting the hospital.

CONCLUSION :

Within the limitations of the study, it was found that children had good oral hygiene. Children in the age group 11-15 had poorer oral hygiene compared to children between 6-10 and 15-18. Girls were found to have better oral hygiene than boys.

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