Gingival Health Status in Children with and without Cleft Lip and Palate: A Case Control Study

Kausalyah Krisna Malay[1], Vignesh Ravindran[2], Jayanth Kumar[3]

[1]Research Associate, Dental Research Cell, [2]Senior Lecturer, Department of Pedodontics, [3]Reader, Department of Oral Medicines, Saveetha Dental College And Hospitals, Saveetha Institute Of Medical And Technical Sciences, Saveetha University, Chennai, India

Abstract

Cleft lip and palate were classified as followed by Veau in 1931. The major four groups are clefts of soft palate, clefts of hard palate, unilateral clefts of the lip, alveolus and palate, bilateral clefts of the lip, alveolus and palate. Gingival health in children is one of the important factors to be taken into a serious problem as it may progress to jeopardize the periodontium of the adult. It affects the periodontal disease in the inception of earlier in life. In dentistry, it is important for a dentist to recognize early and diagnose gingival diseases to optimize treatment outcome. To determine the gingival health status in children with and without cleft lip and palate. The purpose of the study was to analyse the gingival status in children with and without cleft lip and palate (a case control study). A study was carried out by collecting data by reviewing patients data and analysing the data of 86000 patients between June 2019 and March 2020 at the private dental institute. The sample size that was taken included 6 children with cleft lip and palate (case group) and 6 children without cleft lip and palate (control group), who came to the private dental institute for consultation. The gingival health status was evaluated using OHIS score and was compared between the groups. Data was statistically analysed using SPSS 2.0, Mann-Whitney U Test was conducted. Result was recorded. The children with cleft lip and palate showed similar OHI-S scores compared to children without cleft lip and palate. Therefore, it was concluded that within the limitations in current study, there was no difference in oral health status between children with cleft lip and palate and children without cleft lip and palate.

Keywords: *cleft; lip; palate; gingival; OHIS; health; dental*

Introduction

Cleft lip defined as a congenital deformity that occurs in the primary palate which is located anteriorly to incisive foramen. It's occurrence may be unilateral, bilateral, complete or incomplete.[1] Cleft palate is defined as a congenital abnormality that occurs in the secondary palate (soft and hard palate). It's occurrence may be unilateral,bilateral, complete or incomplete.[2] Cleft lip and palate are classified as followed by Veau in 1931. The major four groups are clefts of soft palate, clefts of hard palate, unilateral clefts of the lip, alveolus and palate, bilateral clefts of the lip, alveolus and palate. According to Koch et al in 1995 and Kernahan in 1991, suggested a new classification of cleft lip and palate and it gives a Y shape letter.[3] WHO has given the etiology factors for this condition are mainly environmental factors such as smoking and alcohol, nutritional factors, medications, organic chemicals and solvents. Whereas, another main factor is about the genetic factors.[4] Smoking and alcohol are considered as main causes of clefts where risk of developing a cleft is found in pregnancies with alcohol abuse and smoking.[5]

Moreover, nutritional status plays an essential role in developing cleft lip and palate. Vitamin B6 deficiency was the main reason for increased risk of clefts in the entire global.[6] In addition folic acid deficiency was observed as the main reason for increasing clefts. Furthermore, zinc is considered as the main element

Corresponding author :
Vignesh Ravindran
Senior Lecturer, Department of Pedodontics,
Saveetha Dental College And Hospitals
Saveetha Institute Of Medical And Technical Sciences
Saveetha University, Chennai, India

in the fetal development.[7] The deficiency of nutrients causes cleft lip and palate. It was observed that mother with children with clefts had lower concentrations of zincs in comparison to mother with children without clefts.[8] Clefting of the lip and palate can result from some medications such as corticosteroids, steroids in which some pregnancies take due to insomnia and anxieties. In addition, retinoids drugs are considered as one of the main reasons that cause clefts in infants because of exposing pregnant women to these drugs.[9] Finally genetic factors are influenced by family history which leads to the causative of cleft lip and palate. For example, the risk of transferring one parent having clefts to their children is 9%. The risk of transferring unaffected parents having a child is 4%.10 The occurrence of cleft lip and palate is either associated with many syndromes such as Pierre Robin's Syndrome, Treachers Collins Syndrome and Ectodermal dysplasia.[10] There are many common problems associated with cleft lip and palate, such as speech problems, hearing problems, ear infections, dental problems and feeding difficulties. In dentistry, it is known that dental problems involve orofacial clefts in the size and shape of teeth. For example, the permanent lateral incisor shows abnormalities in position and delayed eruption can be seen.[11] Moreover, many previous literatures had been reported for poor oral status in children with cleft lip and palate.[12] Dental caries and gingival health status in patients especially children with their condition are very discoordinated.[13]

Gingival health in children is one of the important factors to be taken into a serious problem as it may progress to jeopardize the periodontium of the adult.[14] It affects the periodontal disease in the inception of earlier in life. In dentistry, it is important for a dentist to recognize early and diagnose gingival diseases to optimize treatment outcome.[15] As an anatomical consideration, a dentist should analyze the gingiva in order to diagnose the health of gingiva in children.[16] The analysis should be based on the width of attached gingiva is greater in the incisor area, decreased over the cuspids and increases again over primary and permanent molars.[17] The attached gingiva increases in width with age.[18] In addition, the contact points between deciduous teeth are not as tight as those between permanent dentition provided favourable location for bacterial growth, thus leading to increased susceptibility of interdental region.[19] The gingival status can be relevantly decided based on the OHIS score for the teeth indicated in the OHIS score record.[20]

Most of the studies have evaluated the oral hygiene of children using simplified oral hygiene index (OHIS) by Green-Vermilion. It is widely used because WHO recommends this scoring criteria. OHIS contains evaluation of two genres, calculus and debris. The scoring is from 0 to 3. 0 indicated no debris or stains present.[21] Whereas, scoring 1 will be given if the soft debris covers not more than one third of the tooth surface or presence of extrinsic stains can be seen. Scoring of 2 will be given for soft debris covering more than one third, but not more than two thirds of exposed tooth. Finally, score 3 will be given in case of soft debris covering more than two thirds of the exposed tooth surface.[22]

Therefore, the current study aimed to determine the correlation of gingival health status in children with and without cleft lip and palate in a private dental institute. A case control study was planned and executed on children with cleft lip and palate from available data in the institute.

Materials and Methods

This retrospective study was conducted under a hospital based university setting. Ethical approval for this study was granted by the institute's ethical committee. Consent to use treatment records for research purposes were obtained from patient/ guardian at the time of patient entry into the university for dental needs. The retrospective data were collected by obtaining and analysing the 89000 dental case records of the university from June 2019 to March 2020. The sample size that was taken included 6 children with cleft lip and palate (case group) and 6 children without cleft lip and palate (control group), who came to the private dental institute for consultation. The inclusion criteria for the current study were children with cleft lip and palate, children between the age of 2-17 years age, complete photographic and written records regarding the complete intra-oral examination of the patient. Age and gender matched controls i.e. children without cleft palate, were taken according to the relevant cases obtained from the inclusion criteria. The exclusion criteria were incomplete and censored dental records, absence of photographic evidence and children below the age of 2 were excluded.

OHIS scores were evaluated for each of the children from both the groups. The selected case and control group were examined by three people; one reviewer, one guide and one researcher. The patients' case sheets were reviewed thoroughly. Cross checking of data

including digital entry and intra oral photographs was done by an additional reviewer and as a measure to minimise sampling bias, samples for the group were picked by simple random sampling. Digital entry of clinical examinations and intra oral photographs of selected subjects were assessed and this included the assessment of gingival status as mentioned before by the examiner based on intraoral photographs and clinical examination data for each tooth.The examiner was trained to add data of gingival status as present or absent for both case and control group by tabulation using Microsoft Excel software. The mentioned data were coded and transferred into SPSS PC version 2.0 (IBM 2019) software for statistical analysis. A correlation test, Mann-Whitney U Test was done between children with cleft lip and palate (case) and children without cleft lip and palate (control). The results were recorded. The difference was considered statistically significant as the p value was less than 0.05. ($p<0.05$)

Results and Discussion

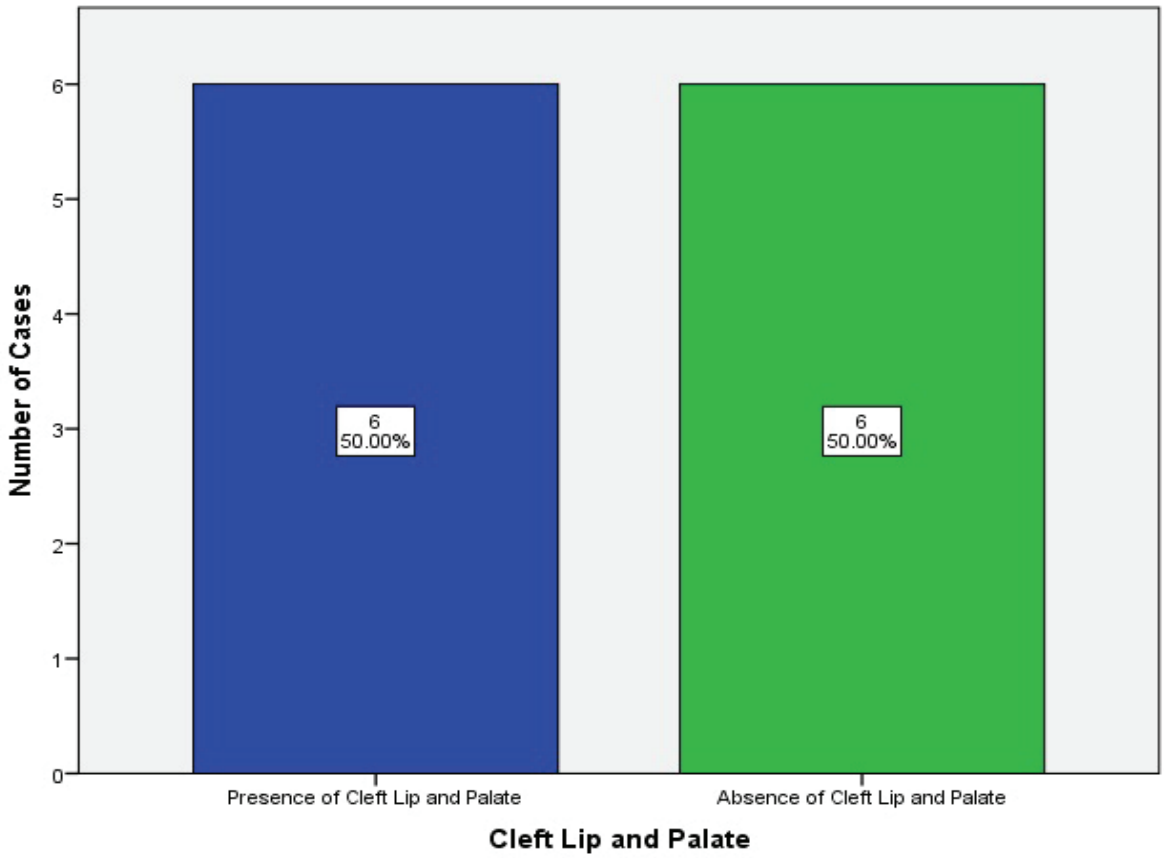

FIGURE 1 - The graph shows case distribution in case group (children with cleft lip and palate) and control group (children without cleft lip and palate). (X axis: Presence or absence of cleft lip and palate; Y axis: number of cases; Blue: Presence of cleft lip and palate; Green: Absence of cleft lip and palate). Notice the equal distribution of cases for both the groups.

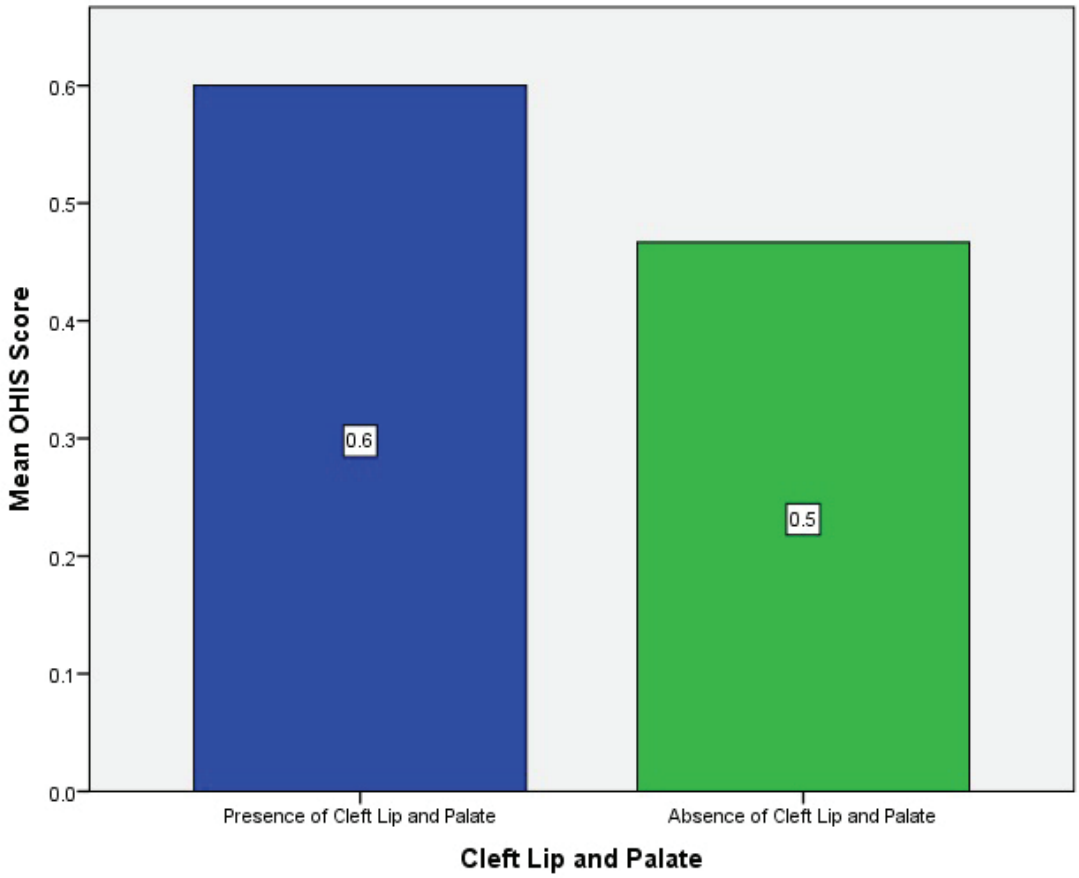

FIGURE 2 - The graph bar portrays the OHIS index score distribution for case (with cleft lip and palate) and for control (without cleft lip and palate) groups. (X-axis: Presences or absence of cleft lip and palate; Y-axis: Mean OHIS score; Blue: Presence of cleft lip and palate; Green: Absence of cleft lip and palate). There was no difference in OHI-S scores between children with cleft lip and palate and children without cleft lip and palate, which was statistically significant. (Mann-Whitney Test; p=0.039- significant).

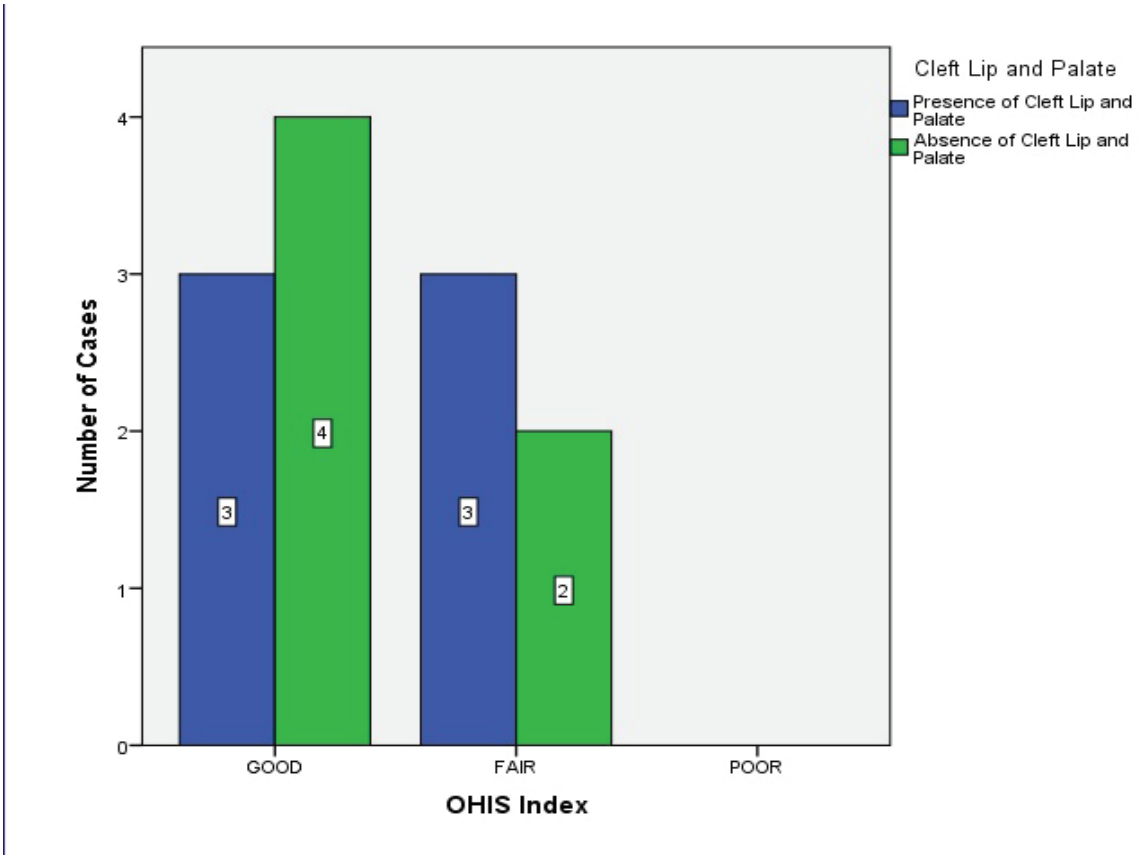

FIGURE 3: Bar graph represents the comparison of OHI-S index scores among the children with and without cleft lip and palate. (X-axis represents the different OHI-S index scores; Y-axis represents the number of cases). Although a slightly higher number of children without cleft lip and palate had good OHI-S score, there was a slight increase in number of children with cleft lip and palate had fair OHI-S score, which did not show any statistical significance (Mann - Whitney U test, p-value - 0.76 - not significant).

The final study sample size included a total of 12 patients with six patients (50%) having cleft lip and palate (case group) and six patients (50%) without cleft lip and palate (control group). It showed the equal distribution of cases in this study [Figure 1]. Among the 12 patients in both the groups, three were males (25%) and three were females (25%), respectively in both groups. The mean OHIS score was 0.6 for the case group (children with cleft lip and palate) and 0.5 for the control group (children without cleft lip and palate). There was no gross difference in the OHI-S scores between the case and control group, which was statistically significant (p=0.039).[Figure 2]. There were four children children without cleft lip and palate with good OHI-S score, while there were three children with cleft lip and palate with fair OHI-S score.[Figure 3] There was no difference in the overall gingival health status between them, which did not show any statistical significance (p = 0.76).

In a similar study by Paul et al[23], revealed that the mean of OHIS score of children with cleft lip and palate was 0.9. They concluded that children with cleft lip and palate had generally poorer oral and gingival health than those without cleft lip and palate. These results were similar to the present study. In present study, the mean score of OHIS for children with cleft lip and palate was 0.6 which was higher than those without this condition, where it showed a mean value 0.5 only. In another similar study conducted by Khijmatgar et al[24], poor oral hygiene and gingival health was observed in children with cleft lip and palate as compared to children in the control group. Again this study was accepted as it was similar to present study. Poorer oral hygiene and gingival status was observed in the case group compared to the control group.

In the present study, the higher OHIS score indicated poorer oral hygiene and gingival health status seen within the case group (with cleft lip and palate).

Statistically the difference was less than 0.05. Here, it is observed that children with cleft lip and palate had a better gingival status than children without cleft lip and palate. The results showed significant difference in the oral hygiene and gingival health status for both the groups ($p<0.05$). However, the consensus for this study was agreed but yet it has to be studied in detail as this study is limited to certain factors.

The advantages of the study were that this was a case-control study with age and gender matched control to provide better results and high internal validity. The limitations of the present study were , it is a single centered, limited sample size, unicentric study and only one ethnic group was involved. Moreover, the possible reason for children having poor gingival health status can also be the difficulties of brushing due to their anomalies and also their dietary which is rich with carbohydrates. For the future scope, the dental department should provide an assessment on the baseline of oral health status in children with or without cleft lip and palate. It is also important to emphasize the need of intensive and preventive measures in oral disease to optimize the clinical outcome in children with or without cleft lip and palate.

Conclusion

Within the limitations in current study, gingival health status of children with cleft lip and palate based on OHI-S index was similar to the gingival status of children without cleft lip and palate. Despite the presence or absence of cleft lip and palate, oral hygiene measures should be emphasized in all the children.

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