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Research Article

Effect of Feeding Plate Obturator Hygiene in Complete Cleft Lip and Cleft Palate Children - A Pilot Study

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Abstract

Introduction: Cleft lip and palate being most common in congenital deformity and also present with many syndrome conditions. Child with CL/P face difficulty in early breast feeding due to improper lip seal and nasal regurgitation, thus compromising nutrition of new born. Oral cleft patients with a palatal fistula showed a significantly higher incidence of poor oral hygiene. This could be due to the tenacious nature of the nasal fluid, which drains into the oral cavity and consequently promotes the adherence of plaque to the teeth. Obturators given before cleft palate surgery can act as a barrier for nasal contamination entering to oral cavity apart from its use for feeding.

Materials and methods: 15 cleft lip and palate children were selected and obturator was given one week prior to saliva collection. saliva was collected using sterile wooden spatula before and after the obturator placement after performing hygiene by immersion in commercially available mouthwash (Belleric Myrobalan, Betel, Meswak). Optical Density (OD) measured using spectrophotometric method.

Results: The mean Optical Density of saliva before obturator placement was 0.138 ± 0.031 and after the placement was 0.070 ± 0.033. There was a significant difference in mean optical density values before and after obturator placement (p-value < 0.001).

Conclusion: The findings of the study shows that the OD due to the bacterial load after obturator placement and practice of obturator hygiene is significantly lower and hence obturator can act not only as a feeding plate but it also helps in preventing the passage of nasal and pharyngeal contamination to oral cavity.

Keywords: *Cleft Lip and Palate; Obturators; Oral Hygiene; Oral Feeding Appliances*

Introduction

Cleft lip and palate being most common in congenital deformity and also present with many syndrome conditions. Child with CL/P face difficulty in early breast feeding due to improper lip seal and nasal regurgitation, thus compromising nutrition of new born.

Studies have shown that patients with cleft lip and/or palate have a higher prevalence of dental caries compared with the general population. Meanwhile, high incidences of middle ear infections and recurrent upper respiratory infections such as otitis media and naso sinusitis have been reported among children with palatal clefts despite previous surgical closure of their clefts [1].

It has been reported previously, oral hygiene improves more in older CLP cases following reconstruction of palatal vault, premaxilla, and anterior lip seal by secondary bone grafting method when compared with oral hygiene indices results in primary periosteoplasty cases [2].

Oral cleft patients with a palatal fistula showed a significantly higher incidence of poor oral hygiene. This could be due to the tenacious nature of the nasal fluid, which drains into the oral cavity and consequently promotes the adherence of plaque to the teeth [3]. This study was undertaken to evaluate whether the Obturators along with appropriate hygiene practices given prior to the cleft repair can act as a barrier for oral cavity and maintain better hygiene apart from its use as feeding and alveolar moulding appliance.

Purpose and Hypotheses

This study aimed to evaluate if the practice of using feeding obturators and its hygiene would have any effect on the salivary bacterial load in cleft lip and palate children below 9 months.

Materials and Methods

Sample size

18 children were screened and only 15 children who met with the following criteria were selected for the study.

Study design

Inclusion criteria were: Children of age group 10 days to 9 months with cleft lip and palate, children who are not under any medication.

Exclusion criteria were children who undergone cleft palate repair, children with systemic diseases and medically compromising conditions.

A new removable acrylic obturator cum feeding appliance prepared using (1.50 mm, Avac R Clear thermoforming sheet, Jaypee, India) vacuum pressure moulding method, Jaypee ASHVAC, India after obtaining the working cast from the rubber base impression (Reprosil regular body, Dentsply, India) blocked the undercuts of the cleft are with plaster of paris. All the fabricated obturators were freshly prepared for all inserted a week before the study to maintain the aging of the obturator. All care takers were given oral hygiene instructions for the gum pads cleaning using tissue wipes. Additionally, the obturator hygiene was advised to be practised after every feed, to follow on removal of the obturator rinse of the debris away on the both surfaces of the obturator with running water and to immerse in 5ml of commercial mouthwash containing Belleric Myrobalan, Betel, Meswak (HiOra-zero alcohol), Himalaya, India) (Figure 2) and after immersion for 30 seconds rinse thoroughly again with water before insertion into the mouth. On the day of the study, the obturator was removed 15minutes prior to the study procedure so as the nasal microbial contaminations would mix with the oral bacterial load. The saliva samples were then collected from anterior lower lingual aspects using sterile wooden spatula transferred to 1ml distilled water in a poly-vinyl sterile cap tubes (Figure 1 and 3).

Figure 1: *Salivary samples collection without obturator.*

Collected saliva samples were stored at -20ºC. Before replacement, obturator was cleaned by immersion in 5 ml of HiOra mouthwash and rinsed using distilled water and wiped dry before reinsertion (Figure 2).

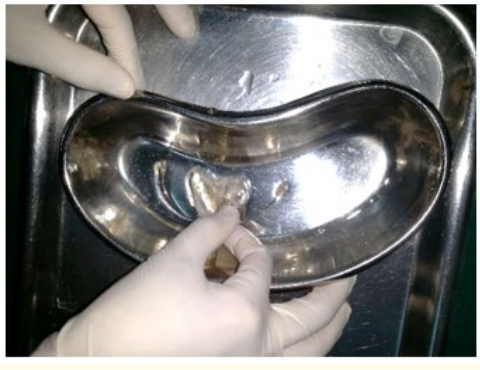

Figure 2: *Obturator immersion in HiOra mouthwash.*

After 15 minutes of post insertion of obturator, saliva samples were again collected (Figure 3). One ml of each sample of pre and post obturator insertion were dispersed in a cuvette to measure optical density using spectrophotometric method. Statistical analysis was done to compare changes in the before and after obturator placement.

Figure 3: *Salivary samples collection on placement of obturator.*

Results and Discussion

N	Before Mean OD ± SD	After Mean OD ± SD	Statistical inference
Salivary OD 15	0.138 ± 0.031	0.070 ± 0.033	T (15) = 9.760 p < 0.001

Table 1: *Mean salivary optical density values before and after insertion of obturator.*

The mean optical density of saliva before obturator placement was 0.138 ± 0.031 and after the placement was 0.070 ± 0.033. There was significant decrease in mean optical density values before and after obturator placement (p-value < 0.001).

Bacterial infections can complicate any surgery. Knowledge of potentially pathogenic bacterial flora in children with cleft lip and palate allows appropriate risk management, including the need for prophylactic antibiotics. After using the obturator, parents reported a decrease in choking, nasal discharge, and the time required to complete feeding [4].

In the present study, HiOra Mouthwash was used to clean the obturators before insertion, as it is non-alcoholic antibacterial agent which helps in reducing the bacterial load on obturators.

Previous studies show that patients with cleft palate have an increased incidence of middle ear diseases. Abnormal insertion of the levator and tensor veli palatine muscles into the posterior margin of the hard palate and muscular hypoplasia with resultant eustachian tube dysfunction appears to be the primary cause consequently exposing the middle ear to oral contaminants and contributing to inflammatory edema of mucosa. Inadequate aeration of the middle ear also results in retraction of the tympanic membrane and adhesive otitis media [5]. Middle ear effusion may occur up to 96.2 percent of cleft case, permanent perforation in 13 percent and cholesteatoma in 1 percent [6]. The early repair of the palate is associated with good cosmesis, better feeding, adequate velo-pharyngeal competence, and good speech and hearing development [7]. A feeding plate is of great help in feeding and effectively separates the oral cavity from the nasal cavity and thereby reducing the middle ear diseases.

Oral cleft patients with a palatal fistula also showed a significantly higher incidence of poor oral hygiene [3]. The presence of palatal cleft and fistula leads to food impaction, and food escapes through the nose and regurgitate into mouth. This act as a substrate for cariogenic bacteria present in the mouth for a longer period and increase the risk of caries development. From the present study, mean salivary optical density of children with Cleft Lip and Palate before placing the obturator was 0.138 ± 0.031 and after the obturator placement mean salivary optical density had lowered to 0.070 ± 0.033. This indicates the role of obturators along with hygiene practice by using a mouthwash in reduces the nasal contamination entering to oral cavity apart from its use for feeding device.

There are no clear mention from research on the feeding appliance obturator hygiene methods except the evidences that there is association between denture cleanliness and inflammation as explored by Budtz-Jorgensen and Bertram. A statistically significant correlation between poor denture cleanliness and severe inflammation was reported in their study [8]. The American College of Prosthodontists (ACP) advocates daily cleaning of dentures through soaking and brushing, employing an effective, nonabrasive denture cleanser to diminish biofilm and mitigate the presence of harmful bacteria and fungi. It is essential to treat dentures akin to natural teeth, cleaning them daily to eliminate food particles, bacteria, and prevent permanent staining. The initial step in denture cleaning involves rinsing away loose food particles and detaching any denture adhesive. Subsequently, a commercial denture cleanser designed for removable dentures, available in various forms such as tablets, creams, pastes, gels, and solutions, should be utilized [9]. However, the denture cleansers chemicals which would not be suitable to be used for the feeding obturators for the infants. Hence, an alternate safe cleaning method should be practicable after every feed unlike once or twice daily in case of complete denture prosthesis for adults.

The null hypothesis of this study proved there was a significant difference in the microbial load reduction on use of feeding obturator appliance after performing its hygiene.

Limitations and Future Directions

In the present study for safety reasons only herbal mouthwash had been used to evaluate the changes further studies are required to compare with other mouthwashes using chlorhexidine, denture cleanser tablets, denture toothpaste and nonchemical based methods like probiotics.

Conclusion

This study provides added evidence the role of obturators after insertion in reducing the nasal contamination entering to oral cavity in complete cleft lip and palate children to recommend the cleft team to practice using obturators with adequate hygiene by immersion in mouthwash solution and mechanical cleaning with denture brushes in cleft lip and/or palate children to prevent infections besides its other use as a feeding appliance. Further studies to evaluate its effects on pneumonia in these children would add evidence to use oral hygiene along with the use of obturators particularly among the cleft lip and palate children in the Intensive critical care units.

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Conflict of Interest

No conflict of interest.

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