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Effect of Congenital Cleft Lip and Palate Treatment on Bacterial Colonization in Children

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ABSTRACT

Purpose : To determine the effect of Inherited Cleft Lip and Palate Management on microbial migration in forked lip and palate (CLP) children. **Material and methods:** Fifteen forked lip and palate children and fifteen standard children (the control group), aged 3 months to 36 months were selected from the out clinic of Faculty of Dental Medicine, Al-Azhar University for Girls. Dribble samples were collected after the breakfast by inserting sterile cotton gauze in the entry from the jaws before and after construction of obturator. **Results:** The highest (mean±SD) value of log bacterial count (CFU/μl) was found in the cleft patients pre-operatively (5.64±1.06), while post-operatively there was a significant reduction in value (0.60±0.06) (P<0.001). The (mean±SD) value of the log bacterial count (CFU/μl) in the control group (0.59±0.04) was significantly lower than that of the cleft patients pre-operatively (P<0.001), while post-operatively there was no significant difference (P=0.834). The differences were statistically significant for the bacterial count between pre and postoperative periods in children with cleft lip and palate as tested by analysis of variance. **Conclusions:** Normal children had lower microbial colonization compared with Fissure lip and palate patients, and using obturators decreased the bacterial colony count following treatment of the fissure lip and palate children. Conclusion, Cleft lip and palate patients had more colonization compared with normal children, and the colony count decreased significantly following treatment of the cleft lip and palate children using obturators.

KEYWORDS

*Fissure Lip and Palate,
Bacterial Colonization.*

- Paper extracted from Doctor Thesis titled 'Effect of Congenital Cleft Lip and Palate Treatment on Bacterial Colonization in Children'

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INTRODUCTION

Fissure lip and palate (CLP) is a developmental defect which happens in the early prenatal phases and shows the most common hereditary defect of the cranium and neck. Fissure lip and palate lead to communication between the nose and the orifice, which may cause fluctuations of normal flora at both locations ⁽¹⁾. Fissure lip and palate lead to facial defects as well as constructional and practical weakening of sucking, and inhalation. The hope for securing an intact dentition with Cleft lip and palate patients offered by Multi-disciplinary teams ^(2,3).

The outcome of bacterial count respecting types and colony were examined after treatment of Fifteen fissure lip and palate (CLP) patients aged from 3 to 39 months. Samples of the fissure patient's saliva were gathered following the breakfast by inserting a hygienic gauze in the oral cavity entrance directly preoperative and 12 weeks postoperative. Control group of standard children was examined. Cultures were prepared from these samples; Bacterial strains were recognized and counted⁽⁴⁾.

MATERIAL AND METHODS

Patient grouping

- Age range from 3-36 months.
- The cases were categorized into two assemblies 15 patients in each assembly:
 - Group (I): Fifteen normal children (the control group).
 - Samples of the fissured patient's saliva were gathered after the breakfast by placing a sanitary gauze in the orifice hall.
 - Bacterial colonization was analyzed.
 - Group (II): Fifteen fissured lip and palate patients aged 3 months to 36 (Fig.1, 2) were selected from the out clinic of Faculty of Dental Medicine Al Azhar University for girls.
 - Saliva samples were collected before and after construction of obturator.
 - Saliva samples were collected immediately preoperative and postoperative.
 - Bacterial colonization were analyzed .



Figure (1): Child (36 months) with palatal fistula (before wearing obturator).



Figure (2): Child wearing obturator.

- Serial dilution agar plate count technique

Antibacterial activity of the different swaps was evaluated by using serial dilution agar plate technique. The media was prepared by dissolving the following in 1 Liter of distilled water; (tryptone 5.0 gm, yeast extract 2.5 gm, glucose 1.0 gm, agar bios LL 15.0 gm, pH 7.0 +/- 0.2) was weighed on a piece of aluminum foil using an electronic sensitive balance. The pH was adjusted to 7.2 and brought to boil to be dissolved completely then sterilized in autoclave at 121°C.

After vibrating the samples in a vortex (Bohemia, N.Y.11716, USA Laboratory equipment) to get a homogenous mix and transfer the bacteria from the swap to the solution. For the pour plate technique, the agar was liquefied by autoclaving, and then the bottle of molten agar was placed in a 50°C water bath and allowed to cool. The required details were marked on the base of sterile agar plates (Petri dishes); about 20 mL of molten agar was poured into each of the plates. 1 mL of each of the diluted swap was poured into the base of the labeled plates using a separate pipette to avoid carryover errors, gently swirling each plate to mix the 1 mL of diluted sample into the agar.

RESULTS

Bacterial count

In this study, the highest (mean±SD) value of log bacterial count (CFU/μl) was found in the cleft patients pre-operatively (5.64±1.06), while post-operatively there was a significant reduction in value (0.60±0.07) (P<0.001). The (mean±SD) value of the log bacterial count (CFU/μl) in the control group (0.59±0.04) was significantly lower than that of the cleft patients pre-operatively (P<0.001), while post-operatively there was no significant difference (P=0.834).

a- Comparison of pre-operative and postoperative values

The mean bacterial count decreased from 5.64±1.06 pre-operatively to 0.6±0.07 post-

operatively. Paired t test revealed that the difference was statistically significant (p=0.00). The percent change in log10 bacterial count was -88.96±2.91% (Table 1).

Table (1): Comparison of pre and post-operative values of bacterial count (log10) using paired t test

	Pre-operative	Post-operative	Percent change
Mean	5.64	0.60	-88.96
SD	1.06	0.07	2.91
T	19.7		----
P	0.00*		

Significance level $p < 0.05$, * significant

b- Comparison of control, pre-operative and postoperative values

Comparing the mean bacterial count in control group with the pre-operative mean value revealed a significantly (P=0.00) lower value in control (0.59±0.05), (Table 1, Fig.3).

Comparing the mean bacterial count in control group with the post-operative mean value revealed no statistically significant significantly (P=0.66), (Table 2, Fig.3).

Table (2): Comparison of pre and post-operative values of bacterial count (log10) using independent t test

	Normal versus pre-operative		Normal versus post-operative	
	Normal	Pre-operative	Normal	Post-operative
Mean	0.59	5.64	0.59	0.60
Std dev	0.05	1.06	0.05	0.07
T	18.43		0.45	
P	0.00*		0.66ns	

Significance level $p < 0.05$,

* significant, ns=non-significant

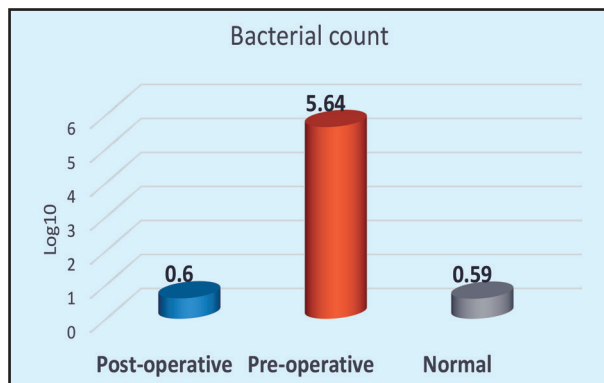


Figure (3): Bar chart illustrating log₁₀ of bacterial count in control and cleft patients.

DISCUSSION

Oral cavity stays sterile during fetal development and in the first hours following delivery oral cavity becomes a different ecosystem colonized by several microorganisms. As a result of communication with the external environment the intra-oral mucosa of neonates became populated by microbial contamination. A major portion of the oral contamination in the initial neonatal period newcomers from the mom and is temporary inhabitants of microbes comprising of intestinal microbes in naturally born neonates⁽⁵⁾.

Inhabitant microbial contamination in that duration depends on peripheral factors, including kind of delivery, gestational age, sort of nutrition, the duration of hospitalization period after birth, and overall health state⁽⁶⁻¹⁵⁾.

The many-sided arrangement of the orifice, with its several folds, cheeks and tongue slots with different pH values, oxygen attentions, oxidation states, ionic structures, buffer abilities, hydration, saliva flow, and mechanical interfaces. These circumstances are encouraging for the progress of a different environment based on the interactions among bacteria and the host location^(16,17). Genetic orofacial defect touches the construction and purposes of the orifice, thus modifying its characteristics⁽¹⁸⁾. The maximum common inherited developmental distortion of the jaws are the orofacial clefts⁽¹⁹⁾.

Presence of connection between orifice and nose in Complete fissure lip and palate (CLP) Neonates has undesirably affects usual sucking or spoils the capacity to swallow diet⁽²⁰⁾.

Specialized care is required for orofacial cleft infants to conserve suitable sanitation of the palatal bone, nasal passages, and the oral cavity which help to training for upcoming medical measures.⁽¹⁹⁾

In this study, the highest (mean±SD) value of log bacterial count (CFU/μl) was found in the cleft patients pre-operatively (5.64±1.06), while post-operatively there was a significant reduction in value (0.60±0.07) (P<0.001). The (mean±SD) value of the log bacterial count (CFU/μl) in the control group (0.59±0.04) was significantly lower than that of the cleft patients pre-operatively (P<0.001), while post-operatively there was no significant difference (P=0.834).

The results were in agreement with other authors comparing cleft lip and palate patients with normal children, they found more bacterial colonization in (CLP) patient, and decreased the count of colony significantly after treatment of the cleft⁽²⁰⁾.

In agreement with other authors found that significant risk of carrying *S. aureus* in fissured lip and palate Kids. These risks need to be considered when prescribing the prophylactic antibiotics⁽²¹⁾.

In this study the saliva specimen is taken by oral swabbing and this technique may cause discrepancy in sample volume. Dribble specimen taken by pipette tips which are a more accurate technique in regulating the specimen size^(22,23). Collection time for sample are standardized to reduce oral microflora discrepancy⁽²³⁾.

CONCLUSIONS

Within the limitations of this vivo study, the following conclusions can be drawn:

1. Cleft lip and palate patients had more colonization compared with normal children.
2. The colony count decreased significantly following treatment of the cleft lip and palate children using obturators.

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