

# Oral Health in 4-6 Years Children with Cleft Lip/Palate: A Case Control Study

Amandeep Chopra, Manav Lakhanpal, Nanak Chand Rao, Nidhi Gupta, Shelja Vashisth

Department of Public Health Dentistry, Swami Devi Dyal Hospital and Dental College (SDDHDC), Panchkula, Haryana, India

## Abstract

**Background:** Oro-facial clefts are a major public health problem. Children with clefts rarely escape dental complications. **Aims:** This study was to determine differences in the dental caries experience, gingival health, and prevalence malocclusion, enamel defects and oral mucosal lesions among 4-6 year old children with and without cleft in Panchkula. **Materials and Methods:** The sampling frame consisted of 4-6 year old children with clefts visiting Swami Devi Dyal Hospital and Dental College, Panchkula, India. As a control group an age ( $\pm 3$  months) and gender-matched sample from the same geographical areas were recruited. Dental caries status, gingival health status, developmental defect of enamel, malocclusion and oral mucosal health were assessed and compared between the two groups. **Results:** Significant differences in dental caries and gingival health status were found between children with and without cleft. Anterior open-bite, increased overjet and oral mucosal lesions ( $P < 0.05$ ) were more prevalent among children with clefts. Children with and without clefts had similar developmental defects of enamel ( $P > 0.05$ ). **Conclusion:** Differences of oral health status exist among 4-6 year old children with and without clefts. Children fare worse in terms of dental caries, gingival health, oral mucosal health and malocclusion.

**Keywords:** Cleft lip, Cleft palate, Dental caries, Oral health

**Address for correspondence:** Dr. Amandeep Chopra, Department of Public Health Dentistry, Swami Devi Dyal Hospital and Dental College, Golpura, Barwala, Panchkula, Haryana, India. E-mail: dr.amandeepchopra@gmail.com

## Introduction

Oro-facial clefts are a major public health problem affecting 1 in every 500 to 1000 births worldwide.<sup>[1,2]</sup> According to World Health Organization (2001), every 2 minutes a child is born with a cleft and in India alone three infants are born every hour with clefts.<sup>[3,4]</sup> Affected children have a range of functional as well as aesthetic problems. These includes difficulties in breast feeding due to improper oral seal, swallowing and nasal regurgitation, other associated problems are hearing difficulties due to abnormalities in the palatal musculature, and speech difficulties due to nasal escape and articulation problems.<sup>[4,5]</sup>

Children with clefts rarely escape dental complications. Since these children and their parents give more importance to the surgical correction of their clefts and neglect their dental health they tend to have more decayed and missing teeth, and poor oral health as compared to that of normal children.<sup>[6,7]</sup> However, reports on the oral health status of children affected by clefts have for the most part been limited to clinical samples, have lacked control comparison groups and have been very selective in terms of oral health aspects studied.

This initiated our present study to determine differences in the dental caries experience, gingival health, and prevalence malocclusion, enamel defects and oral mucosal lesions among 4-6 year old children with and without cleft in Panchkula.

## Materials and Methods

### Sample

The sampling frame consisted of 4-6 year old children with clefts visiting Swami Devi Dyal Hospital and Dental College, Panchkula, India, during January-December

### Access this article online

Quick Response Code:



Website:  
www.najms.org

DOI:  
10.4103/1947-2714.134371

2013. In total, 52 children with clefts were identified and their parents/primary care-givers were invited to participate in the study. As a control group age ( $\pm 3$  months) and gender-matched samples from the same geographical areas visiting the OPD of the dental institution and were free from cleft lip and palate or any systemic disease were recruited. Ethical clearance was obtained from the institutional ethical committee. A written consent was taken from the parents/primary care givers and an oral informed consent was obtained from the participants before the complete oral examination was carried. Those who were uncooperative and refused to participate in the study were excluded.

### Data collection

All the recruited children received clinical examinations by a single trained and calibrated examiner. The examination procedures and diagnostic criteria were those recommended in the World Health Organization Oral Health Survey Basic Methods and included assessment of dental caries experience (dmft).<sup>[8]</sup>

Six index teeth: maxillary right second primary molar (55), maxillary right central primary incisor (51), maxillary left first primary molar (64), mandibular left second primary molar (75), mandibular left central primary incisor (71), mandibular right first primary molar (84) were chosen for the assessment of gingival health and developmental defects of enamel. Gingival health was assessed by the Simplified Debris Index and the Gingival Index.<sup>[9,10]</sup>

The presence of developmental defects of enamel was also recorded as being present/absent on index teeth based on the Development Defects of Enamel Index criteria.<sup>[11]</sup> In assessing malocclusion, the presence or the absence of anterior open-bite and over-jet was recorded. The presence or absence of oral mucosal lesions was also recorded.<sup>[12]</sup>

The examiner was trained and calibrated prior to the commencement of the study by conducting repeat assessments after 1 week on 20 children (5 cases and 15 controls). Agreement of clinical assessments was established to be good (Kappa values = 0.82) which validated the examination procedure. The number of people enrolled as controls were selected to meet statistical power requirements (80% power) for the case control study.

### Statistical analysis

Data were analyzed using the statistical package SPSS PC Version 20.0 (Chicago, IL, USA). Differences in mean caries experience, plaque index and gingival index scores between those with and without clefts were compared

using the Mann-Whitney U-test. A comparison of developmental defects of enamel, oral mucosal lesions and open-bite and over-jet between those with and without clefts was assessed using chi-square tests.

## Results

It was possible to conduct oral examinations for 92.3% (48/52) of the children with clefts (four care givers declined to participate in the study). The mean age of the children was  $57 \pm 8$  months (Cases =  $56 \pm 8$ , Controls =  $58 \pm 9$ ), of whom 59% were males. The characteristics of the 74 children with cleft evaluated in this study are shown in Table 1. An age ( $\pm 3$  months) and gender match sample of 48 children attending the dental institution acted as the control group for the study. No significant difference was observed in the dental caries experience, gingival health, and prevalence malocclusion, enamel defects and oral mucosal lesions among children with different types of cleft. Henceforth results for children with different types of cleft were combined and not depicted separately.

Among the children with cleft the prevalence of dental caries was found to be 71.9% and mean dmft score was found to be 3.8. A significant difference was observed in caries experience between cleft and non-cleft children ( $P < 0.05$ ) (Table 2).

In terms of gingival health of children with cleft, the mean plaque index score was 0.92 and the mean gingival index score was 0.83 for the index teeth. Children with

**Table 1: The characteristics of the 48 children with cleft**

Classification	N (%)
Defects of the lip or alveolus	12 (25)
Clefts of the secondary palate (hard palate, soft palate, or both)	20 (41.7)
Any combination of clefts involving the primary and secondary palates	16 (33.3)

**Table 2: A comparison of the dental caries experience and periodontal condition of children with and without cleft**

Variable	Cleft	Non-cleft	P-value
Periodontal status	Mean (SD)	Mean (SD)	
Plaque index score	0.92 (0.40)	0.72 (0.28)	0.005
Gingival score	0.83 (0.21)	0.70 (0.19)	0.002
Dental caries experience	Mean (SD)	Mean (SD)	
dmft	3.8 (4.5)	2.0 (2.5)	0.04
Caries prevalence	N (%)	N (%)	
	71.9	60.87	0.07

clefts had higher plaque index scores ( $P = 0.005$ ) and higher gingival index scores ( $P = 0.002$ ) than the children without clefts.

Table 3 shows the comparison of developmental defects of enamel, malocclusion and oral mucosal health among children with and without cleft. The presence of an anterior open-bite and over-jet was more common among children with clefts, when compared to those without clefts, 26.0% versus 2.7%, respectively ( $P < 0.001$ ). In addition, children with cleft more frequently had an oral mucosal lesion present (ulcers, coated tongue, candidiasis) than children without cleft, 20.6% versus 8.2%, respectively ( $P = 0.03$ ). There was no significant difference ( $P > 0.05$ ) in the prevalence of development defects involving enamel among children with and without cleft.

## Discussion

This was a comparative cross-sectional study of children with and without clefts matched for sex and age. Although this was time consuming it enabled a reasonably large and representative sample to be obtained.

In assessing the oral health, a large number of oral health factors were considered, including dental caries experience, gingival health, developmental defects of enamel and oral mucosal condition, so as to provide a comprehensive view of the oral health status of children with clefts. Considering limited level of cooperation in 4-6 year children and for having comprehensive assessment, index teeth were used for a number of assessments (i.e., partial sampling). This type of approach is commonly adapted by clinicians who frequently examine and treat young children and special needs patients.<sup>[13]</sup>

The caries experiences were significantly greater in cleft subjects than those in the non-cleft control group. The results are in concordance to study done by Britton *et al.* (2010) and Aldrees (2009).<sup>[14,15]</sup> Although the

underlying mechanism remains unclear, this can be attributed to dry mouth caused by mouth-breathing habits, less natural cleaning of the teeth because of the morphology, different diet or feeding habits,<sup>[16]</sup> irregularity of the teeth,<sup>[17]</sup> increased oral clearance time for foods, and more carious bacteria in the oral cavity of cleft children.<sup>[18]</sup> Further research is necessary to elucidate the cause. No significant difference was observed in caries prevalence between cleft and non-cleft children. This can be due to caries is a chronic infectious disease; the observation period is too short for 4- to 6-year-old children, limiting us from demonstrating the effect of cleft on the development of caries. More research is needed to clarify this point. The results for caries prevalence reported in the study were similar to results reported among pre-school children in India i.e. 40-70%.<sup>[19-22]</sup>

Poor oral hygiene was observed in children with clefts as compared to controls. Possible reasons for the poorer oral hygiene in children with cleft can be: (a) the presence of residual scar tissue as a result of the multiple surgical procedures carried out at the cleft region which in turn impairs tooth cleaning; (b) the lack of interest for oral hygiene due to many other health problems such as otitis media, difficulty in speech and the fear that children often have when they brush their teeth at the cleft area.<sup>[23]</sup> All the above factors make the importance of the administration of individualized preventive oral health programs in cleft patients, indispensable.

In assessing malocclusion two attributes were considered. The presence or absence of an anterior open-bite and increased over-jet were found more common among children with clefts. This could possibly be related to aberrant tongue movement or positioning, a poor swallow reflex and frequent mouth breathing. Furthermore, the prevalence of developmental defect of enamel was higher in children with cleft than those without, but the difference was not statistically significant. These findings are in agreement with the literature.<sup>[24,25]</sup>

**Table 3: A comparison of developmental defects of enamel, malocclusion and oral mucosal health among children with and without cleft**

Variable	Description	Cleft group (%)	Non-cleft group (%)	P-value	
Developmental defects of enamel	No defect	12.1	20.3	0.490	
	Enamel opacity	73.0	68.9		
	Hypoplasia	14.9	10.8		
Malocclusion	Present	Anterior open bite	27.5	3.1	0.003
		Increased overjet	31.5	10.7	0.041
		Oral mucous lesions	19.5	7.1	0.042

Patients and their families are usually concerned with other aspects of their health care, such as surgery, nutrition, mental health, and speech development, that they pay little/no attention to basic preventive dental care.<sup>[26]</sup> These assessments not only provide a baseline for oral health parameters in young patients with clefts, but also underline the need for a more vigorous approach to the prevention of oral disease to improve on clinical outcome.

## Conclusion

In this case control study, conducted in SDDHDC, Panchkula differences of oral health status exist among 4-6 year old children with and without cleft. Children with cleft tend to fare worse in terms of dental caries, gingival health, malocclusion and oral mucosal health than normal 4-6 year old children. These findings have implication in advocacy for oral health care for children with clefts.

## References

- Murray JC. Gene/environment causes of cleft lip and/or palate. *Clin Genet* 2002;61:248-56.
- Cooper ME, Stone RA, Liu Y, Hu DN, Melnick M, Marazita ML. Descriptive epidemiology of nonsyndromic cleft lip with or without cleft palate in Shanghai, China, from 1980 to 1989. *Cleft Palate Craniofac J* 2000;37:274-80.
- Global strategies to reduce the health-care burden of craniofacial anomalies : report of WHO meetings on International Collaborative Research on Craniofacial Anomalies, Geneva, Switzerland, 5-8 November 2000 ; Park City, Utah, U. S. A., 24-26 May 2001.
- Mossey P, Little J. Addressing the challenges of cleft lip and palate research in India. *Indian J Plast Surg* 2009;(Suppl 42):S9-18.
- Banerjee M, Dhakar AS. Epidemiology-clinical profile of cleft lip and palate among children in India and its surgical consideration. *CJS* 2013;2:45-51.
- Murthy ST, Dhanuja RJ, Diwakar S, Vernekar NV, Lodaya R. Prevalence of dental caries and oral hygiene practices in children with cleft lip and/or palate. *IJCD* 2010;1:12-7.
- Al-Wahadni A, Alhaja EA, Al-Omari MA. Oral disease status of a sample of Jordanian people ages 10 to 28 with cleft lip and palate. *Cleft Palate Craniofac J* 2005;42:304-8.
- World Health Organization. *Oral Health Surveys: Basic Method*. 4th ed. Geneva: World Health Organization; 1997. p 39-46.
- Greene JC, Vermillion JR. The simplified oral hygiene index. *J Am Dent Assoc* 1964;68:7-13.
- Loe H, Silness J. Periodontal disease in pregnancy. I. Prevalence and severity. *Acta Odontol Scand* 1963;21:533-51.
- A review of the developmental defects of enamel index (DDE Index). Commission on Oral Health, Research & Epidemiology. Report of an FDI Working Group. *Int Dent J* 1992;42:411-26.
- Rioboo-Crespo Mdel R, Planells-del Pozo P, Rioboo-García R. Epidemiology of the most common oral mucosal diseases in children. *Med Oral Patol Oral Cir Bucal* 2005;10:376-87.
- Dougall A, Fiske J. Access to special care dentistry, part 6. Special care dentistry services for young people. *Br Dent J* 2008;205:235-49.
- Britton KF, Welbury RR. Dental caries prevalence in children with cleft lip/palate aged between 6 months and 6 years in the West of Scotland. *Eur Arch Paediatr Dent* 2010;11:236-41.
- Aldrees AM. Dental caries in Saudi cleft lip and palate patients attending a teaching dental institution. *J King Saud Univ* 2010;22:39-44.
- Besseling S, Dubois L. The prevalence of caries in children with a cleft lip and/or palate in Southern Vietnam. *Cleft Palate Craniofac J* 2004;41:629-32.
- Wong FW, King NM. The oral health of children with clefts—a review. *Cleft Palate Craniofac J* 1998;35:248-54.
- Ahluwalia M, Brailsford SR, Tarelli E, Gilbert SC, Clark DT, Barnard K, *et al.* Dental caries, oral hygiene, and oral clearance in children with craniofacial disorders. *J Dent Res* 2004;83:175-9.
- Jose B, King NM. Early childhood caries lesions in preschool children in Kerala, India. *Pediatr Dent* 2003;25:594-600.
- National Oral Health Survey and Flouride Mapping, 2002-2003. Vol. 32. New Delhi: Dental Council of India, Ministry of Health and Family Welfare, Government of India; 2004. p. 67-78.
- Ali YA, Chandranee NJ, Khan A, Khan ZH. Prevalence of dental caries in nursery school children of Akola city. *J Indian Soc Pedod Prev Dent* 1998;16:21-5.
- Mandal KP, Tewari AB, Chawla HS, Gauba KD. Prevalence and severity of dental caries and treatment needs among population in the Eastern states of India. *J Indian Soc Pedod Prev Dent* 2001;19:85-91.
- Parapanisiou V, Gizani S, Makou M, Papagiannoulis L. Oral health status and behaviour of Greek patients with cleft lip and palate. *Eur Arch Paediatr Dent* 2009;10:85-9.
- Aizenbud D, Camasuvi S, Peled M, Brin I. Congenitally missing teeth in the Israeli cleft population. *Cleft Palate Craniofac J* 2005;42:314-7.
- Slayton RL, Williams L, Murray JC, Wheeler JJ, Lidral AC, Nishimura CJ. Genetic association studies of cleft lip and/or palate with hypodontia outside the cleft region. *Cleft Palate Craniofac J* 2003;40:274-9.
- Zhu WC, Xiao J, Liu Y, Wu J, Li JY. Caries experience in individuals with cleft lip and/or palate in China. *Cleft Palate Craniofac J* 2010;47:43-7.

**How to cite this article:** Chopra A, Lakhanpal M, Rao NC, Gupta N, Vashisth S. Oral health in 4-6 years children with cleft lip/palate: A case control study. *North Am J Med Sci* 2014;6:266-9.

**Source of Support:** Nil. **Conflict of Interest:** None declared.