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Incidence of Dental Anomalies in Cleft Lip and Palate Cases among Libyan Population

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Abstract

Dental anomalies may occur as a result of genetic and environmental factors.

Objective: To evaluate the prevalence of dental anomalies in the individuals with cleft lip and palate as well as to assess the incidence of differences among unilateral cleft lip and palate and bilateral cleft lip and palate subjects in terms of dental anomalies and sexual dimorphism.

Material and Method: A retrospective study was designed. Orthopantomographs (OPG) of 200 non-syndromic subjects with cleft lip and palate were analyzed for dental anomalies.

Results: Hypodontia was observed in 62% subjects, the tooth most commonly missing was the maxillary lateral incisor while, the second highest prevalence was observed as microdontia with 55%. While 31.5% of subjects had transposition and/or ectopic teeth; 28% had hypoplasia; 18% had dilacerations; supernumerary teeth were found in 13% of subjects. 8% had retained teeth; 6.5% had impacted tooth.

Conclusion: Generally, subjects with CL/P require extensive dental care; the large amount of required health care interventions is complicated by the presence of various dental anomalies.Orthodontists should consider the risk of site and type of specific lateral incisor agenesis in orthodontic diagnosis and treatment planning.

Keywords: Dental Anamolies; Hypodontia; Supernumerary Teeth; Microdontia; Hypoplasia; Ectopic Teeth; Dilaceration

Introduction

It has long been proposed that the most frequent craniofacial birth defects are cleft lip and/or palate(CLP) [1,2]. The overall incidence of CLP is approximately 1 in 700 live births [3], the prevalence rate for live births with cleft lip and palate in Libyans was found to be 1.39 per 1000 live births [4]. Children with cleft anomalies may experience a multitude of physical and developmental challenges.This congenital defect is attributed to many etiological factors e.g., environmental agents, gene mutations, and chromosomal aberrations or is caused by the interaction of environmental and genetic factors [5]. CLP is accompanied by a wide variety of dental anomalies, which also have a long-term impact on the patient's facial anatomy and self-esteem [6].

Dental anomalies were found frequently in children with cleft lip and palate which are attributed to abnormal development of the alveolar process at the cleft area or to the early surgical correction of the defects. Studies have shown that both permanent and deciduous teeth may be affected, and that dental anomaly occurs more frequently on the cleft side [7]. Various phenomena, including delayed tooth development and eruption as well as alteration in tooth number and size have been suggested in cleft lip and palate subjects. It has been suggested that there was co-relation between dental anomalies of cleft lip and palate in severity with present variable according to its extent [8-10].

Teeth agenesis and supernumerary teeth are considered the most frequent dental anomalies in subjects with cleft lip and palate cases and they are seven times more when compared to the individuals without clefts [11-13].

First common anomaly affecting dentition in patients with cleft lip and palate was teeth agenesis where maxillary lateral incisor followed by the second premolars was most affected teeth [1,14,15]. The considerable frequency of missing lateral incisors has been contributed to the absence of fusion between the medial nasal and maxillary processes that happened in the lateral incisors [1]. The incidence of teeth agenesis was reported in and outside of cleft area [11].

Supernumerary teeth are considered as the second most common anomaly [1,16]. The main reason of this anomaly had been reported to occur due to disturbances during the morpho-differentiation stage of tooth development, possibly affecting the histo-differentiation stage, and may be developed from the dental lamina as a distinct tooth or be originated from the dichotomy of the tooth bud [17]. Ectopic eruption or transposition of tooth has been reported with cleft lip and palate patients [13,18].

Malformed teeth frequently also have been seen with cleft lip and palate. The most common tooth affected by this anomaly is lateral incisors [19,20]; the teeth that appear small are generally considered as microdonts. In addition to that, enamel hypoplasia also has been reported in patients with cleft lip and palate, maxillary central incisor was the most affected tooth [21]. Moreover, Taurodontism, was observed more frequently in cleft lip and palate subjects, where pulp chamber is enlarged [22].

The importance of dental anomalies studies in patients with cleft lip and palate is edentulous space management, which was observed within or outside the cleft region as a result of missing teeth in the maxillary arch that must be closed either with orthodontics or prosthodontics treatment. Thus, because dental anomalies may complicate dental treatment, because dental anomalies may complicate dental treatment, the present study investigated the prevalence of dental anomalies in a sample of Libyan subjects with non- syndromic cleft lip and palate and classified them according to cleft type.

Material and Methods

A retrospective study was performed using the available pre-orthodontic treatment records of patients with non-syndromic cleft lip and palate who recruited from a population seeking orthodontic consultation at the Orthodontic Department, faculty of dentistry, Sirte University, Libya from the period of March 2016 to December 2018. The records of 200 subjects with CLP were collected in this retrospective study; 150 subjects were from an orthodontic clinic at university clinics and 50 subjects were from orthodontic clinics at other hospital. Ethical committee approval for this study was obtained.

Orthopantomographs were analysed of 200 subjects (125 males, 75 females aged between 6 and 20 years, mean age was 10.11 ± 5.09Years) meeting the criteria were enrolled in the study. Out of 200 patients, 123 had unilateral cleft lip and palate and 77 bilateral cleft lip and palate. All the subjects were selected according to the following criteria:

1. Patient's age from 6 to 20 years old.
2. Non-syndromic cleft lip and palate patients.
3. No history of teeth extraction or orthodontic treatment.
4. Patients had good quality of the radiograph image.

Record analysis

Pre-treatment orthopantomographs for each participant were taken with cephalostat (Siemens Orthophos-5 machine) under a standardized technique with the teeth in light inter-cuspation. During investigation, the room was darkened and the viewing screen was blanked off showing only the radiograph. Magnification of radiographs was corrected and calibrated according to the magnification factor using the radiopaque ruler (calibration marker). Pre-orthodontic treatment lateral cephalographs were analysed. The possible dental anomalies like tooth agenesis in and outside of cleft area, supernumerary teeth, ectopic eruption or transposition, impacted, retained, malformed, hypoplasia and dilacerations were recorded.

Calculation of methodological error

Twenty lateral cephalographs were selected randomly and re-analyzed after one month interval. Dahlberg's formula ($M.E=\sqrt{\Sigma d2/2N}$) for double measurement determination was used to calculate the error of the method of measurements (Dahlberg, 1940). Houston coefficient of reliability was also calculated for all measured variables (Houston, 1983).

Statistical Analysis

The data obtained were analysed using the Statistical Package for the Social Sciences, version 15 (SPSS Inc., Chicago, IL). Association of the radiological dental anomalies according to cleft type and gender was tested using the chi-square test (x^2). A statistically significant association was considered to be present when p values at < 0.05

Result

Sample distribution

Among 200 patients with cleft lip and palate, 125 were male and 75 were female. There was a male dominant tendency in both (47) and unilateral cleft lip and palate (78) patients. Dahlberg's error ranged from 0.001 for tooth agenesis to 0.175for malformed tooth, indicating that there were no significant differences between any of the measured variables at two different time points. Houston coefficient of reliability was calculated and was above 91% for all measured variables.

The total sample distribution according to the cleft type and gender is shown in (Table 1).

Cleft	Male	Female	Total
BCLP	47	30	77
UCLP	78	45	123
Total	125	75	200

Table 1: Distribution of the total sample according to Cleft type and gender

Dental Anomalies

Individuals born with clefts presented considerably with dental anomalies. Tooth agenesis (62 %), malformed tooth (55%), and ectopic eruption (31.5%) were the most common anomalies. The frequency of occurrence and percentages of the various dental anomalies showed in the (Table 2).

Anomaly	Frequency	Percentage
Tooth agenesis	124	62%
Tooth agenesis at cleft area	62	31%
Supernumerary Tooth	26	13%
Transposition and/or Ectopic eruption	63	31.5%
Impacted tooth	13	6.5%
Retained tooth	16	8%
Malformed tooth	109	55%
Hypoplasia	56	28%
Dilacerations	36	18%

Table 2: Frequency of occurrence of the various dental anomalies

Regarding tooth agenesis, the upper lateral incisors were more frequently absent in the cleft group (n=158) and were significantly more frequent in patients with unilateral cleft lip and palate, followed by maxillary and mandibular second premolars (55 and 54) respectively. The distribution of missing teeth among patients showed in the (Table 3) and the prevalence of dental anomalies according to gender showed in the (Table 4). Incidence of tooth agenesis was higher in unilateral cleft lip and palate and bilateral cleft lip and palate patients. Tooth malformation occurred more frequently in the UCL/P (P <) than UCLP (P <) patients (Table 5).

Cleft	Max.1	Max.2	Max.3	Max.4	Max.5	Mand.3	Mand.4	Mand.5	Total
BCL/P	11	49	0	0	6	0	0	17	118
UCL/P	29	109	0	15	49	0	0	37	204
Total	40	158	0	15	55	0	0	54	322

Table 3: Distribution of missing teeth amongst patients

Anomaly	Female	Male	P value
Tooth agenesis	53	71	0.49
Tooth agenesis at cleft area	35	31	0.41
Supernumerary Tooth	9	17	0.11
Ectopic eruption	31	25	0.6
Impacted	6	7	0.7
Retained Tooth	8	8	0.65
Malformed (Microdontia)	49	60	0.47
Hypoplasia	27	36	0.42
Dilacerations	16	20	0.56

Table 4: Prevalence of dental anomalies according to gender

Anomaly	BCL/P (77)	UCL/P (123)	P value
Tooth agenesis	51 (66.2%)	73 (56.3%)	0.41
Tooth agenesis at cleft area	29 (37.67%)	37 (30.1%)	0.62
Supernumerary Tooth	11(14.3%)	15 (12.2%)	0.54
Ectopic eruption	26 (33.8%)	30 (24.4%)	0.61
Impacted	7 (9.09%)	6 (4.9%)	0.53
Retained Tooth	6 (7.8%)	10 (8.1%)	0.94
Malformed (Microdontia)	43 (55.8%)	66 (53.7%)	0.82
Hypoplasia	28 (36.4%)	35 (28.5%)	0.54
Dilacerations	19 (24.7%)	17 (13.8%)	0.73

Table 5: Prevalence of dental anomalies according to cleft type

Discussion

Subjects with a cleft lip and palate (CLP) have been found to have a higher prevalence of dental anomalies, such as variations in tooth position and number, tooth shape and reduced tooth dimensions, most of which are localized in the area of the cleft defect .The present study investigated the frequency of anomalies in a sample of Libyan subjects and classified them according to cleft type.

Gender differences in the prevalence of oral clefts have been reported previously .The absence of a gender-based difference in the prevalence of dental anomalies in the present study is in agreement with the findings of others [11,16]. According to cleft severity, the three most common dental anomalies were tooth agenesis, malformed tooth and ectopic eruption.

The diagnosis of tooth agenesis was based on initial and follow-up panoramic radiographs in subjects' records. The dental records of each subject were evaluated to investigate the possibility of previous tooth extraction to avoid misdiagnosis of tooth agenesis. Third molars were not included in the study. In the present study, the prevalence of tooth agenesis in our sample (62 %) with maxillary lateral incisor as the most frequently affected tooth. This is agreement with previous study have reported congenital absence of the cleft-side permanent lateral incisor to be the most common finding in children with a cleft lip, CP, or both [18]. It has been suggested that the high rate of agenesis near the cleft may be due to a deficiency in blood supply, either congenital or secondary to surgery, or to a deficiency in the mesenchymal mass [16,21].

Another dental anomalies observed in our study was malformed tooth (microdontia) which represented (55%) than reported by Dewinter et al. [23] (32%). Previous research has shown the prevalence of microdontia to vary in the general population from 1.5% to 2% [24]. The results clearly show that morphological irregularities of dental crowns, especially microdontia, occur throughout the entire dentition in subjects with CLP; they are not limited to maxillary units in the immediate area of the cleft.

In our study, ectopic eruption was found in (31.5%) of subjects with CLP. Larson et al. [13] reported that ectopic eruption of the permanent maxillary first molars was seen in 45% of subjects with large clefts and in (31%) subjects with small clefts. Other research [25] have shown no ectopically erupted tooth in their sample of subjects with CL/P.

A tooth with an apically displaced pulp chamber that did not show the usual constriction of the pulp at the cement-enamel junction and had an apically displaced furcation area was considered a taurodont. Transposition was said to be present when two teeth have exchanged positions. A sharp bend or curve in a tooth anywhere along its length was considered to represent dilacerations. This was clearly apparent when the root bent mesially or distally. In cases where dilacerations were toward the buccal or lingual, these were determined by evaluating the appearance of the apical portion of the root. If there was a round opaque area with a dark shadow in its central region cast by the apical foramen and the root canal gave a "bull's-eye" appearance, a dilacerations was recorded. Based on the radiographic examination, a tooth with any region of the crown that had an ill-defined radiolucency was diagnosed as hypoplastic. Caries was excluded upon the caries chart. For the diagnosis of supernumerary teeth, panoramic radiographs were evaluated, and in cases where doubt existed, periapical radiographs were used also (Figures 1,2,3,4,5 and 6).

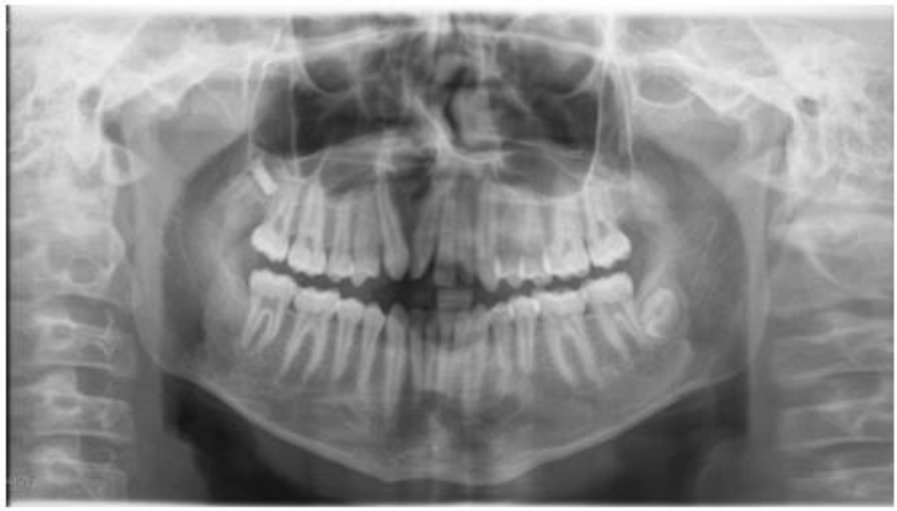

Figure 1: Orthopantomography of case showing right UCLP with missing lateral incisors

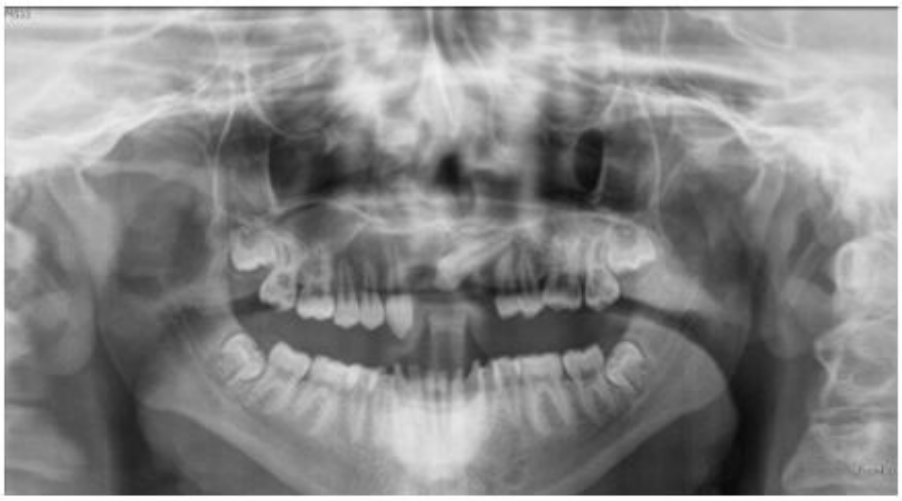

Figure 2: Orthopantomography of case showing BCLP with missing upper incisors, ectopic eruption of upper left canine

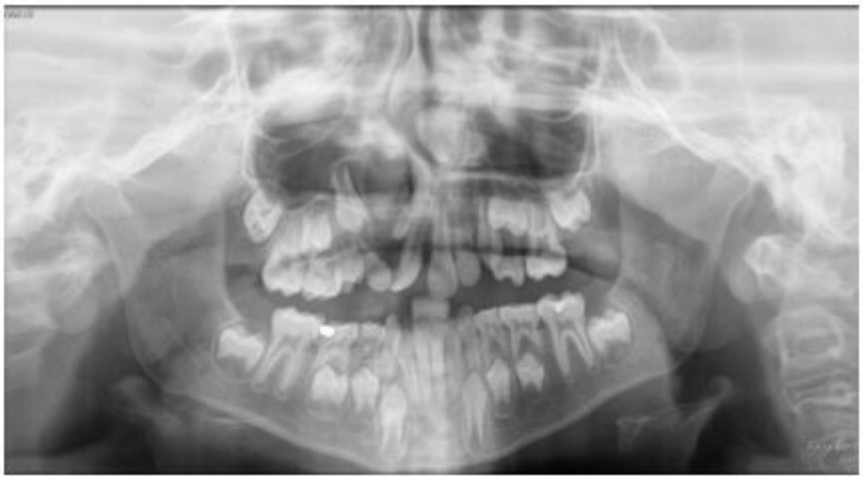

Figure 3: Orthopantomography of case showing right UCLP with microdontia of upper right incisor

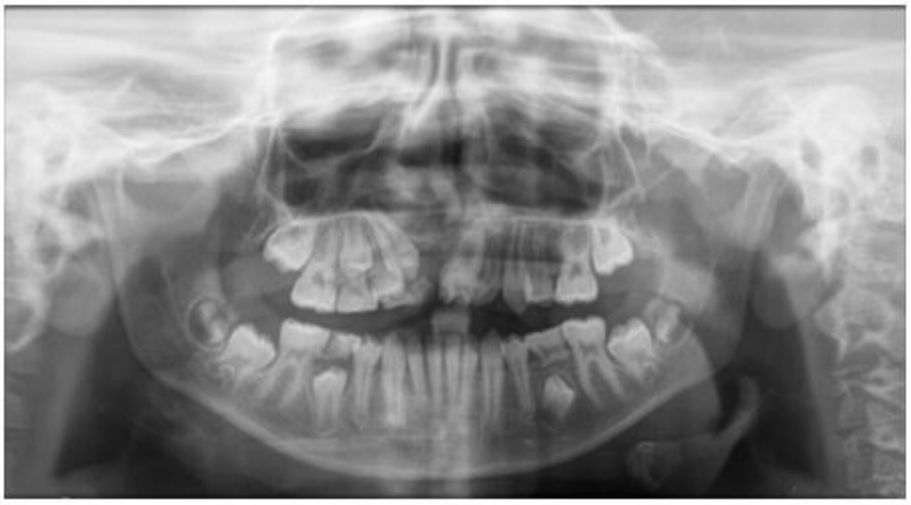

Figure 4: Orthopantomography of case showing right UCLP with agenesis of 12, 11, and 25, malformed of upper left central and lateral incisor

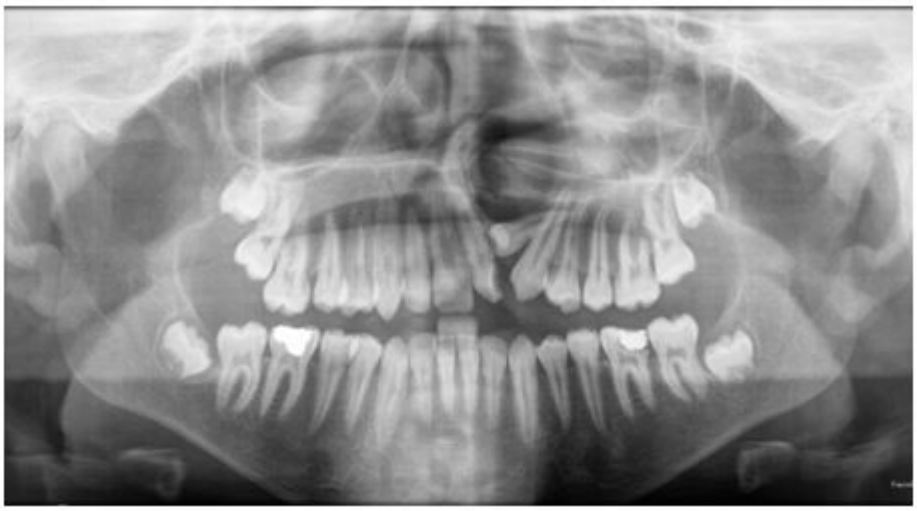

Figure 5: Orthopantomography of case showing left UCLP with ectopic eruption of 21

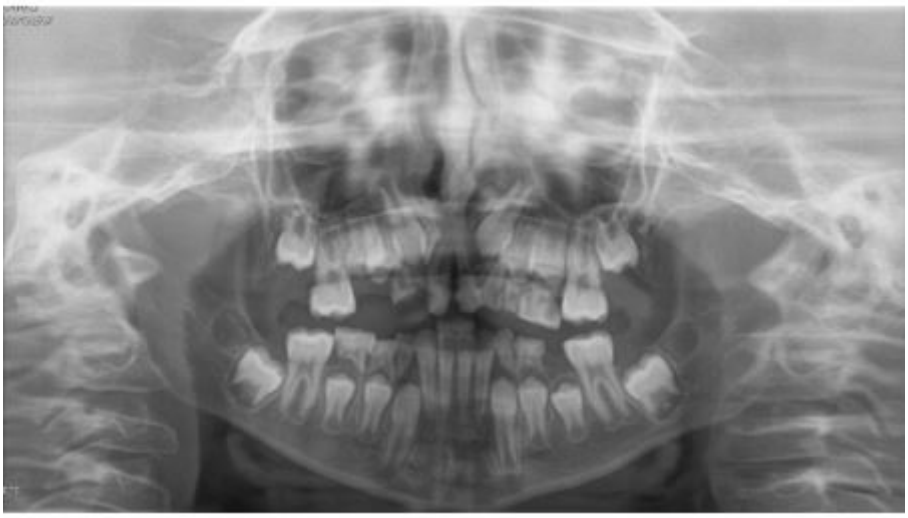

Figure 6: Orthopantomography of case showing BCLP with missing upper left lateral incisor, microdontia of both central incisors

Conclusion

The incidence of certain dental anomalies is correlated with CLP, a finding that is consistent with previous studies so should be taken into consideration in treatment planning of individuals with a cleft. Orthodontists should consider the risk of site and type of specific lateral incisor agenesis in orthodontic diagnosis and treatment planning. This study also emphasizes remarkable percentage of hypoplastic teeth which require interdisciplinary approach between oral surgery, orthodontics and restorative dentistry. The limitation of this present study, it was retrospective study and as such was limited to the clinical records available to the researchers. There might have been a higher number of congenital anomalies seen in the period under review but we have presented what was available in patient's records. Also arger samples are required to effectively determine the relationship of each dental anomaly with cleft type.

References

1. Tsai TP, Huang CS, Huang CC, See LC (1998) Distribution patterns of primary and permanent dentition in children with unilateral complete cleft lip and palate. Cleft Palate Craniofac J 35: 154-60.

2. Ruiz MAS, Gomide MR, Costa B, Neves LT (1999) Anomalias dentarias en la dentadura decidua en pacientes portadores de fisura complete unilateral de labio y paladar. Rev Fac Odontol Univ Chile 17: 35-41.

3. Mossey P, Castillia E (2003) Global Registry and Database on Craniofacial Anomalies, Geneva (CH): World Health Organization.

4. Al Omari F, Al-Omari IK (2004) Cleft lip and palate in Jordan: birth prevalence rate. Cleft Palate Craniofac J 41: 609-12.

5. Cassolato SF, Ross B, Daskalogiannakis J, Noble J, Tompson B, et al. (2009) Treatment of dental anomalies in children with complete unilateral cleft lip and palate at SickKids hospital, Toronto. Cleft Palate Craniofac J 46: 166-72.

6. Fraser FC (1970) The genetics of cleft lip and cleft palate. Am J Hum Genet 22: 336-52.

7. Camporesi M, Baccetti T, Marinelli A, Defraia E, Franchi L (2010) Maxillary dental anomalies in children with cleft lip and palate: a controlled study. Int J Paediatr Dent 20: 442-50.

8. Schroeder DC, Green LJ (1975) Frequency of dental trait anomalies in cleft, sibling, and noncleft groups. J Dent Res 54: 802-7.

9. Suzuki A, Takahama Y (1992) Maxillary lateral incisor of subjects with cleft lip and/or palate: Part 1. Cleft Palate Craniofac J 29: 376-9.

10. Eerens K, Vlietinck R, Heidbuchel K, Van Olmen A, Derom C, et al. (2001) Hypodontia and tooth formation in groups of children with cleft, siblings without cleft, and nonrelated controls. Cleft Palate Craniofac J 38: 374-8.

11. Ranta R, Rintala A (1982) Tooth anomalies associated with congenital sinuses of the lower lip and cleft lip/palate. Angle Orthod 52: 212-21.

12. Lopes LD, Mattos BS, Andre M (1991) Anomalies in number of teeth in patients with lip and/or palate clefts. Braz Dent J 2: 9-17.

13. Larson M, Hellquist R, Jakobsson OP (1998) Dental abnormalities and ectopic eruption in patients with isolated cleft palate. Scand J Plast Reconstr Surg Hand Surg 32: 203-12.

14. Larmour CJ, Mossey PA, Thind BS, Forgie AH, Stirrups DR (2005) Hypodontia a retrospective review of prevalence and etiology. Part I. Quintessence Int 36: 263-70.

15. Oliveira DFB, Capelozza ALA, Carvalho IMM (1996) Changes in tooth development in fissures [Alterac¸o˜ es de desenvolvimento denta´ rio em fissurados]. Rev Assoc Paul Cir Dent 50: 83-6.

16. Ribeiro LL, Neves LT, Costa B, Gomide MR (2003) Dental anomalies of the permanent lateral incisors and prevalence of hipodontia outside the cleft area in complete unilateral cleft lip and palate. Cleft Palate Craniofac J 40: 172-5.

17. Da Silva AP, Costa B, de Carvalho Carrara CF (2008) Dental anomalies of number in the permanent dentition of patients with bilateral cleft lip: radiographic study. Cleft Palate Craniofac J 45: 473-6

18. Ranta R (1989) Tooth germ transposition: report of cases. ASDC J Dent Child 56: 366-70.

19. van der Wal KG (1993) Dento-alveolar cleft and the lateral incisor [in Dutch], Ned Tijdschr Tandheelkd 100: 442-4.

20. Stahl F, Grabowski R, Wigger K (2006) Epidemiology of Hoffmeister's "genetically determined predisposition to disturbed development of the dentition" in patients with cleft lip and palate. Cleft Palate Craniofac J 43: 457-65.

21. Vichi M, Franchi L (1995) Abnormalities of the maxillary incisors in children with left lip and palate. ASDC J Dent Child 62: 412-7.

22. Laatikainen T, Ranta R (1996) Taurodontism in twins with cleft lip and/or palate. Eur J Oral Sci 104: 82-6.

23. Dewinter G, Quirynen M, Heidbuchel K, Verdonck A, Willems G, et al. (2003) Dental abnormalities, bone graft quality, and periodontal conditions in patients with unilateral cleft lip and palate at different phases of orthodontic treatment. Cleft Palate Craniofac J 40: 343-50.

24. Akcam M, Evirgen S, Uslu O, Memikoglu U (2010) Dental anomalis in individuals with cleft lip and/or palate. Eur J Orthod 32: 207-13.

25. Menezes R, Vieira AR (2008) Dental anomalies as part of the cleft spectrum. Cleft Palate Craniofac J 45: 414-9.