

## PREVALENCE OF DENTAL ANOMALIES IN PATIENTS WITH CLEFT LIP AND PALATE, PARAIBA, BRAZIL: CLINIC AND RADIOGRAPHIC STUDY

Camila H.M. Costa, Luciana V.O. Diniz, Rosa H.W. Lacerda, Franklin D.S. Forte, Fábio C. Sampaio

Postgraduate Programmes in Preventive and Pediatric Dentistry, Paraíba Federal University, João Pessoa, Brazil.

### ABSTRACT

The aim of this study is to investigate the prevalence of dental anomalies in a group of individuals with different types of clefts attending the reference service in orthodontics for the care of patients with clefts in Paraíba state, northeastern Brazil. This was a cross-sectional, observational study. Two previously trained examiners ( $\kappa = 0.89$ ) performed the clinical examination of 76 patients with post and incisive transforamen unilateral or bilateral clefts, of both sexes, aged 4 to 32 years, and the analysis of periapical and panoramic radiographs from archived records of these patients. Only the upper front teeth were evaluated. Data were processed by descriptive statistics and subjected to statistical Chi-square test considered significant at 5%. Among the patients evaluated, males (57.9%) and

left unilateral transforamen clefts (40.8%) were prevalent. Of the total 76 patients examined, 56 (73.68%) had at least one dental anomaly, the most frequent being agenesis (31.6%) and conical teeth (28.9%). The presence of anomalies differed significantly between the cleft and the contralateral sides ( $p < 0.00001$ ). The diagnosis and treatment of patients with clefts should therefore receive more attention. It is suggested that clinical and radiographic examination be performed together with careful planning and implementation of specialist services in an effort to provide early and adequate detection and treatment.

**Keyword:** cleft palate - anodontia - supernumerary tooth - epidemiology

## PREVALÊNCIA DE ANOMALIAS DENTÁRIAS EM PORTADORES DE FISSURA DE LÁBIO E PALATO, PARAÍBA, BRASIL: ESTUDO CLÍNICO E RADIOGRÁFICO

### RESUMO

O presente estudo teve como objetivo investigar a prevalência de anomalias dentárias em um grupo de indivíduos com diferentes tipos de fissuras que procuraram o serviço de referência em ortodontia no atendimento de fissurados da Paraíba, nordeste do Brasil. O estudo foi do tipo transversal e observacional. Para tanto, foi realizado por dois examinadores previamente treinados ( $\kappa = 0,89$ ) o exame clínico em 76 pacientes portadores de fissuras pós e transforame incisivo unilateral ou bilateral, de ambos os sexos e de 4 a 32 anos, e análise das radiografias periapicais e panorâmicas do arquivo dos prontuários desses pacientes. Apenas os dentes anteriores superiores foram avaliados. Os dados foram submetidos à estatística descritiva e ao teste estatístico qui-quadrado, sendo significativo ao nível de 5%. Dentre os indivíduos examinados, o gênero masculino (57,9%) e a fis-

sura transforame incisivo unilateral esquerda (40,8%) foram os mais prevalentes. A maioria dos examinados (73,68%) apresentou pelo menos uma anomalia dentária, sendo a agenesia (31,6%), seguida pela presença de dentes conóides (28,9%) as alterações mais frequentes. Os dentes mais afetados foram os incisivos laterais e houve diferença estatística significativa ( $p < 0,00001$ ) entre a presença de defeito do lado fissurado e do contralateral. Portanto, maior atenção deve ser dispensada ao diagnóstico e tratamento odontológico dos pacientes fissurados, sugerindo-se a associação do exame clínico e radiográfico a um planejamento criterioso e a implementação de serviços especializados na tentativa de detectar e tratar de forma precoce e correta estes pacientes.

**Palavras chave:** fissura palatina agenesia dentária - dente supranumerário - epidemiologia

### INTRODUCTION

Disturbances in growth or fusion of the tissue processes involved in the complex formation of the face and oral cavity can result in the formation of lip and/or palate clefts<sup>1-3</sup>. Clinical manifestations of these defects range from isolated cleft lip to cleft with bilateral involvement of the lip, alveolus and

palate. They can occur between the 4th and 8th weeks of intrauterine life and have been related mainly to the interaction of genetic and environmental factors<sup>4</sup>.

The formation of clefts is one of the most common birth defects in humans, although its prevalence is quite variable. In some European countries a preva-

lence rate of 1.3 to 1.81 per 1000 live births has been found<sup>5</sup>. In Latin America, prevalence estimates from 1982 to 1990 indicated a rate of 1 in 953 babies<sup>6</sup>. In Brazil, an epidemiological study conducted between 1998 and 2002 in Brazilian capitals showed a prevalence of 0.36 per 1000 live births<sup>7</sup>. It has also been proposed that individuals with cleft lip-palate have significantly more dental anomalies than individuals without clefts<sup>8-10</sup>. These changes can be attributed to the cleft itself or to trauma during the surgical repair of defects<sup>8</sup>. Furthermore, the severity of these abnormalities may be related to the severity of the cleft<sup>11</sup>.

These abnormal conditions include dental anomalies in number, shape, structure, location and timing of development and eruption<sup>3,8,10,12-15</sup>. Studies have shown that both permanent and deciduous teeth may be affected and that dental anomalies are more frequent on the cleft side<sup>16</sup>. Knowledge of the prevalence and behavior of dental anomalies is essential to good treatment planning for patients with cleft, since specific patterns of these changes may be related to different types of cleft.

Given the above, the aim of this study was to investigate the clinical and radiographic prevalence of dental anomalies in a group of individuals with different types of clefts attending the reference service in orthodontics for care of patients with cleft in Paraiba state, northeastern Brazil.

## MATERIALS AND METHODS

The Brazilian Dental Association (ABO), located in João Pessoa - Paraiba, has the regional referral service for orthodontic treatment of patients with cleft, and has provided this service since 2004.

The study was cross-sectional and observational, using clinical examination of 76 patients with post and incisive transforamen unilateral or bilateral clefts, of both sexes, aged 4 to 32 years, and X-ray analysis of archived records of these patients enrolled in the ABO orthodontics service in Joao Pessoa.

The sample included patients with lip-palate post and transforamen unilateral or bilateral clefts, with no other associated deformities, who had undergone primary surgery for cleft lip repair and palatoplasty and had periapical and panoramic radiographs of the jaws. The study was conducted in March and June 2011.

Two previously trained examiners ( $\kappa = 0.89$ ) collected data regarding changes in number (agenesis and supernumerary), shape (conical and twin teeth), position (rotated tooth and ectopic) and eruption (impacted tooth), which were properly recorded in the patient's identification form. Clinical evaluation was conducted with the aid of the dental chair under artificial light, using dental mirror number 5. The radiographic analysis was performed with panoramic and periapical radiographs of patients obtained prior to orthodontic treatment, which were in their records. All patients had their radiographs evaluated and were examined clinically.

Only the upper front teeth (central incisor, lateral incisor and canine) were evaluated. Once collected, data were processed by descriptive statistics and subject to statistical Chi-square test considered significant at 5%.

The research project was approved by the Ethics in Human Research, University Hospital Lauro Wanderley, Federal University of Paraiba (protocol 079/2011) and patients or their parents/guardians signed the consent form, agreeing with participation in the study.

## RESULTS

Among the 76 patients evaluated, 44 (57.9%) were male and 32 (42.1%) were female. Mean age was 13.3 years. Of these patients, 12 (15.8%) had right unilateral transforamen cleft, 32 (40.8%) had left unilateral transforamen cleft, 25 (32.9%) had bilateral transforamen cleft and only eight (10.5%) had post-foramen cleft.

Table 1 shows the distribution of patients according to the type of the cleft and presence or absence of dental anomalies. Of the total 76 patients exami-

**Table 1: Distribution of patients according to the type of the cleft and presence or absence of dental anomalies. João Pessoa/PB, Brazil, 2011.**

| Anomalies | Unilateral Cleft |      |      |      | Bilateral Cleft |      | Post-Foramen Cleft |     |
|-----------|------------------|------|------|------|-----------------|------|--------------------|-----|
|           | Right            |      | Left |      | n               | %    | n                  | %   |
|           | n                | %    | n    | %    |                 |      |                    |     |
| Absence   | 3                | 3.9  | 5    | 6.6  | 6               | 7.9  | 6                  | 7.9 |
| Presence  | 9                | 11.8 | 26   | 34.2 | 19              | 25.0 | 2                  | 2.6 |

ned, 56 individuals (73.68%) had at least one dental anomaly.

Among the anomalies observed, 31.6% of patients had agenesis, 28.9% abnormality in shape (conical teeth), 13.2% supernumerary teeth, 5.3% ectopy, 13.2% rotated teeth and 14.5% were impacted teeth. Only one patient had a twin tooth (1.3%).

Table 2 shows the number of teeth affected by different types of anomalies. Among the deficiencies found, 33.3% tooth had agenesis with 97.1% of this change located in the cleft area; 26.5% teeth with anomalies had altered shape (conical teeth), 92.6% of them being on the cleft side; 11.8% were supernumerary teeth, 100% located in the cleft region, 4.9% had ectopy, 10.8% of teeth were rotated 100% in the cleft area and 11.8% impacted with 66.7% on the cleft side.

Fig. 1 shows the distribution of these anomalies according to the 456 teeth examined (central incisors, lateral incisors and upper canines).

Among the dental anomalies found in this study, agenesis was the most prevalent, with teeth 22 (15%) and 12 (14%) as the most affected. The highest prevalence of conical teeth was also found for teeth 22 and 12 (19% and 6% respectively).

Of the 43 patients with unilateral clefts, 258 teeth were examined. Thus, when the presence of anomalies between the cleft and the contralateral sides is evaluated, the proportion of teeth with changes on the cleft side is significantly higher ( $p < 0.00001$ ) (Table 3).

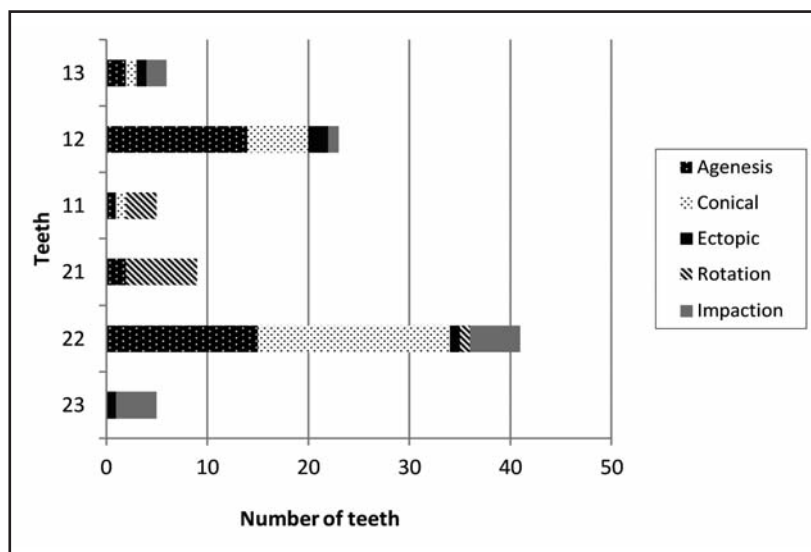


Fig. 1: Distribution of teeth according to the type and number of anomalies. João Pessoa/PB, Brazil, 2011.

Table 3: Distribution of the number of the teeth with and without dental anomalies according to cleft side (cleft side and noncleft side). João Pessoa/PB, Brazil, 2011.

|                   | Cleft side |       | Noncleft side |       | p*      |
|-------------------|------------|-------|---------------|-------|---------|
|                   | n          | %     | n             | %     |         |
| With anomalies    | 47         | 18.2% | 5             | 1.9%  | 0.00001 |
| Without anomalies | 82         | 31.8% | 124           | 48.1% |         |

\*Chi-square

Table 2: Distribution of dental anomalies according to cleft types. João Pessoa/PB, Brazil, 2011.

| Anomalies           | Unilateral Cleft |      | Bilateral Cleft | Post-Foramen Cleft | Total |      |
|---------------------|------------------|------|-----------------|--------------------|-------|------|
|                     | Right            | Left |                 |                    | n     | %    |
|                     | n                | n    | n               | n                  |       |      |
| Agenesis            | 4                | 10   | 20              | 0                  | 34    | 33.3 |
| Conical             | 2                | 15   | 10              | 0                  | 27    | 26.5 |
| Supranumerary teeth | 3                | 5    | 4               | 0                  | 12    | 11.8 |
| Ectopic eruption    | 2                | 1    | 2               | 0                  | 5     | 4.9  |
| Rotation            | 2                | 7    | 2               | 0                  | 11    | 10.8 |
| Impaction           | 0                | 7    | 3               | 2                  | 12    | 11.8 |
| Geminate            | 1                | 0    | 0               | 0                  | 1     | 1.0  |
| Total               | 14               | 45   | 41              | 2                  | 102   | 100  |

\*7 teeth showed two changes at once

## DISCUSSION

This research was conducted at the dental reference service for people with cleft lip or palate in the state of Paraíba. Knowledge of the prevalence of dental anomalies in cleft patients is essential for designing diagnostic, preventive and therapeutic measures, according to the frequent presence of abnormalities in these patients. The prevalence of anomalies found in this study highlights the importance of the study in order to determine frequencies, plan action at clinics and foster the development of guidelines for treatment of these patients.

Dentistry, through its diverse specialties, has achieved remarkable results in the rehabilitation of individuals with lip-palatine congenital malformations<sup>17</sup>. Dental anomalies in number, size and shape of teeth, as well as changes in the times of formation and eruption are often observed in these patients, causing not only aesthetic problems but also difficulties in chewing, breathing, swallowing and phonation<sup>16,18</sup>.

The high prevalence of dental anomalies in patients with clefts found in several studies therefore suggests the need for extensive research regarding detection and early diagnosis, so that clinical decisions may be taken with the aim of providing comprehensive care for the oral health of these patients. This proposal of clinical protocol should also address preventive, interceptive and corrective orthodontic measures in order to achieve better occlusion<sup>17</sup>.

Many studies indicate high prevalence of dental abnormalities in patients with clefts<sup>3,8,12-14,16,18-20</sup>. In this study, most individuals (73.6%) had at least one dental anomaly.

Agenesis was the most prevalent abnormality (33.3%), with 97.1% located in the cleft area and the most affected teeth being the lateral incisors. Patients with complete lip-palate clefts showed loss of bone structure at the site, which probably harms tooth development, thus justifying the high absence rate of the tooth adjacent to the cleft. This defect was also observed in many other studies<sup>3,18-20</sup> in which the upper lateral incisors were also the most affected tooth type<sup>8,10,13,14,16,21,22</sup>.

A radiographic investigation performed on a group of 78 individuals with lip-palate cleft in Jordan found that 66.7% had agenesis of some tooth with frequent lack of the lateral incisor<sup>8</sup>.

In agreement with the data presented, research performed in Sweden, Holland and Norway analyzing

240 panoramic radiographs of patients with complete bilateral cleft lip and palate found agenesis of at least one tooth in 59.8% of the patients, highlighting the higher frequency for lateral incisors and second premolars<sup>22</sup>.

A clinical study of 75 patients with unilateral lip-palate cleft from the University Hospital of the Catholic University of Leuven found that most dental anomalies were present on the cleft side in the anterior region. Agenesis of the lateral incisor was found in 58.6% patients on the cleft side, while the agenesis of these teeth on the non-cleft side was only 5%<sup>13</sup>.

The shape anomaly (conical teeth) was the second most prevalent alteration, with lateral incisors again being the most affected. The presence of supernumerary teeth was found in 13.2% of patients, 100% located in the cleft area, corroborating other studies<sup>8,12,13,16,19</sup>.

In a study conducted in Athens on children and adolescents with lip-palate clefts and a control group, the aim of which was to investigate the profile of oral health and dental anomalies, it was found that 9.8% of children with clefts had at least one supernumerary tooth; however, this was not found in the control group<sup>20</sup>.

Among anomalies of position, 5.3% of patients had ectopy and 13.2% had rotated teeth, with the highest prevalence in central incisors. Impacted teeth were present in 14.5% of patients. The same was observed in our study, and has been confirmed in other studies where patients with cleft showed high incidence of ectopic, impacted and rotated teeth, especially in the cleft area<sup>8,12,14,20,21</sup>.

Research indicates that dental anomalies are significantly more prevalent in patients with lip-palate clefts than in the overall population<sup>20,23</sup> and there is more incidence in the cleft region than in the contralateral region<sup>10,12-14,16, 21</sup>.

As shown in Table 3, the number of teeth with anomaly on the side affected by the cleft is higher than on the contralateral side ( $p < 0.0001$ ), not only emphasizing the relationship of the cleft with all the anomalies studied, but also suggesting that the perturbing effect of the cleft is more local than general on the dentition, as the number of teeth with anomalies increases with proximity to the cleft.

Another important observation is the relationship between cleft severity and the presence of anomaly. In cases of patients with post-foramen cleft, the pre-

sence of anomaly was much lower than in patients with transforamen cleft, suggesting that the greater its complexity, the greater patients' compromise. The acquisition of epidemiological data regarding these individuals should be considered relevant to the planning of health services. The lack of proper dental care exacerbates skeletal and dental changes resulting from malformations, further compromi-

sing the function, aesthetics and psychosocial aspects of individuals. Thus, greater attention should be given to diagnosis and dental treatment of patients with clefts. It is suggested that clinical and radiographic examination, careful planning and implementation of specialized services are needed in an effort to provide early and adequate detection and treatment.

#### CORRESPONDENCE

Dr. Camila Helena Machado da Costa  
Rua Maria Eunice Fernandes, nº118, Manaira.  
João Pessoa-PB, CEP 58038-480 - Brasil  
e-mail:camila\_helena\_@hotmail.com

#### REFERENCES

- Dixon DA. Defects of structure and formation of teeth in persons with cleft palate and effect of reparative surgery on the dental tissues. *Oral Surg Oral Med Oral Pathol* 1968; 25:435-446.
- Ranta R. Association of hypodontia and delayed development of the second premolars in cleft palate children. *Eur J Orthod* 1983;5:145-148.
- da Silva AP, Costa B, de Carvalho Carrara CF. Dental anomalies of number in the permanent dentition of patients with bilateral cleft lip: radiographic study. *Cleft Palate Craniofac J* 2008;45:473-476.
- Cobourne MT. The complex genetics of cleft lip and palate. *Eur J Orthod* 2004; 26:7-16.
- Derijcke A, Eerens A, Carels C. The incidence of oral clefts: a review. *Br J Oral Maxillofac Surg* 1996; 34:488-494.
- Rodrigues MTC, Torres MEM. Labio y paladar fisurados. Aspectos generales que deben conocer en la atención primaria de salud. *Rev Cuba Med Gen Integr* 2001;17:379-385.
- Rodrigues K, Sena MF, Roncalli AG, Ferreira MA. Prevalence of orofacial clefts and social factors in Brazil. *Braz Oral Res* 2009;23:38-42.
- Al Jamal GA, Hazzaa'a AM, Rawashdeh MA. Prevalence of dental anomalies in a population of cleft lip and palate patients. *Cleft Palate Craniofac J* 2010;47:413-420.
- Shapira Y, Lubit E, Kuftinec MM. Congenitally missing second premolars in cleft lip and cleft palate children. *Am J Orthod Dentofacial Orthop* 1999;115:396-400.
- Aizenbud D, Camasuvi S, Peled M, Brin I. Congenitally missing teeth in the Israeli cleft population. *Cleft Palate Craniofac J* 2005; 42:314-317.
- Eerens K, Vlietinck P, Heidbuchel K, Van Olmen A, Derom C, Willems G, Carels C. I. Hypodontia and tooth formation in groups of children with cleft, siblings without clefts, and non-related controls. *Cleft Palate Craniofac J* 2001;38:374-478.
- Akcam MO, Evirgen S, Uslu O, Memikoğlu UT. Dental anomalies in individuals with cleft lip and/or palate. *Eur J Orthod* 2010; 32:207-213.
- Dewinter G, Quirynen M, Heidbüchel K, Verdonck A, Willems G, Carels C. 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* 2003; 40:343-350.
- Lai MC, King NM, Wong HM. Abnormalities of maxillary anterior teeth in chinese children with cleft lip and palate. *Cleft Palate Craniofac J* 2009; 46:58-64.
- Vichi M, Franchi L. Abnormalities of the maxillary incisors in children with cleft lip and palate. *ASDC J Dent Child* 1995; 62:412-417.
- Camporesi M, Baccetti T, Marinelli A, Defraia E, Franchi L. Maxillary dental anomalies in children with cleft lip and palate: a controlled study. *Int J Paediatr Dent* 2010;20: 442-450.
- Vettore MV, Sousa Campos AE. Malocclusion characteristics of patients with cleft lip and/or palate. *Eur J Orthod* 2011;33:311-317.
- Menezes R, Vieira AR. Dental anomalies as part of the cleft spectrum. *Cleft Palate Craniofac J* 2008;45:414-419.
- Dahlöf G, Ussisoo-Joandi R, Ideberg M, Modeer T. Caries, gingivitis, and dental abnormalities in preschool children with cleft lip and/or palate. *Cleft Palate Craniofac J* 1989; 26:233-238.
- Parapanisiou V, Gizani S, Makou M, Papagiannoulis L. Oral health status and behaviour of Greek patients with cleft lip and palate. *Eur Arch of Paediatr Dent* 2009;10:85-89.
- Tortora C, Meazzini MC, Garattini G, Brusati R. Prevalence of abnormalities in dental structure, position, and eruption pattern in a population of unilateral and bilateral cleft lip and palate patients. *Cleft Palate Craniofac J* 2008; 45:154-162.
- Bartzela TN, Carels CE, Bronkhorst EM, Rønning E, Rizell S, Kuijpers-Jagtman AM. Tooth agenesis patterns in bilateral cleft lip and palate. *Eur J Oral Sci* 2010; 118:47-52.
- Kramer PF, Feldens CA, Ferreira SH, Spiguel MH, Feldens EG. Dental anomalies and associated factors in 2- to 5-year-old Brazilian children. *Int J Paediatr Dent* 2008; 18:434-440.