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Prevalence of Dental Anomalies in Children with Different Types of Cleft

Występowanie wad zębowych u dzieci z różnymi rodzajami rozszczepów

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A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of article

Abstract

Background. Cleft lip and/or palate (CLP) is one of the most common types of craniofacial birth defects

Objectives. The aim of the current study was to investigate the prevalence of dental anomalies in children with CLP and classify them according to the type of cleft.

Material and Methods. This study consisted of 201 cleft patients including 131 males (mean age 12.3 ± 4 years) and 70 females (mean age of 12.6 ± 3.9 years). Dental anomalies including rotation, enamel opacity and hypoplasia, and shape malformation of central and lateral incisors were recorded. T-test and chi-square test were used for assessment of the data.

Results. Central incisor rotation was the most frequent anomaly observed. 57.2% of all the patients had central incisor rotation while only 15.4% of them had lateral incisor rotation. Chi square test showed that no specific association existed between anomalies and type of cleft. Enamel opacity and hypoplasia of central incisor was recorded in 40.3% and 35.8% of the patients respectively. 16.4% of the patients had peg shaped lateral incisors.

Conclusions. Vast majority of cleft lip and or palate patients had at least one dental anomaly and most of the dental anomalies were observed at the side of cleft. However, no association could be found between the type of cleft and dental anomalies (*Dent. Med. Probl.* 2015, 52, 2, 192–196).

Key words: cleft lip and palate, total cleft, epidemiology.

Słowa kluczowe: rozszczep wargi i podniebienia, rozszczep całkowity, epidemiologia.

Cleft lip and/or palate (CLP) is one of the most common types of craniofacial birth defects [1]. It accounts for 65% of all head and neck anomalies [2]. Dental anomalies have been reported to be higher in patients with CLP compared with general population [3, 4]. This can be due to the cleft itself or a consequence of surgical corrections. Additionally, proximate anatomy, time of cleft formation, and dental development are some contributory factors to the association between dental anomalies and CLP [5]. Anomaly of shape and size of the teeth, enamel hypoplasia and opacity, and tooth malforma-

tion and rotation are examples of common dental anomalies in patients with CLP [6, 7]. Akcam et al. [7] reported that a significant proportion (96.7 per cent) of individuals with a cleft had at least one dental anomaly. In another study, a higher prevalence of enamel discoloration was found in children with a CLP when compared with a control group [8].

Because dental anomalies may be complicating factors in dental as well as orthodontic treatment, a detailed examination to determine the existence of anomalies is required before the initiation of orthodontic correction.

Very few studies investigating dental deformities among individuals with CLP have differentiated their results according to cleft type. Considering this lack of sufficient information regarding dental anomalies in regards to type of CLP especially in Persian population, the aim of the current study was to investigate the prevalence of dental anomalies in children with CLP and classify them according to the type of cleft and whether the anomaly is ipsilateral, contralateral, or on both sides.

Material and Methods

202 consecutive cleft lip and/or palate patients with Persian origin who were referred to orthodontic department of SBUMS from 2009 until 2011 were included in the study. This study was carried out in accordance with the ethical standards set forth in the 1964 Declaration of Helsinki. Informed written consent was obtained from each patient and a parent or guardian. Except for one subject who was excluded from the study none of the subjects had other known syndromes. Subjects' distribution according to gender can be seen in table 1. The final sample of 201 subjects included 131 males with the mean age of 12.3 ± 4 years and 70 females with the mean age of 12.6 ± 3.9 years. The patients' population was racially and ethnically similar. The patients were classified into 8 groups according to the classification proposed by Whitaker et al. [9]. Dental casts, panoramic and/or periapical and occlusal radiographs of the patients were used to determine the presence or absence of the teeth. A thorough examination for dental anomalies of the CLP patients including malformation of size and shape, rotation, and enamel hypoplasia and opacity of the incisors was undertaken.

Two observers analyzed the records at the same time. The results of their observations were

kept separate. The reliability of the measurements was determined by randomly selecting 20 samples and analyzing them on a separate occasion. Paired t-test showed no statistically significant differences between the two measurements. The Statistical Package for Social Sciences, Version 20 (SPSS Inc. Chicago, Illinois, USA) was used to analyze the data. T-test and Chi-square test were used to analyze the data and p-value was set at $p < 0.05$.

Results

201 consecutive cleft patients including 131 males and 70 females were included in the study. Table 2 shows the distribution of samples according to cleft type. Since unilateral and bilateral cleft lip and cleft palate groups had only one up to maximum 9 patients and the number of dental anomaly in them was negligible they were omitted from the study.

57.2% of all patients had central incisor rotation. The highest amount of central incisor rotation was observed in unilateral cleft lip and alveol patients (79.3%) while only 13.8% of them had lateral incisor rotation. 11 of these patients had central incisor rotation on the cleft side and 12 of them on both sides. Table 3 shows the detailed number and percentage of central and lateral incisors rotation of the patients. Chi-square test showed that there is no significant association between central incisor rotation and type of cleft ($P < 0.06$). No significant association was also found between lateral incisor rotation and cleft type ($P < 0.07$).

Table 4 shows the prevalence of central and lateral incisors opacity and hypoplasia. Chi-square test showed that there were no significant associations between type of cleft and central incisor opacity and hypoplasia ($P < 0.2$ and $P < 0.6$ respectively). Table 5 shows the prevalence of peg shaped laterals. This anomaly did not have any significant association with cleft type either ($P < 0.1$).

Table 1. Gender distribution of samples

Gender	N (%)	Age (year) Mean \pm SD
Male	131 (65.2)	12.3 ± 4
Female	70 (34.8)	12.6 ± 3.9

Table 2. Distribution of samples according to cleft type

Gender	Unilateral cleft lip	Bilateral cleft lip	Unilateral cleft lip and alveol	Bilateral cleft lip and alveol	Cleft palate	Unilateral cleft lip and palate	Bilateral cleft lip and palate	Total
Male	1	1	18	8	2	64	37	131
Female	-	1	11	4	7	27	20	70
Total	1	2	29	12	9	91	57	201

Discussion

Study of the most common patterns of dental anomalies including central and lateral incisors rotation, opacity, and hypoplasia and shape mal-

Table 3. Rotation of central and lateral incisors in different cleft types

Anomaly	Cleft Type	Unilateral cleft lip and alveol		bilateral cleft lip and alveol		unilateral cleft lip and palate		bilateral cleft lip and palate	
		No. of subj.	No.	%	No.	%	No.	%	No.
	Side	29	100	12	100	91	100	57	100
Central incisor rotation	Ipsilateral	11	38	5	41.6	17	18.7	10	17.5
	Contralateral	0	–	0	–	4	4.4	0	–
	Both	12	41.4	3	25	33	36.2	20	35
	Total	23	79.3	8	66.6	54	59.3	30	52.6
lateral incisor rotation	Ipsilateral	2	6.9	1	8.3	10	10.1	3	5.2
	Contralateral	0	–	0	–	4	4.4	0	–
	Both	2	6.9	0	–	1	1.1	8	14
	Total	4	13.8	1	8.3	15	16.5	11	19.3

Table 4. Enamel opacity and hypoplasia of central and lateral incisors in different cleft types

Anomaly	Cleft Type	Unilateral cleft lip and alveol		bilateral cleft lip and alveol		unilateral cleft lip and palate		bilateral cleft lip and palate	
		No. of subj.	No.	%	No.	%	No.	%	No.
	Side	29	100	12	100	91	100	57	100
Central incisor opacity	Ipsilateral	5	17.2	1	8.3	13	14.3	7	12.3
	Contralateral	2	6.9	0	–	7	7.7	0	–
	Both	6	20.7	4	33.3	22	24.2	14	24.5
	Total	13	44.8	5	41.6	42	46.1	21	36.8
Central incisor hypoplasia	Ipsilateral	2	6.9	2	16.6	11	12.1	6	10.5
	Contralateral	1	3.4	0	–	0	–	0	–
	Both	6	20.7	5	41.6	23	25.3	16	28.1
	Total	9	31	7	58.3	34	37.3	22	38.6
Lateral incisor opacity	Ipsilateral	2	6.9	1	8.3	4	4.4	4	7
	Contralateral	0	–	0	–	3	3.3	0	–
	Both	2	6.9	1	8.3	3	3.3	5	8.8
	Total	4	13.8	2	16.6	10	10.1	9	15.8
Lateral incisor hypoplasia	Ipsilateral	2	6.9	0	–	2	2.2	2	3.5
	Contralateral	1	3.4	0	–	1	1.1	0	–
	Both	0	–	1	8.3	0	–	5	8.8
	Total	3	10.3	1	8.3	3	3.3	7	12.3

Table 5. Peg shaped laterals in different cleft types

Anomaly	Cleft Type	Unilateral cleft lip and alveol		bilateral cleft lip and alveol		unilateral cleft lip and palate		bilateral cleft lip and palate	
		No. of subj.	No.	%	No.	%	No.	%	No.
	Side	29	100	12	100	91	100	57	100
Peg laterals	Ipsilateral	7	24.1	1	8.3	10	11	6	10.5
	Contralateral	0	–	0	–	2	2.2	0	–
	Both	1	3.4	1	8.3	1	1.1	4	7
	Total	8	27.5	2	16.7	13	14.3	10	17.5

formation in subjects with unilateral and bilateral cleft lip and palate, either in the cleft area or outside it, is important for accurate, timely, and effective orthodontic treatment planning.

This study showed that dental anomalies are very common in all types of cleft lip and or palate patients and there are no specific associations between the types of cleft and tooth anomalies including incisors and laterals rotation, opacity and hypoplasia and peg shaped laterals. The current study also found that the vast majority of the patients had at least one dental anomaly.

The findings of current study correspond with the findings of Akcam et al. [7] and Eslami et al. [10] who investigated the prevalence of dental anomalies in patients with cleft lip and palate, and found that a significant proportion of individuals with a cleft had at least one dental anomaly.

Similarly to the findings of the current study, Eslami et al. [10] did not find any associations between cleft type and dental anomalies either.

Enamel opacity and/or enamel hypoplasia may be caused by developmental or pathological disturbances during amelogenesis or by a mechanical trauma during enamel maturation. Maciel et al. [11] evaluated the presence of enamel

alterations affecting the deciduous and permanent central maxillary incisors of children with unilateral cleft lip and palate and found that enamel alterations affecting incisors adjacent to the cleft was higher than in the case of incisors on the non-cleft side. In our study also, enamel opacity of central incisor was recorded in 40.3% of the patients and enamel hypoplasia of central incisors was recorded in 35.8% of the patients. These numbers are very similar to the amount reported by Pegelow et al. [12] who reported that the central incisor had enamel opacities or enamel hypoplasia in 48.1 per cent of the patients in their total sample.

One of the limitations of current study, which generalizes the results, is the small number of patients. Further multi-center studies with a larger sample size and different races would definitely improve the literature. Future multidisciplinary studies focusing on dental anomalies of cleft patients are required.

The vast majority of cleft lip and or plate patients had at least one dental anomaly and most of the dental anomalies were observed at the side of cleft. However, no association could be found between the type of cleft and dental anomalies.

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