

## PREVALENCE OF DENTAL ANOMALIES IN NON-SYNDROMIC CLEFT LIP AND PALATE PATIENTS IN ERBIL CITY (AN ORTHOPANTOMOGRAMIC STUDY)

OMAR FAWZI CHAWSHLI

Dept. of POP, College of Dentistry, Hawler Medical University, Kurdistan Region-Iraq

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### ABSTRACT

**Background and objectives:** Cleft lip and palate deformity is one of the highly frequent and most difficult problems arising in the orthodontic clinics, one of the problems associated with these deformities is the dental anomalies presented as defect in the number and eruption process, this study aimed to find the prevalence of these dental anomalies in the cleft lip and palate patients in Erbil city.

**Method:** One hundred orthopantomograms out of 167 cleft lip and palate patients examined by a well-trained orthodontist for the presence of hypodontia, supernumerary teeth and any impactions and arranged according to the age, gender and the grouping of the deformity whether involving the alveolus or its unilateral or bilateral clefts then analyzed using statistical packages.

**Results:** Prevalence of dental anomalies involved a total of 271 dental anomalies distributed between the most frequent anomaly, starting with hypodontia (139) teeth missed, Impactions (103) teeth impacted and Supernumerary of a total (29) teeth, (96%) of the cases examined has at least one dental anomaly.

**Conclusion:** Dental anomalies commonly present with cleft lip and palate cases in Erbil city, orthodontists should consider these anomalies for managing such cases.

**KEY WORDS:** Cleft lip and palate, Dental anomalies, Orthopantomograms, Prevalence

### INTRODUCTION

Cleft lip and palate reported to be one of the most common congenital malformations in the head and neck region in the world. Surgical procedures for the management of cleft lip and palate have been advanced very quickly, but the epidemiologic research for the prevention of these defects remains in its primitive steps (Kim et al 2002, Fattah and Ali 2015).

With the advances that are available nowadays in the specialty of orthodontics and the fast evolution that happened in the appliances and the techniques, the orthodontist always faces difficulties with the management of the severe orthodontic problems like skeletal deformities and problems associated with cleft lip and palate patients which requires special interventions due to the associated dento-facial deformity (Nouri et al 2010, Okada et al 2012).

The management of these cleft lip and palate deformities necessitate a team intervention with a great share for the orthodontist. The main problem faces the orthodontist during the management of cleft lip and palate patients are the bone defect and the associated dental anomalies (Hong et al 2022).

The dental anomalies will affect the treatment plane of the orthodontist since space management should be planned and whether spaces left at end of treatment for future prosthetic replacements (Wu et al 2013).

Cleft lip and palate represents one of the most common dento-facial anomalies seen in the orthodontic clinics, these deformities express itself more as aberrations in the number, shape, location and chronology of eruption with hypodontia and supernumerary teeth expressed with much higher frequency (Viga et al 2015). These anomalies may be affected by the gender and the anomaly position, which affected the subject (Shapira et al 2000, Jamilian et al 2015).

The reason for these dental anomalies belongs mainly to the regional defect that affects the dental development. On the other hand iatrogenic factors like early surgical procedure applied during early child's age to close the defects may be responsible for these dental anomalies (Baek et al 2007, Moller et al 2021).

Comparing these cleft lip and palate patient with general population reveals much high prevalence of dental anomalies including the numbers of the teeth (Lekkas et al 2000, Suzuki et al 2017, Suria et al 2018)).

The incidence of the clip lip and/or palate patients is Erbil city 2:1000 birth which is

regarded a high number, this study aims to evaluate the prevalence of dental anomalies regarding numbering and eruption problems like impactions in cleft lip and palate patients in Erbil city (Nouri et al 2010, Fattah et al 2015).

## METHOD

The study design was an epidemiological retrospective study, which was carried at Erbil city at pedodontics, orthodontics and preventive dentistry (POP) department of college of dentistry at Hawler medical university according to the ethical approval of the college. All the data was collected from orthopantomographs of the Rizgary teaching hospital dental radiology department and teaching clinics of the college of dentistry at Hawler medical university. Records retrieved from February 2014 till November 2022. The sample size selected according to the data available from a study done on the incidence of cleft lip and/or palate patients in Erbil city.

The inclusion criteria were involved non-syndromic cleft lip and alveolus or cleft lip and palate cases aging 6 years and older with recorded OPGs for regular dental procedures with no history of orthodontic treatment depending on the file records of the patient at the hospitals. All unclear OPGs, atypical type of cleft and associated syndrome were excluded from the sample.

One hundred orthopantomographs of cleft lip and palate patients out of 167 that included the inclusion criteria were examined and observed by a single well trained orthodontic specialist to avoid any personal interpretation differences except for unclear or suspicious cases the interpretations Checked with another observer

just to be sure of the reliability of the data recorded.

The orthopantomographs examined for abnormalities in the numbering including hypodontia and supernumerary were recorded also any impactions according to the age of the patient at radiographic acquisition date was recorded, all patients information regarding the age, gender or any associated syndrome and the type of the clefts was recorded depending on the patient file record at the hospital and combined with the dental anomalies recorded from the examined OPGs for later on grouping and statistical analysis.

The collected data were classified into five groups: cleft lip and alveolus Right side CLAR, cleft lip and alveolus Left side CLAL, Unilateral cleft lip and palate Right side UCLPR, Unilateral cleft lip and palate Left side UCLPL and Bilateral cleft lip and palate BCLP Depending on the patients file and record. SpSS package for statistical evaluation was used.

## RESULTS

The sample that examined included one hundred orthopantomographs out of one hundred and sixty seven orthopantomographs analyzed due to absence of inclusion criteria. From this 100 orthopantomographs 66 was for male patients and 34 were for female patients.

Regarding the cleft severity frequency, UCLPL was the most frequent (42%) followed by BCLP (37%) then CLAL (9%) then UCLPR (8%) and the least was CLAR (4%) suggesting a more frequency of cleft in the left side more than the right side and unilateral more than bilateral clefts (see Table .1)

**Table (1):** Frequency of Cleft Types

	Frequency (percentage)	%	Valid %	Cumulative %
BCLP	37	37.0	37.0	37.0
CLAL	9	9.0	9.0	46.0
CLAR	4	4.0	4.0	50.0
UCLPL	42	42.0	42.0	92.0
UCLPR	8	8.0	8.0	100.0
Total	100	100.0	100.0	

Prevalence of studied dental anomalies involved a total of 271 dental anomalies distributed between the most frequent starting with hypodontia (139) teeth missed, Impactions (103) teeth impacted and supernumerary of a total (29) teeth, (96%) of the cases examined has at least one dental anomaly expressed as hypodontia, impactions or supernumerary teeth.

### Hypodontia:

Hypodontia involved a total of 139 teeth (75% of the cases); upper lateral incisors were the most frequent (75) teeth missed (46 left and 29 right) all present with BCLP cases then followed by upper 2<sup>nd</sup> premolars (41) teeth missed (20) right mostly present in BCLP and UCLPL cases equally (40% for each) and less in

UCLPR cases (20%) least frequently missing teeth was for the upper central incisors (12 teeth) and lower 2<sup>nd</sup> premolars (11 teeth) with more frequency for the left upper incisors (8) compared to less for right upper incisors (4) inversely more frequency of right lower 2<sup>nd</sup> premolars (7) compared to less for the left lower 2<sup>nd</sup> premolars (4) all distributed in BCLP cases for upper incisors and UCLPL for lower left 2<sup>nd</sup>

premolars and between UCLPL (71.4%) and BCLP (28.6%) for lower right 2<sup>nd</sup> premolar (Table 2).

A non-significant ( $p=0.572$ ) relation between the gender and the prevalence of hyposontia seen using the Chi square test also the relation between the severity of cleft and prevalence of hypodontia was non-significant ( $p=0.808$ ).

**Table (2):** Distribution of Hypodontia

Cleft type	Right central incisor	Left central incisor	Right lateral incisor	Left lateral incisor	Upper right 2 <sup>nd</sup> premolar	Upper left 2 <sup>nd</sup> Premolar	Lower right 2 <sup>nd</sup> premolar	Lower left 2 <sup>nd</sup> premolar
BCLP	100.0%	100.0%	44.8%	37.0%	40.0%	57.1%	28.6%	-
CLAL	-	-	13.8%	19.6%	-	-	-	-
CLAR	-	-	-	-	-	-	-	-
UCLPL	-	-	27.6%	34.8%	40.0%	42.9%	71.4%	100.0%
UCLPR	-	-	13.8%	8.7%	20.0%	-	-	-

### Impactions:

Impactions involved total of 103 teeth (75% of the cases); upper canines were the most frequent to be impacted (42) teeth being equally distributed between right and left (21 right and 21 left) all of which occurred in BCLP cases then followed by lateral incisors (32) teeth more with the left lateral incisors (24) which more occurred in UCLPL cases (70.8%) then BCLP cases (29.2%) while for the right ones all present with BCLP cases (100%) lastly the less frequent was the central incisors (29) teeth more with the left central incisors (25) which more presented in UCLPL cases (48%) and less at CLAL and

BCLP (36% and 16% respectively) while the right central incisors involved only (4) teeth being all with CLAR cases (Table 3).

Chi square test revealed a significant ( $p=0.041$ ) relation of gender with the prevalence of impaction being more in males (80.3% of males) than females (61.8 of females).

Also the Chi square test showed a highly significant relation ( $P=0.000$ ) between severity of cleft and prevalence of impaction being significantly higher in BCLP cases than CLA (both sides), which in turn was significantly higher than UCLP (both sides).

**Table (3):** Distribution of impactions

Cleft type	Right central incisor	Left central incisor	Right lateral incisor	Left lateral incisor	Right canine	Left canine
BCLP	-	16.0%	100.0%	29.2%	100.0%	100.0%
CLAL	-	36.0%	-	-	-	-
CLAR	100.0%	-	-	-	-	-
UCLPL	-	48.0%	-	70.8%	-	-
UCLPR	-	-	-	-	-	-

### Supernumerary teeth:

Total supernumerary teeth found in the examined orthopantomaograms of 100 patients was (29) teeth (25% of the cases): upper right lateral incisor seemed to be the most frequent one (14) supernumerary teeth mostly distributed at BCLP cases (64.3%) and less at UCLPL cases (35.7%) followed by upper left lateral incisor (7) supernumerary teeth which was all present with BCLP cases then the least ones was upper left central incisor, mesiodense and upper right

central incisor (4,3 and 1tooth) respectively (Table 4).

No gender predominance found regarding the prevalence of supernumerary teeth using Chi square test ( $p=0.617$ ) while the severity of cleft manifested a highly significant ( $p=0.008$ ) relation between the cleft and prevalence of supernumerary teeth being significantly higher in BCLP than CLA and UCLP while was significantly lower in CLA than BCLP and UCLP.

**Table (4):** Distribution of Supernumerary teeth

Cleft type	Mesiodense	Right central incisor	Left central incisor	Right lateral incisor	Left lateral incisor
BCLP	-	-	-	64.3%	100.0%
CLAL	-	-	-	-	-
CLAR	-	-	-	-	-
UCLPL	100.0%	100.0%	100.0%	35.7%	-
UCLPR	-	-	-	-	-

## DISCUSSION

The total number of dental anomalies in the 100 patients that examined reflect the magnitude of this problem in CLP patients which necessitates a thorough orthodontic treatment plan, being more expressed as hypodontia and impaction which both creates space problems with orthodontic management and this is usually present with these patients.

Cleft lip and palate are known to be more prevalent in boys. Cooper et al (1979) concluded the ratio of boys to girls to be as 1.6:1. In Korean cleft patients, the ratios of boys to girls are about 2.1:1 (Kim et al 2006). According to the outcome of the present study, the ratio of boys to girls was 1.95:1, which is in comparable to the previous studies.

Statistically non-significant differences were found in the incidence of hypodontia between males and females or the severity of the impactions which suggesting that this anomaly could be present in any type of dento-facial clefts with no gender predominance.

### Hypodontia:

This study showed a prevalence of 75% hypodontia in CLP patients in Erbil city. This frequency was statistically higher than (1.6-9.6%) recorded for a non-cleft population (Graber1979) and Reasonable more than the 45.5% previously recorded for cases with cleft lip and palate patients (Bohn1963). Hypodontia of the maxillary permanent lateral incisors, recorded in 53% in this study total cleft sample, was significantly higher than the 2.2% of normal population recorded by (Symons et al 1993), and similar to the 56.9% previously reported for cases with cleft lip and palate (Suzuki et al 1992)

Many Explanations have been advocated to explain the reason behind so many teeth is missing in dento-facial cleft patients. These theories state many environmental and genetic factors, lack of mesenchyme, and local effect of the cleft on the primeval tissues participated in the formation of the lateral incisor (Ross et al 1972). As of this time, there is not reasonable explanation about the left-side predominant occurrence for clefts and hypodontia, which was confirmed in the performed study or it could be due to the blood supply manner in that region.

### Impactions:

Impaction of the maxillary canines occurs in (1-3%) in general population (Peck 1994). The

findings of the current study showed a significantly high occurrence of impactions in the anterior regions in the cleft lip and palate patients (75%), with the highest rates in the anterior region on the cleft side with higher incidence for canine followed by lateral incisor then central incisor. It has been reported that impacted maxillary canines often present as a co-occurrences with other genetically related dental abnormalities (Baccetti1998).

The results of the current study showed a highly significant relation of this dental anomaly with the gender of the patient showing higher frequency of impaction in male patients more than females.

The results revealed a highly significant relation of the impactions with the severity of the dento-facial cleft in contrast to (Hong et al 2022) who found no significant relation with the severity of the cleft to the incidence of impaction.

### Supernumerary teeth:

The occurrence of supernumerary teeth in the cleft regions of dento-facial clefts has been reported to be the most 2<sup>nd</sup> predominant dental anomaly after hypodontia (Ribiero et al 2003). Supernumerary teeth have been recorded to be occur in various populations at different rates between (0.1-3.8%) (Peck et al 1994, Baccetti 1998). The finding of the current study showed higher rates expressed as (25%) in all cleft groups. A similar result (22.2%) of supernumerary permanent teeth in the cleft area was observed in patients with a unilateral cleft lip or palate, or both, and that supernumerary teeth related to a CLP result from degradation and segmentation of the dental lamina during cleft formation (Vichi and Franchi1995).

The incidence of supernumerary teeth in this study revealed to be related to the severity of the cleft present more in BCLP cases which is similar study done by (Werner et al 1989 and Uslu et al 2009).

## CONCLUSIONS

1. Highly incident dental defects (96%) present with CLP patients in Erbil city
2. Most dental anomalies revealed to be hypodontia then impactions and lastly supernumerary teeth.

3. Only impactions showed to be gender related in reverse to the other types of dental anomaly.

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