

HYPOPLASIA ASSESSMENT INDEX IN CLEFT LIP AND PALATE SUBJECTS

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ABSTRACT

The aim of this study was to assess hypoplasia in permanent maxillary anterior dentition.

The sample for this study consisted of 60 subjects divided into two groups: Group 1 consisted of 30 subjects with complete unilateral cleft lip and palate. Group 2 consisted of 30 subjects with complete bilateral cleft lip and palate (both males and females). Informed consent was taken from all patients. Inclusion criteria for cleft lip and palate subjects included: Complete repaired lip and palate, non-syndromic unilateral and bilateral cleft lip and palate both males and females with age 14 year-16 year (mean age cleft group 14.6 year \pm 73 year). Exclusion criteria included: Cleft lip and palate subjects with systemic diseases, incomplete repaired palate, open fistulas, developmental or acquired craniofacial muscular deformities, autoimmune conditions, syndromes, endocrine abnormalities, neurological problems, any previous history of orthodontic treatment and signs and symptoms of temporomandibular disorders. Clinical examination was performed under natural light with a dental mirror and dental probe. The presence or absence of lesions, their location, and their characteristics were recorded following the Simplified Index described by Silber man et al two digit system scoring.

The results showed highest 52% cases of obvious hypoplasia with caries and roughly round or oblong lesion.

It was concluded that hypoplasia is frequently related to maxillary anterior segment both in unilateral and bilateral cleft lip and palate.

Key Words: Hypoplasia in cleft-lip, cleft palate.

INTRODUCTION

Cleft lip and palate is the common anomaly found frequently with syndromes or without syndromes. Their associated characteristics varied widely based on multiple genetic and environmental causes. They affect craniofacial envelop with altered function. Dentition and related anomalies are frequent findings amongst them. This includes hypoplasia, missing tooth, impacted tooth, supernumerary etc. Hypoplasia is most common in maxillary anterior dentition.¹ This is also associated with maxillary hypoplasia. Its classification varied which is the significant part of orthodontic and restorative treatment. Dental anomalies found frequently in cleft lip and/or palate subjects include: Missing teeth 66.7%; the tooth most commonly missing

is the maxillary lateral incisor. Supernumerary teeth 16.7%; 30.8% microdontia; 70.5% taurodontism; 30.8% transposition and/or ectopic teeth; 19.2% dilacerations; and 30.8% hypoplastic teeth. They are found to be no statistically significant difference in the above anomalies between males and females. However, subjects with bilateral cleft lip and/or palate had significantly more microdontia, dilacerations, and hypoplastic teeth than subjects with unilateral cleft lip and/or palate. Overall, 96.7 percent of patients have at least one dental anomaly. Developmental defects of enamel became more prevalent with age, with at least one opacity at 56% of 4-year-old and 100% of 12-year old patients.^{13,14,15,16,17,18,19,20} Hypoplasia is frequently associated with the permanent maxillary anterior segment. Therefore, the aim of this article is to assess hypoplasia in permanent maxillary anterior dentition.

METHODOLOGY

Cleft subjects who were attending department of orthodontics at Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences, Dow University of Health Sciences, a major tertiary care center in Karachi-Pakistan.

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The sample for this study consisted of total 60 subjects divided into two groups: Group 1 consisted of 30 subjects with complete unilateral cleft lip and palate. Group 2 consisted of 30 subjects with complete bilateral cleft lip and palate (both males and females). Informed consent was taken from all patients.

Inclusion criteria for cleft lip and palate subjects include: Complete repaired lip and palate, non-syndromic unilateral and bilateral cleft lip and palate both males and females with age 14 year-16 year (mean age cleft group 14.6 year \pm 0.73 year).

Exclusion criteria include: Cleft lip and palate subjects with systemic diseases, incompletely repaired palate, open fistulas, developmental or acquired cranio-facial muscular deformities, autoimmune conditions, syndromes, endocrine abnormalities, neurological problems, any previous history of orthodontic treatment and signs and symptoms of temporomandibular disorders.

Clinical examination was performed under natural light with a dental mirror and a dental probe after drying the teeth with gauze to eliminate both saliva and plaque that might hide the defect. The presence or absence of lesions, their location, and their characteristics were recorded following the Simplified Index described by Silber Mann et al two digit system scoring.

The first digit indicates the severity and history of the lesion: 0: no hypoplasia, 1: minimal hypoplasia: smooth surface texture and brown, white, or yellow opaque areas, 2: obvious hypoplasia: defined structure loss with dotted and invaginated appearance, enamel loss, or surface rugosity, 3: obvious hypoplasia associated with caries, 4: restoration at the area usually affected by hypoplasia, 5: recurrent caries around the restoration at the area usually affected by hypoplasia, 6: excluded tooth: either extracted or restored with a full Crown. The second digit describes the type of hypoplasia: 0: linear, transverse, and encircling lesion occurring along the developmental lines of enamel; 1: roughly round or oblong lesion presenting plane or concave area with an opaque white or brown shade measuring 1 to 5 mm in diameter.

RESULTS

The results showed highest 52% cases of obvious hypoplasia with caries and roughly round or oblong lesion presenting plane or concave area with an opaque white or brown shade measuring 1 to 5 mm in diameter. Unilateral maxillary anterior segment affecting less as compared to bilateral cleft lip and palate. Results are also shown in the table and bar graph given below:

DISCUSSION

Cleft lip and palate is associated with failure of

TABLE 1: HYPOPLASIA INDEX (N=50) CLEFT LIP AND PALATE SUBJECTS

Grade	Percentage
1.0	2.0
2.0	26
2.1	8
3.0	12
3.1	52*

* predominates with obvious hypoplasia with caries and roughly round or oblong lesion presenting plane or concave area with an opaque white or brown shade measuring 1 to 5 mm in diameter.

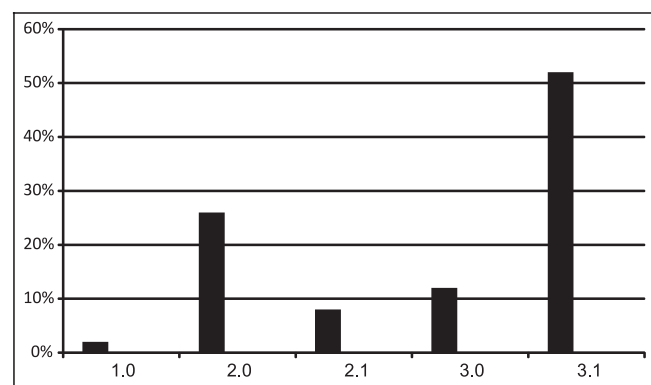


Fig 1: Percentage distribution of index in cleft lip and palate group

mesoderm migration and fusion related to branchial arches including developing maxillary and nasal process. Tooth formation is an integrated interaction between genetics, and oral environment in children with cleft lip and/or palate is already being reviewed by developmental studies of cleft lip/palate. There is an association of cleft type and dental abnormalities in number, size, shape, timing of formation, and eruption and cause of the abnormalities. The upper lateral incisor is the most susceptible to injury in the area of cleft in both deciduous and permanent dentitions.³ Our findings are also inconsistent with this. Antonarakis et al., in their meta-analysis showed increased DMF/dmf score in cleft lip and palate cases.³ Riis et al., also explained neural crest development fields related deviation associated with structural defects or agenesis.⁴ The abnormalities in tooth crown dimensions also explained by Rawashdeh et al., in their comprehensive data of 1525 teeth.^{5,6} Hypoplasia is also associated with gingival recession and proclination of maxillary central incisors in unilateral cleft lip and palate subjects.^{5,7,8,9} Our cleft data also showed 52% of cleft lip and palate cases with grade 3-1.

Janete et al., in their study noted the prevalence of enamel hypoplasia in deciduous canine as 43.8% in unilateral and 39% for bilateral cleft lip and palate

group.^{8,9,10} Their characteristic predominates with obvious hypoplasia with roughly rounded surface.^{11,12,13,14} But in our sample permanent dentition were being taken and overall obvious hypoplasia with rough surfaces were found. This showed a potential deficit of data in most of the cleft studies which lack permanent dentition grading.^{14,15,16,17,18,19} Hence our study is valuable in this regard. Further need of comprehensive strategies related to permanent dentition data status is required among cleft lip and palate subjects.

The maxillary anterior dentition is affected in most instances, even in the cases of microforms of the cleft lip. Oral epithelium is under rephrase under the combine inductive influence of both epithelium and neural crest. These cells migrated peripherally contributing craniofacial skeleton formation interacts also with mesenchymal cells. The neural crest cells also studied widely under experimental methods to enlighten their role and surface interactions. The expression of Bone morphogenetic, transforming growth factors, fibroblast growth factors, activin, follistatin are associated with morphogenesis. Bmp-2, Bmp-4, Bmp-7 shows expression in dental epithelium and have role in interaction with surrounding mesenchymal tissues.^{13,18} There is found no gender differences related to distribution of hypoplasia. Our data also did not find any significant differences related to this.^{11,12} However, statistically ($p < .05$) significant values found for anomalies related to both cleft type and side. These findings are inconsistent with our study data.

Currently available research data have limitations as there is a need to describe differences between dental arch development affected by hypoplasia both at pre-treatment stage and post treatment. The studies show limited sample, inconsistent age groups as controls. Further, there are no Long term data available with adequate follow up times both in unilateral and bilateral cleft lip and palate group related to surgical procedures employed for detailing or comparing both pretreatment and post-treatment. Our study also shows limitations related to sample size, three dimensional views and related long term outcomes among the treated group.

CONCLUSION

Hypoplasia is frequently related to maxillary anterior segment both in unilateral and bilateral cleft lip and palate. Bilateral cleft lip and palate are associated

with hypoplasia Grade (3-1) more than unilateral cleft lip and palate. Caries are found to be directly related with hypoplasia.

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