

PYRAMIDAL MOLAR ROOTS IN PRIMARY AND PERMANENT DENTITION ALONG WITH NON SYNDROMIC OLIGODONTIA IN A 11 YEAR OLD BOY.

* Manoj Kumar M.G., ** Sai Sankar A.J., *** Srikanth R.K.

* Professor and Head

** Professor

*** Assistant professor

Department of Pedodontics and Preventive Dentistry, Sibar Institute of Dental Sciences, Guntur, A.P.

ABSTRACT

Primary and permanent molars are usually multi rooted. At times we can encounter cases with a single root, called pyramidal root. Oligodontia is defined as the developmental absence of six teeth or more, excluding third molars. It can be isolated (Oligodontia-I) or as a part of a syndrome (Oligodontia-S) such as in ectodermal dysplasia. The present report describes a case of single-rooted primary and permanent molars associated with oligodontia in an 11 year old boy with no apparent systemic complications.

Key words: Oligodontia, syndrome, pyramidal root, tuberculated crown, single root, and barrel shaped incisor.

INTRODUCTION:

Primary and permanent molars are usually multirooted. Maxillary molars usually have three roots and mandibular are double-rooted (DuBrul 1980). A single root was attributed to fusion of roots or deep taurodontism. These roots previously were termed "pyramidal," "cuneiform," "tubular," "cylindrical," "prismatic," and "conical" (Ackerman et al. 1973). Investigators agree that this variation in root form results from failure of invagination of Hertwig's epithelial root sheath.¹

Oligodontia is defined as the developmental absence of six teeth or more, excluding third molars. It can be isolated (Oligodontia-I) or as a part of a syndrome (Oligodontia-S) such as in ectodermal dysplasia. Oligodontia in the permanent dentition occurs in 0.3 % of the population. Congenital absence of teeth most commonly occurs with the maxillary lateral incisors, second premolars, and mandibular central incisors. It may be either unilateral or bilateral.²

Morphologic dental anomalies may involve a single tooth, groups of teeth, or the entire dentition. In the present case, a combination of anomalies is described that involves the entire dentition without any other apparent systemic complications. The present report describes a case of single-rooted

primary and permanent molars associated with oligodontia in an 11 year old boy.

Case report:

An 11 year old male patient (FIG: 1) visited the department of pedodontics and preventive dentistry complaining of pain in the left side of tongue. On clinical examination traumatic ulcers were noted on the left lateral border of the tongue (FIG: 2). Patient

gave no significant past medical and dental history, neither there was any abnormality detected extra orally or on general examination. There interesting findings noted intra orally;

The teeth present are:

16 55 54 13 11 21 23 64 65
85 84 83 81 71 73 74 75 36

The maxillary central incisors are barrel shaped with deep lingual pits. The occlusal surfaces of mandibular primary and permanent molars are tuberculated (FIG 2). Since patient had fewer permanent teeth than normally expected for that chronological age, and though maxillary central incisors and canines have erupted; lateral incisors have not yet erupted (FIG 3) an ortho pantamograph (OPG) was advised to evaluate the developing dentition (FIG 4). OPG revealed no teeth

developing in the crypts except crypts seen succedaneous to 54 and 64 assuming to be developing 14 and 24. Also noticed on the radiograph was the single conical root of the molars, present in the oral cavity. The roots are called pyramidal roots. The ulcers seen on the left lateral border of the tongue are in association with sharp lingual cusps of 74. In an attempt to address the chief complaint of the patient the lingual cusps were rounded off and dentogel was prescribed to relieve mucosal pain. A removable partial denture was planned to replace the missing teeth mainly to maintain space so that later the missing teeth could be replaced with fixed prosthesis once growth is completed. The patient was accompanied by his grandparents who said that the patient's parents are in consanguineous marriage and they neither have similar problem nor they could recollect anyone in their family with similar dental condition. Impressions of the maxillary and mandibular arches were made and the patient was asked to come back with his parents in the next visit. Unfortunately the patient didn't turn up.

Discussion:

Variation in configuration of tooth structures were described and illustrated by early students of tooth morphology. The most commonly observed variation was confluence of the usually separate molar roots. Confluent roots were found most frequently in third molar and least often in the first. The term root fusion was applied to roots that appeared compressed and interconnected by cementum. Subsequently the descriptive term root fusion was clarified to convey the notion that these teeth represent failure of root differentiation rather than a secondary unification. Today there is considerable agreement that variation in root form result from failure of invagination of HERS. In taurodont tooth the body or trunk, is elongated relative to the short roots, the constriction at the neck is less marked and the pulp chamber is relatively large in relation to the outer tooth configuration.³

A single root was attributed to fusion of roots or deep taurodontism. These roots previously were termed pyramidal, cuneiform, tubular, cylindrical, prismatic and conical. Taurodont, pyramidal, fused roots may be variations of a single heritable trait, with the single pyramidal-shape the most sever

expression of the trait. Ackerman reported a kindred with root formation anomalies and described a 10 yr old boy with pyramidal roots in all primary molars.¹ The condition of single rooted molars is extremely rare, especially in primary dentition. Since Ackerman et al described the first case of single rooted primary molars in a 10 yr old child¹ only one report were found in the literature which was reported by Gideon Holan et al in 1991¹.

An in-depth analysis of similar dental anomalies was first reported by Robbins and Keene in 1964 and by Ackerman et al in 1971. Ackerman et al. discussed a group of dental and other abnormalities that occurred in three generations of a family of English and German descent. These abnormalities included skin manifestations such as a lack of "cupid's bow" and widening of the philtrum, clinodactyly of the fingers, and juvenile type glaucoma. The dental anomalies included conical, pyramidal, and fused roots. Although the patients described in this case report possessed similar dental anomalies like pyramidal roots, they have no physical appearances or family history of the other features found in the Ackerman et al. patients.⁴

A patient with similar mandibular molar features as noted in our case was described by Robbins and Keene in 1964, he described it as "multitubercular" appearance of the molars. These "tubercles" were described in another publication as "interstitial cusps" and "odontomes of the axial core type. In a similar case reported by Nguyen et al in 1996 the maxillary central incisors were slightly barrel shaped with deep lingual pits as noted in our case.⁴

It was found that 34.8% of 66 patients with hypodontia had at least one mandibular first permanent molar which showed taurodontism compared to only 7.5% of a control group without hypodontia. The trait may be seen both unilaterally and bilaterally and is most frequently seen in patients with multiple missing teeth⁵ and since taurodont, pyramidal, fused roots may be variations of a single heritable trait this could explain the association of oligodontia with pyramidal molars in the present case.

Genetic linkage and molecular biology studies have allowed, in the last decade, the identification of



Fig. 1 – an Eleven year old male patient.



Fig. 3 - Maxillary arch dentition showing barrel shaped central incisors and missing laterals.



Fig. 2 - Mandibular arch dentition showing tuberculated primary and permanent molars as well as ulcerations on the tongue

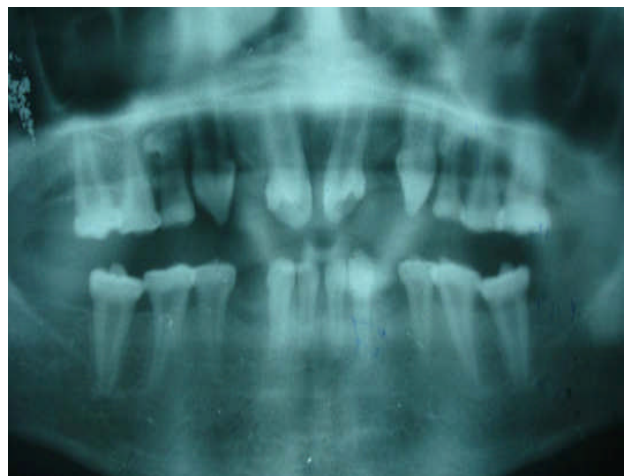


Fig. 4 - OPG showing missing tooth buds and pyramidal molar roots.

mutations responsible for some patterns of syndromic and non syndromic tooth agenesis. The mutated genes are key genes for the development of dentition, like the ones that encode the transcription factors MSX1, PAX9 and PITX2, the signalling protein EDA and its receptor EDAR.⁶

Congenital absence of teeth most commonly occurs with the maxillary lateral incisors, second premolars, and mandibular central incisors. It may be either unilateral or bilateral.² Non-syndromic agenesis can be sporadic or familial; and may be inherited in mendelian dominant or recessive autosomic mode, or X-linked Recessively inherited. Similar to the present case, Pirinen et al, described a condition in patients from 34 Finnish families. It is characterized by the absence of several lower incisors and upper lateral permanent incisors, also involving other teeth, particularly second premolars. In half of the patients, the corresponding deciduous teeth had either been missing. It is associated with other anomalies, like taurodontism, eruption delays and atopic conditions.⁶

Robbins and Keene 1964 suggested that single pyramidal shaped roots in molars inherited as an autosomal dominant condition.¹ The major dental anomalies in the present condition is similar to those described by Robbins and Keene, but the pattern of transmission in the family described here suggests an autosomal recessive condition. Both parents of the affected children and probably other members of the family are heterozygote carriers of the condition. The fact that the parents are close relatives, ie first cousins increase the possibility that their child is homozygotic. A case of a brother and sister with similar dental findings and mode of inheritance was reported by Gideon Holan et al in 1991.¹

CONCLUSION:

Treatment of patients with oligodontia generally requires a multidisciplinary approach. Some patients like ours may require pre restorative orthodontics to close space between central insisors. Restoration with a removable partial denture, conventional fixed partial denture, an implantretained prosthesis and adhesive restorative techniques, or a combination of these therapies are the treatment options. A number of factors must be

taken into account for success of our treatment, important being the age of the patient.

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Corresponding Author :

Dr. A. J. Sai Sankar. M. D. S.

Professor

Department of Pedodontics and Preventive Dentistry

Sibar Institute of Dental Sciences, Guntur, Andhra Pradesh, INDIA-522509

Email: saisamata@gmail.com

Ph: 9346550646.