

Congenitally Missing Teeth - A Rare Case Phenomenon

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Abstract- Congenitally missing teeth is the abnormality in the number of teeth. Also called anodontia. it can be total or partial anodontia. Studies shows that there is 35% missing of 3rd molars in the subject examined. Other commonly missing teeth are maxillary lateral incisor, & maxillary & mandibular 2nd premolars, often bilaterally. Congenitally missing deciduous teeth are uncommon but when occurring involving maxillary lateral incisor & mandibular cuspids. This paper describes the case of a young female patient with partial anodontia came for the extraction of over retained deciduous teeth followed by a proper treatment.

I. INTRODUCTION

In dentistry hypodontia is the condition at which the patient has missing teeth as a result of failure of those teeth to develop (also called tooth agenesis). Hypodontia describes a situation where the patient is missing upto 5 permanent teeth excluding 3rd molar. Studies on the frequency of missing 3rd molars have shown this tooth to be congenitally absent in as many as 35%. Other studies have shown that the maxillary lateral incisor & maxillary & mandibular premolars are commonly missing¹¹

II. DENTAL NORMAL FEATURES

A. DEVELOPMENT OF TOOTH

The tooth is formed from the ectoderm & ectomesenchyme². The enamel is derived from the enamel organ which is differentiated from the primitive oral epithelium lining stomodeum. Dentin & pulp are derivatives of dental papilla while cementum, periodontal ligament & alveolar bone are all derivatives of dental follicle.^{2,7,8}

Humans have two sets of teeth during a lifetime. **Deciduous dentition** which begins to form prenatally about **14 weeks in utero** & completed postnatally at about age **3**. the **permanent dentition** is completed at about age **14 to 15** except **3rd molar** which completes at **18 to 25**.¹

B. ERUPTION & SHEDDING

The eruption of teeth is a highly programmed event. The teeth developing within the bony crypt initially undergo bodily & eccentric movements & finally by eccentric movement make its appearance in oral cavity. At that time the roots are about half to two third complete^{2,7,8}

C. PATTERN OF TOOTH MOVEMENT^{2,7,8}

Preruptive tooth movement:

When deciduous tooth germ 1st differentiate they are very small & a good deal of space is between them. This space is soon used because of rapid growth of tooth germs & crowding results. This crowding is then relieved by growth of the jaws in length which permits drifting of tooth germs. Permanent teeth with deciduous predecessors also move before they reach the position from which they will erupt.

The permanent molars which have no deciduous predecessors also exhibit movement. Preruptive tooth movement should be considered as movement positioning the tooth & its crypt within the growing jaw.

Eruptive tooth movement: here the tooth moves from its position within the bone of the jaw to its functional position in occlusion & the principal direction of movement is **occlusal or axial**.

Posteruptive tooth movement: are those that **1) maintain the position of the erupted tooth while the jaws continue to grow & 2) compensate for occlusal & proximal wear**.

D. THEORIES OF TOOTH ERUPTION.^{2,7,8}

There are many possible causes have been proposed, only 4 merit serious consideration: **1) bone remodelling 2) root growth 3) vascular pressure & 4) ligament traction**.

1) Bone remodelling: it is important to permit tooth movement. Whether the bony remodelling that occurs around the teeth causes or is the effect of tooth movement is not known & both circumstances may apply. Others studies on bone remodelling have indicated that control may reside with the bone lining cells the **osteoblasts**. It is proposed that these cells under **proteolytic enzymes** to remove the osteoid layer & providing stimulus to attract **osteoclast** to its site.²

2) root formation: at 1st glance it would seem that root formation is the obvious cause of eruptive tooth movement. It produces enough force that leads to the resorption of bone. However this force in itself doesn't cause tooth movement. However rootless teeth also erupts.^{2,8}

3) vascular pressure: it is known that tooth move in synchrony with the arterial pulse, so **called local volume changes** can produce limited tooth movement. Decreased pressure overlying the tooth & increased pressure around the tooth are major factors in tooth eruption. Remodelling of tissues around the of the developing tooth brings about an increase in pressure tooth which causes the tooth movement.^{2,7}

4) periodontal ligament traction: there is a good deal of evidence that the eruptive force resides in the **dental follicle-periodontal ligament complex**. So long as the periodontal tissue is available, tooth movement occurs. Drugs that interrupt proper formation of collagen in the ligament also interfere with eruption.

Tissue culture experiments have shown that ligament fibroblasts are able to contract a collagen-gel which in turn brings about movement of a disk of root tissue attached to that gel.

Thus according to this theory, eruption of teeth could be brought about by a combination of events involving a force initiated by fibroblast. The force is transmitted to the extracellular compartment via fibronexus & to collagen fiber bundles which align in an appropriate inclination brought about by root formation, bring about tooth movement.^{2,7}

E. SHEDDING OF DECIDUOUS TEETH

The physiologic process resulting in the elimination of deciduous dentition is called *shedding or exfoliation*.²

Mechanism of resorption & shedding^{2,7,8}

Pressure exerted by tumours & cysts may be the cause for pathological root resorption. Unlike osteoblasts, cementoblasts covering the root are not responsive to hormones & cytokines. Therefore prior to resorption cementoblastic layer has to be damaged probably by inflammatory process.

Bone resorption is thought that the osteoblast must 1st degrade the osteoid thereby exposing mineralized bone to which osteoclast can attach.

The mechanisms of physiological root resorption & bone resorption were similar.

Whatever the preliminary steps in hard tissue resorption it is clear that the odontoclast attaches to the hard tissue surface peripherally through the clear zone thereby creating a sealed space lined by the ruffled border of the cell. In this way a microenvironment results.

The forces of mastication applied to the deciduous tooth capable of initiating resorption by giving trauma to the ligament which initiates resorption.

F. CLINICAL CONSIDERATIONS²

Remnants of deciduous teeth: sometimes part of deciduous teeth are not in the path of erupting permanent teeth & may escape resorption. Such remnants consisting of dentin & cementum may remain embedded in the jaw for a considerable time. They are most frequently found in association with the permanent premolars, especially in the region of the lower second premolars.

Retained deciduous teeth: such teeth are usually without permanent successors, or their successors are impacted. Most often seen are upper lateral incisor, less frequently 2nd permanent premolar & rarely the lower central incisor.

Submerged deciduous teeth: trauma may result in damage to either the dental follicle or the developing periodontal ligament. If this happens the eruption of the tooth ceases & it become ankylosed to the bone of the jaw.

G. CHRONOLOGY OF ERUPTION OF PRIMARY TEETH^{1,8}

<u>MAXILLARY</u>	<u>MANDIBULAR</u>	<u>ERUPTION(MEAN AGE) IN MONTH</u>	
CENTRAL INCISOR	CENTRAL INCISOR	10	8
LATERAL INCISOR	LATERAL INCISOR	11	13
CANINE	CANINE	19	20
1 ST MOLAR	1 ST MOLAR	16	16
2 ND MOLAR	2 ND MOLAR	29	27

CHRONOLOGY OF ERUPTION OF PERMANENT TEETH^{1,8}

<u>MAXILLARY</u>	<u>MANDIBULAR</u>	<u>EMERGENCE(ERUPTION)YEARS</u>	
CENTRAL INCISOR	CENTRAL INCISOR	7-8	6-7
LATERAL INCISOR	LATERAL INCISOR		
CANINE	CANINE	8-9	7-8
1 ST PREMOLAR	1 ST PREMOLAR	11-12	9-10
2 ND PREMOLAR	2 ND PREMOLAR	10-11	10-12
1 ST MOLAR	1 ST MOLAR	10-12	11-12
2 ND MOLAR	2 ND MOLAR	6-7	6-7
3 RD MOLAR	3 RD MOLAR	12-13	11-13
		17-21	17-21

In the absence of congenital disorders, dental diseases or trauma, the 1st teeth in the dentition begin to appear in the oral cavity at the mean age of 6 and the last at the mean age of 28 years.¹

**III. ABNORMALITY IN THE NUMBERS OF TEETH
ANODONTIA**

True anodontia: congenital absence of teeth. 2types *total & partial*.³

True partial anodontia (hypodontia): involves one or more teeth & is a common condition. Hypodontia is the development of an increased number of teeth & the additional number of teeth are termed as supernumerary.²

Oligodontia: a subdivision of hypodontia indicates lack of development of six or more teeth.⁴

Pseudo anodontia: when teeth are absent clinically because of impaction or delayed eruption⁵

False anodontia: when teeth have been exfoliated or extracted.^{3,4,5}

Complete anodontia is rare but is often associated with a syndrome known as Hereditary Ectodermal Dysplasia.⁵

Hypodontia is associated with syndromes like cleft lip or palate, Crouzon syndrome, Down's syndrome, Oral facial Digital syndrome, Ectodermal Dysplasia. Femal predominance is approximately 1.5:1.

Studies show the frequency of *missing 3rd molars* are common. Other studies shown that *maxillary lateral incisor & maxillary & mandibular 2nd premolars* are commonly missing often bilaterally. Although the etiology of a single missing tooth is unknown^{3,4,5,6,9,10}

Graber reported it as a result of one or more point mutation in a *closely linked polygenic system*. Partial anodontia is also seen in case of *Hereditary ectodermal dysplasia*. Also found in children due to exposure of *x ray radiation* at an early age³

IV. CASE REPORT

A patient, 25 years female, named Runali Pattanaik came to the OPD of institute of dental sciences to the department of oral & maxillofacial department with a *chief complain of pain on the lower right back teeth region*. (Figure 1)



Figure 1: patients photograph

On examination shows *retained deciduous tooth 85* with dislodged restoration & secondary caries along with tender on percussion.(Figure 2)

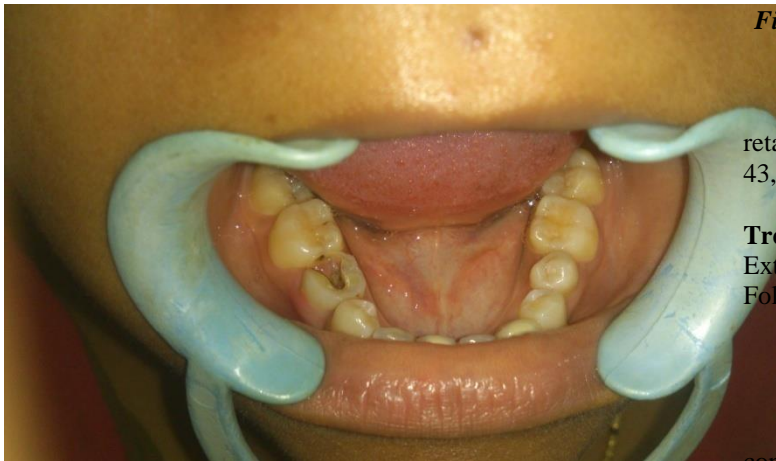


Figure 2: Intraoral examination showing overretained deciduous 85, with dislodged restoration & secondary caries.

Investigation of IOPA reveals radiolucency involving enamel & dentin with periapical pathology with resorbed root & congenitally missing the tooth bud of permanent 2nd premolar 45. (Figure 3)



Figure 3: IOPA showing retained 85 with apical pathology & congenital missing of its successor, 2nd premolar

With the diagnosis of *partial anodontia* we advised the patient for OPG which reveals *congenitally missing 45, 43, 31, 33 & impacted 48 & 18.* (Figure 4)



Figure 4: OPG showing congenitally missing 45, 43, 31, 33 & impacted 48, 18

With the above mentioned case our diagnosis was over retained 85 with periapical pathology & partial anodontia i.r.t 45, 43, 31, 33.

Treatment:

Extraction of 85
Followed by placement of bridge

V. CONCLUSION

Based on the above mentioned case report, it can be concluded that there are several etiology present behind the congenitally missing teeth. It can be due to evolutionary trend, genetic mutation, radiation or due to hereditary diseases. This above case shows the condition of congenital missing of deciduous successors in satisfactory level.

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