DEVELOPMENT AND ERUPTION OF THE TEETH

MALFORMATIONS

Dental anomalies are seen most often with third molars , maxillary lateral incisors , and mandibular second premolar.

Abnormally shaped crowns such as peg laterals and mandibular second premolars with two lingual cusps present restorative and space problems respectively.

Enamel hypoplasia is a general term referring to all quantitative defects of enamel thickness. They range from single or multiple pits to small furrows and wide troughs to entirely missing enamel.

Hypocalcification and opacities are qualitative defects. The location of defects on tooth crowns provides basic evidence for estimating the time of the development of the defect with an unknown error and potential bias .

In a cleft palate and lip , various associated malformations of the crowns of the teeth of both dentitions occur. The coronal malformations are not limited to the region of

the region of the cleft but involve posterior teeth as well .

A number of congenital malformations involving the teeth are evident , with some the result of endogenous factors and others the result of exogenous agents .

When a malformation has some particular characteristics (eg. Screwdriver- shaped central incisors) and is consistent with a particular phase of dental development , it may be possible to determine the cause of the disturbance .

CHRONOLOGY OF PRIMARY DENTITION

	Tooth		Emergence of Teeth (Months)
Upper	i1	E, F	10 (8–12)
	i2	D, G	11 (9–13)
	c	C, H	19 (16–22)
	m1	B, I	16 (13–19)♂ (14–18)♀
	m2	A, T	29 (25–33)
	Maxillary Teeth		
	Right	**A B C D E | F G H I J**	**Left**
		T S R Q P | O N M L K	
	Mandibular Teeth		
Lower	i1	P, O	8 (6–10)
	i2	Q, N	13 (10–16)
	c	R, M	20 (17–23)
	m1	S, L	16 (14–18)
	m2	T, K	27 (23–31)♂ (24–30)♀

i1, Central incisor; *i2*, lateral incisor; *C*, canine; *m1*, first molar; *m2*, second molar.
*Universal numbering system for primary/deciduous dentition (see Chapter 1). See Table 2-3 for detailed presentation of the data.

DEVELOPMENT AND ERUPTION / EMERGENCE OF THE TEETH

The term eruption was used tooth emergence through the gingiva , but then it became more completely defined to mean contimuous tooth movement from the dental bud to occlusal contact.

Emergence of the primary dentition takes place between 6^{th} and 30^{th} months of post natal life . It takes from 2 to 3 years from the primary dentition to be completed beginning with the initial calcification of primary central incisor to completion of the roots of primary second molar .

The emergence of primary dentition through the alveolar mucus membrane is a important time for the development of the oral motor behavior and the acquisition of masticator skills.

PRIMARY TEETH

Enamel organ do not all develop at the same rate , some teeth are completed before others are formed which results in different times of eruption for different groups of teeth.

Some of the primary teeth are undergoing resorption while the roots of others are still forming. Not all the primary teeths are lost at the same time , some are lost 6 years before the primary canines .

The primary dentition is completely formed by approximately 3 years and functions for relatively short period before it is lost completely at approximately age 11. Permanent dentition is completed at approx age 25 if 3rd molars are included.

Crown formation of the primary teeth continuous after birth for approximately 3 months for the central incisor , approximately 4 months for lateral incisor , 7 months for primary 1st molar and approx. 8.5 months for canine, and 10.5 months for second primary molar.

DENTITION

Human dentition are usually categorized as being primary , mixed (transitional), and permanent dentition.

1)Pre Natal/ Post natal development

The first indication of tooth formation occurs as early as the sixth week of pre natal life , when the jaws have assumed their initial shape , however at this tyime the jaws are rather small compared with the large brain case and orbits .

Mandibular arch is larger than maxillary arch.

When the jaws clos at this stage in the development of the dentition they make contact with the tongue which in turn makes contact with the cheeks .

All the stage of tooth formation fill both jaws during this stage of development .

Development of primary dentition

Development of both primary and permanent teeth continuous in this period and the jaw growth follows the need for additional spaces posteriorly for additional teeth.

In addition , the alveolar bone height increases to accommodate the increasing length of teeth. However Growth of interior parts of jaws is limited after about the first year of post natal life.

Sequence of emergence of primary teeth

- Emergence of primary teeth

At approximately 8 months of age , the mandibular central incisor emerge through the alveolar gingiva , followed by the other anterior teeth , so that by approximately 13 to 16 months , all 8 primarty incisor have erupted.

2) Primary dentition

The primary dentition is considered to be completed by approximately 30 months or when the second primary molars are in occlusion .

A slight increase in the intercanine width occurs about the time the primary incisors are lost , and an increase in size in both jaws in a sagittal direction is consistent with the space needed to accommodate the succedaneous teeth .

The splanchnocranium remains small in comparison with the neurocranium . the part of

the jaws that contain the primary teeth has almost reached adult width.

3) transitional (mixed) dentition period

First transition dentition begins with the emergence and eruption of the permanent mandibular first molars and ends with the loss of the last primary tooth , which usually occurs at approximately age 11 and 12.

The initial phase of the transition period lasts approximately 2 years , during which time the permanent first molars erupt , the primary incisors are shed , and the permanent incisors emerge and erupt into position .

The permanent teeth do not begin eruptive movements until after the crown is completed.

During eruption , the permanent mandibular first molar is guided by the distal surface of the second primary molar.

Permanent Dentition

Permanent dentition consisting of 32 teeth is completed from 18 to 35 years of age if 3rd molar is included . 4 or more centre of formation (developmental lobes) for each tooth.

The follicles of developing incisors and canines are in a position lingual to deciduous roots . The developing pre molars which eventually takes place of deciduous molars , are within the bifurcation of primary molar roots . The permanent incisor, canine and pre molars are called succedaneous teeth because they take the place of their primary predecessors .

Before the permanent central incisor can come into position , the primary central incisor must be exfoliated .This occurs through the

resorption of deciduous roots. The permanent tooth in its follicle attempts to move into the position held by its predecessor . Its influence on the primary root evidentaly causes resorption of the root , which continues until the primary crown has lost its anchorage , becomes loose and is finally exfoliated .

3rd molars do not come in until its seventeen or later . Considerbaly postrior jaw growth is required after age 12 to allow room for these teeth . 3RD molars are subject to many anomalies and variation of form .

DENTAL PULP

Connective tissue organ containing a number of structures , including arteries , veins , a lymphatic system , and nerves.

Primary function – form the detin of the tooth .

Dental pulp of newly erupted tooth is large and progressively becomes smaller as the tooth is completed.

Opening of the pulp cavity at the apex is constricted and is called apical foramen.

The pulp cavity becomes smaller and more constricted with age .

The pulp chamber within the crown may become almost obliterated with a secondary deposit(eg.osteodetin). this process is not as extensive in deciduous teeth.

CEMENTO ENAMEL JUNCTION

At the CEJ visualized anatomically as the cervical line , the following several types of junctions are found :

1) The enamel overlapping the cementum ,
2) An end- to- end approximating junction ,
3) The absence of connecting enamel and cementum so that the dentin is an external part of the surface of the root,
4) An overlapping of the enamel by the cementum.

These different junctions have clinical significance in the presence of disease cervical sensitivity, caries, and erosion and placement of the margins of dental restorations.

The CEJ is a significant landmark for probing the level of the attachment of

fibers to the teeth in the presence of periodontal diseases.

Using a periodontal probe , it is possible to relate the position of the gingival margin and the attachment to the CEJ .

Probing is done clinically to determine the level of periodontal support .

DENTAL AGE

Dental age is generally based on the formation of the eruption of the teeth .

When the last tooth has been completed the skeleton is approaching complete maturation. Lateral attrition and wear maybe used to estimate chronological age , but the estimation of the adult age and best is only on order of +/- 5 years . Estimation of juvenile age is more precise than that if adult age .

Pre natal tooth formation are based generally on dissected fetal material . Post natal development chronologies are most often based on radiological data .

Dentition maybe considered to be the single best physiological indicator of the chronological age in juveniles . Dental age has been assessed on basis of number of teeth at each chronological age or on stages of the formation of crowns and roots of the teeth .

AGE OF ATTAINMENT

age -of – attainment chronologies may be produced by cumulative distributive functions or product analysis and by the average of age at first appearance less one half between examination .

cumulative distributive functions , which have been used by number of investigators appear to be the best method of determining the age of attainment.

Age -of -attainment schedules are useful clinically when it is necessary to avoid damage to developing teeth during treatment .