# GROWTH AND DEVELOPMENT OF THE DENTITION

## ABNORMALITIES OF TOOTH DEVELOPMENT

## LECTURE OBJECTIVES

Abnormalities of tooth eruption
Abnormalities of tooth form
Abnormalities of tooth number
Abnormalities of tooth structure

# ABNORMALITIES OF TOOTH ERUPTION

# CHRONOLOGY OF ERUPTION OF DECIDUOUS & PERMANENT DENTITIONS

# TEETH AT DIFFERENT AGES

## CHRONOLOGY OF THE HUMAN DECIDUOUS TEETH

| Tooth | Enamel organ appearance | Beginning of calcific-ation | Eruption | Root completed | Beginning of root resorption | Shedding. |
|---|---|---|---|---|---|---|
| A | 7 w.i.u. | 4 m.i.u. | 7 m. | 1.5 y. | 4 y. | 7 y. |
| A | 7 w.i.u. | 4 m.i.u. | 6 m. | 1.5 y. | 4 y. | 7 y. |
| B | **7 w.i.u.** | 4.5 m.i.u. | **8 m.** | **2 y.** | **5 y.** | **8 y.** |
| B | 7 w.i.u. | **4.5 m.i.u.** | 7 m. | 1.5 y. | 5 y. | 8 y. |
| C | **8 w.i.u.** | **5 m.i.u.** | **18 m.** | **3 y.** | **8 y.** | 11 y. |
| C | 8 w.i.u. | 5 m.i.u. | 16 m. | 3 y. | 8 y. | 9 y. |
| D | **8 w.i.u.** | **5 m.i.u.** | **14 m.** | **2.5 y.** | **6 y.** | **10 y.** |
| D | 8 w.i.u. | 5 m.i.u. | 12 m. | 2.5 y. | 6 y. | 9 y. |
| E | **9 w.i.u.** | 6 m.i.u. | **24 m.** | **3 y.** | **7 y.** | **10 y.** |
| E | 9 w.i.u. | 6 m.i.u. | 20 m. | 3 y. | 7 y. | 10 y. |

## CHRONOLOGY OF THE HUMAN PERMANENT TEETH

| Tooth | Enamel organ appearance. | Beginning of calcification | Crown completed. | Eruption. | Root completed. |
|---|---|---|---|---|---|
| $\underline{1}$ | 5 m.i.u. | 3-4 m. | 4-5 y. | 7-8 y. | 10 y. |
| 1 | 5 m.i.u. | 3-4 m. | 4-5 y. | 7-8 y. | 9 y. |
| $\underline{2}$ | 5 m.i.u. | 10-12 m. | 4-5 y. | 8-9 y. | 11 y. |
| 2 | 5 m.i.u. | 3-4 m. | 4-5 y. | 7-8 y. | 10 y. |
| $\underline{3}$ | 6 m.i.u. | 4-5 m. | 6-7 y. | 11-12 y. | 14-15 y. |
| 3 | 6 m.i.u. | 4-5 m. | 6-7 y. | 9-10 y. | 12-14 y. |
| $\underline{4}$ | 7 m.i.u. | 1½-1¾ y. | 5-6 y. | 10-11 y. | 12-13 y. |
| 4 | 7 m.i.u. | 1¾-2 y. | 5-6 y. | 10-12 y. | 12-13 y. |
| $\underline{5}$ | 8 m.i.u. | 2-2½ y. | 6-7 y. | 10-12 y. | 13-15 y. |
| 5 | 8 m.i.u. | 2¼-2½ y. | 6-7 y. | 11-12 y. | 13-15 y. |
| $\underline{6}$ | 4 m.i.u. | At birth. | 3-4 y. | 6-7 y. | 9-10 y. |
| 6 | 4 m.i.u. | At birth. | 2½-3 y. | 6-7 y. | 9-10 y. |
| $\underline{7}$ | 1 y. | 2½-3 y. | 7-8 y. | 12-13 y. | 14-16 y. |
| 7 | 1 y. | 2½-3 y. | 7-8 y. | 11-13 y. | 14-16 y. |
| $\underline{8}$ | 4 y. | 7-9 y. | 12-16 y. | 17-21 y. | 18-25 y. |
| 8 | 4 y. | 8-10 y. | 12-16 y. | 17-21 y. | 18-25 y. |

## FACTORS THAT INFLUENCE THE TIMING OF ERUPTION

Genetic factors

Race

Birthweight

Gender

Systemic factors- Hypo/Hyperthyroidism, Hypopituitarism

Syndromic factors- Downs, Sturge-Weber

Hormones and Vitamins

Socioeconomic factors-? Nutrition

# ABNORMALITIES OF TOOTH ERUPTION

**TEETHING** (Misnomer)

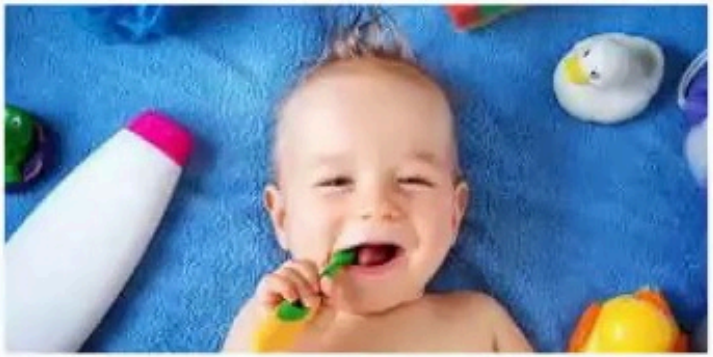
- Emergence/cutting of the (primary) tooth into the oral cavity
- Begins in the $5^{th}$-$7^{th}$ month of the child's life
- Represents an important early milestone in a child's development, eagerly awaited by parents
- Most cases of teething cause no distress to the child other than some local and/or general irritability

## SYMPTOMS IN TEETHING

Symptoms are usually mild but some infants may suffer significant discomfort

- general fussiness & irritability
- drooling of saliva &circumoral rash
- disturbed sleep
- refusal to eat
- flushed cheeks with ***mild*** fever
- gum irritation

Treatment of Teething is symptomatic



*Caution*

***High fever, vomiting & diarrhoea*** are ***not*** normal symptoms of Teething

*Possibilities*

-Age at which they are losing mother's passive immunity & developing own through exposure therefore vulnerable to viral infections

-Babies do not discriminate what they put in the mouth as part of oral exploration at that age

Therefore when these symptoms are reported, they require proper evaluation & management.

## NATAL & NEONATAL TEETH

- Teeth that are present at birth or erupt within the first month of birth (natal, neonatal teeth respectively)
- Older terms- ‘fetel teeth’, ‘congenital teeth’
- Prevalence -1: 2000 or 3000 births

## AETIOLOGY

- Hereditary-autosomal dominant trait?
- Abnormal superficial positioning of the tooth-germ
- Excessive hormonal stimulation
- Environmental factors
- Associated with certain conditions such as dystrophic fingernails or hyperpimentation
- Syndromes-cleidocranial dysplasia, pachyonichia congenita, Ellis-van Crevald syndrome

## CLINICAL IMPLICATIONS

- Natal and neonatal teeth lack root structure and will usually exfoliate during infancy.
- May present a potential hazard to the infant from aspiration.
- May cause traumatic ulceration on tongue, frenum or lip if sharply edged.
- Baby may present with difficulties in breastfeeding.
- **Parents are frequently unhappy (taboo)!**

## MANAGEMENT OF NATAL TEETH

- Reassurance- these teeth are most often members of the normal series
- Extraction is indicated if highly mobile (may be inhaled), or when interfering with breastfeeding or causing ulceration of the tongue or lingual frenum
- If left in position development continues, root growth takes place and attachment improves
- Final size may often be small

# NEONATAL TEETH

# DELAYED ERUPTION OF TEETH

## DELAY IN ERUPTION OF TEETH(LOCAL FACTORS)

- Retention of the predecessor
- Aberrant tooth position
- Lack of space in the arch
- Congenital absence of teeth
- Ankylosis of predecessor
- Dilaceration due to trauma
- Cysts(dentigerous cysts)
- Tumours


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Figure 1: Showing scar

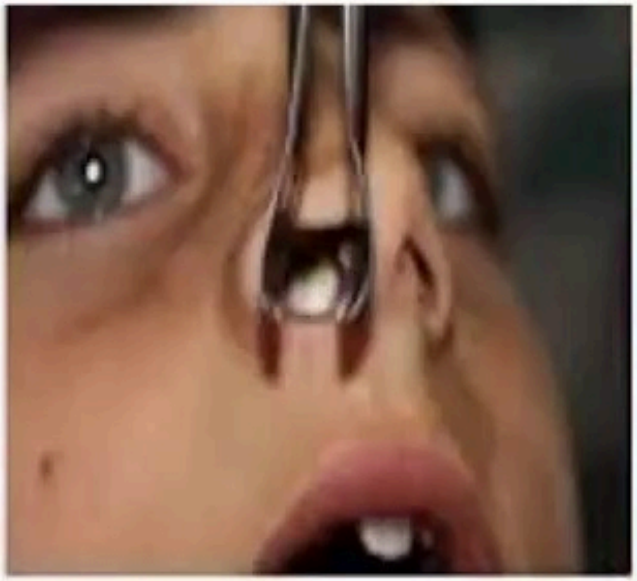
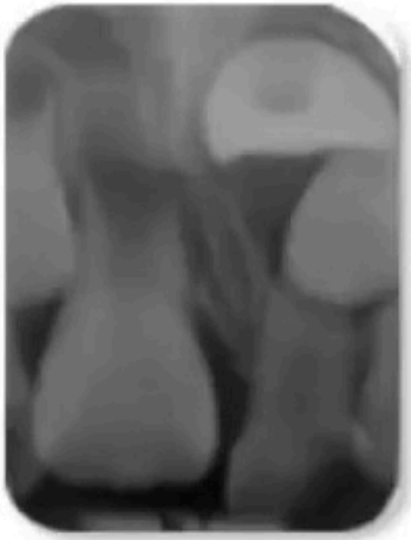
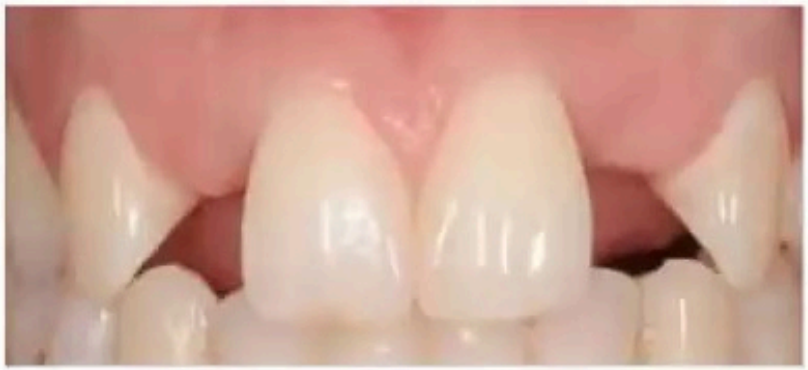


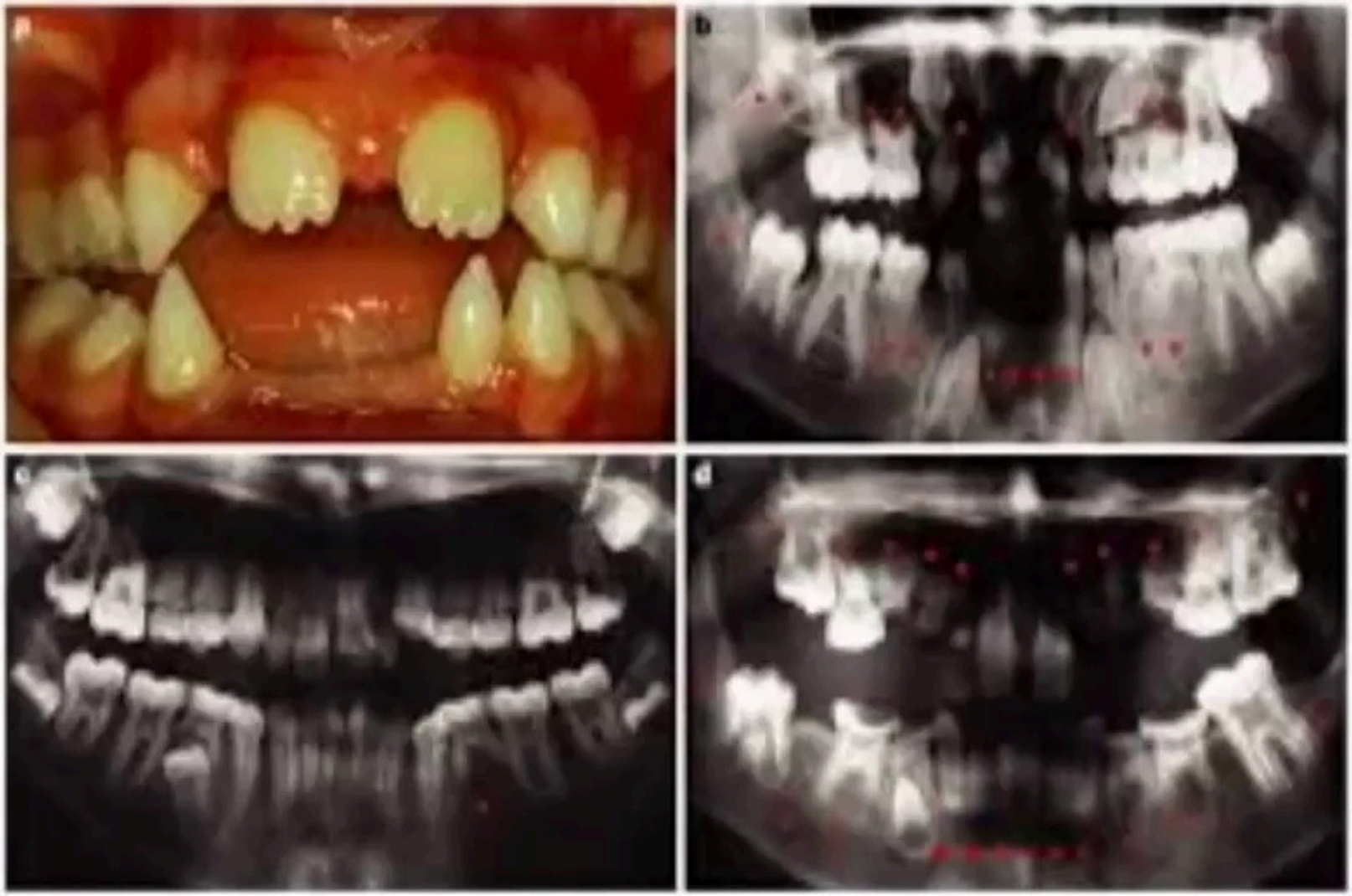
Figure 2: Extraoral examination

Figure 3: Intraoral Examination





Lateral Missing



Nature Reviews | Genetics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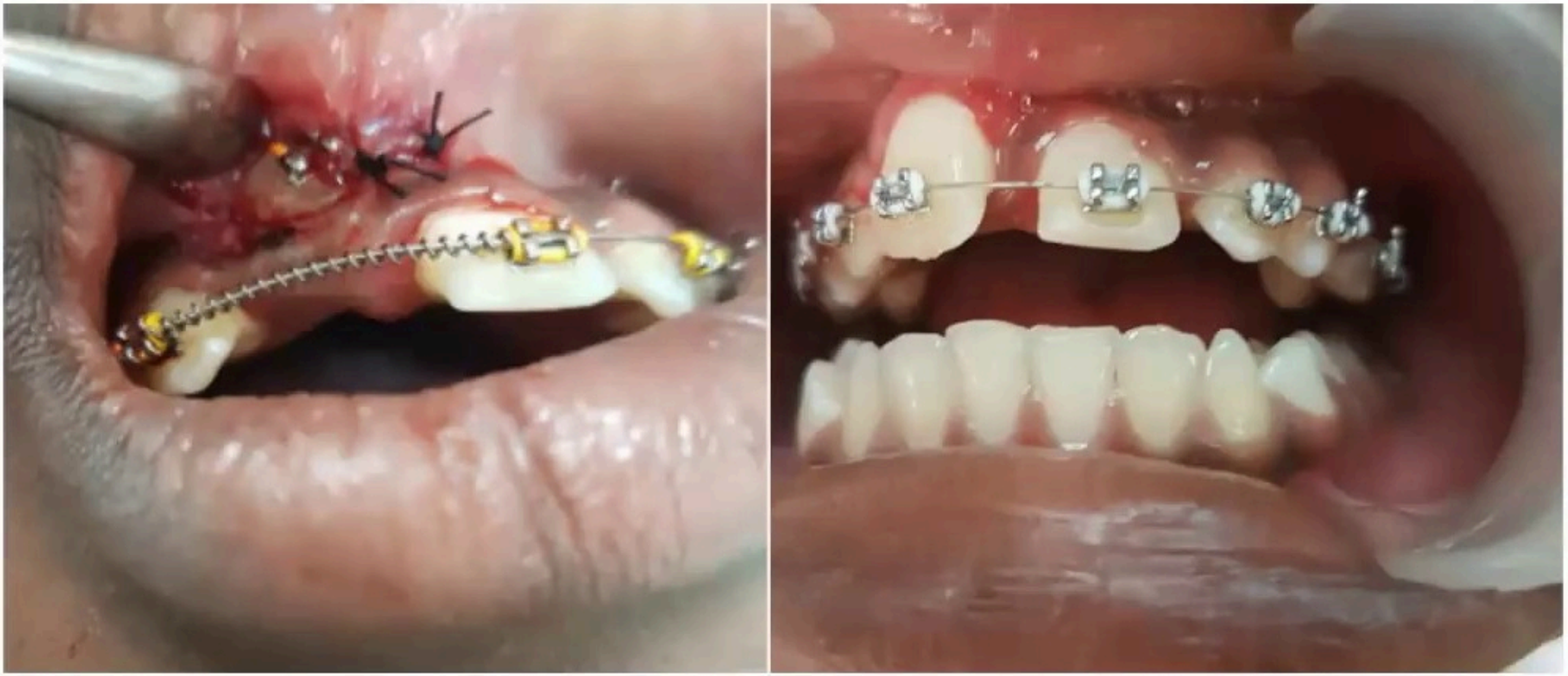
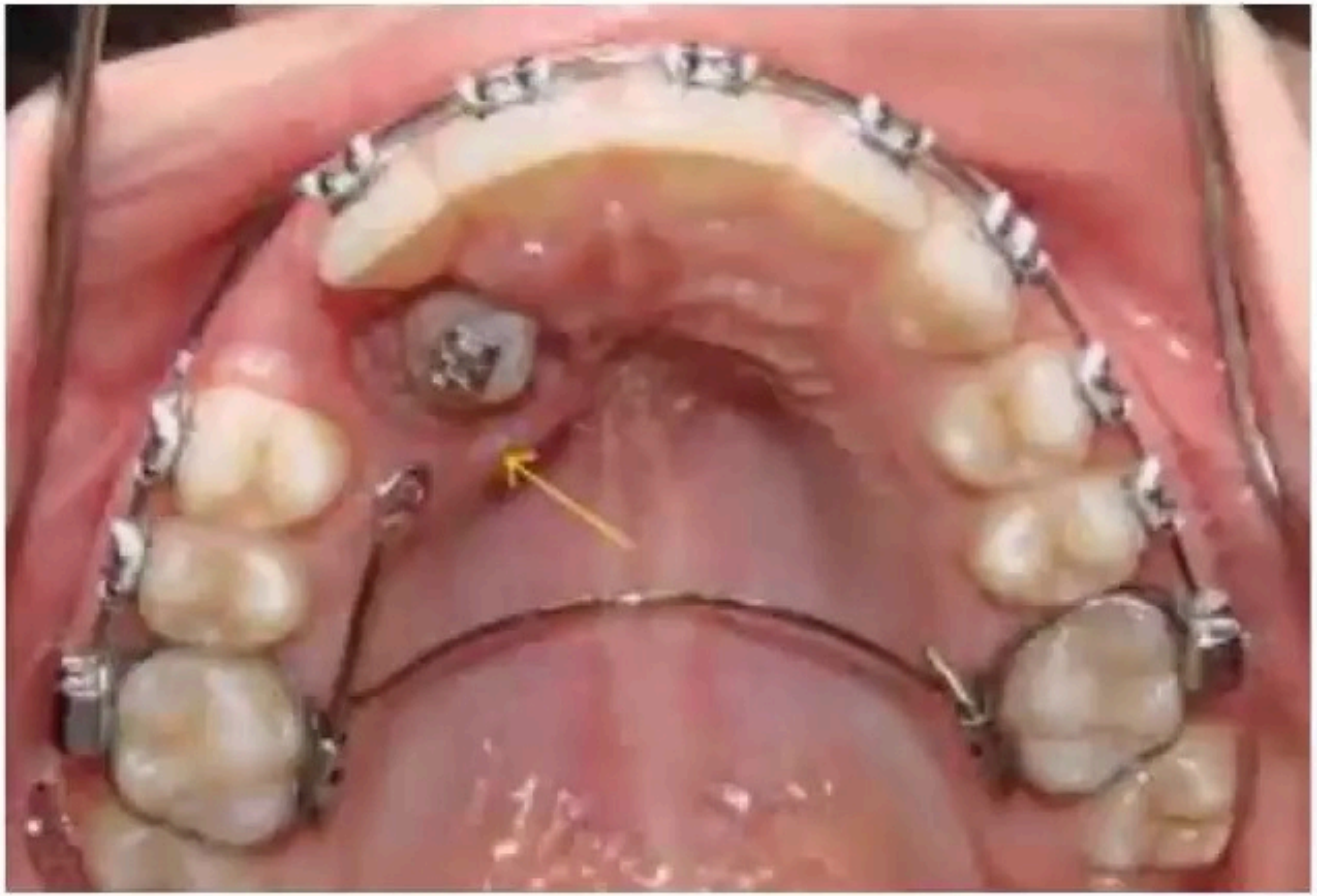
# MANAGEMENT OF DELAYED TEETH



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# ABNORMALITIES OF TOOTH FORM

## ABNORMAL TOOTH FORMS

- Microdont
- Macrodont
- Talon cusp
- Fusion
- Gemination
- Dens invaginatus
- Dens evaginatus
- Taurodont
- Dilacerated
- Concresence
- Odontome

# ABNORMALITIES OF TOOTH NUMBER

**Teeth may be :**

Increased in number- Supernumerary teeth

Decreased in number- Hypodontia/Oligodontia

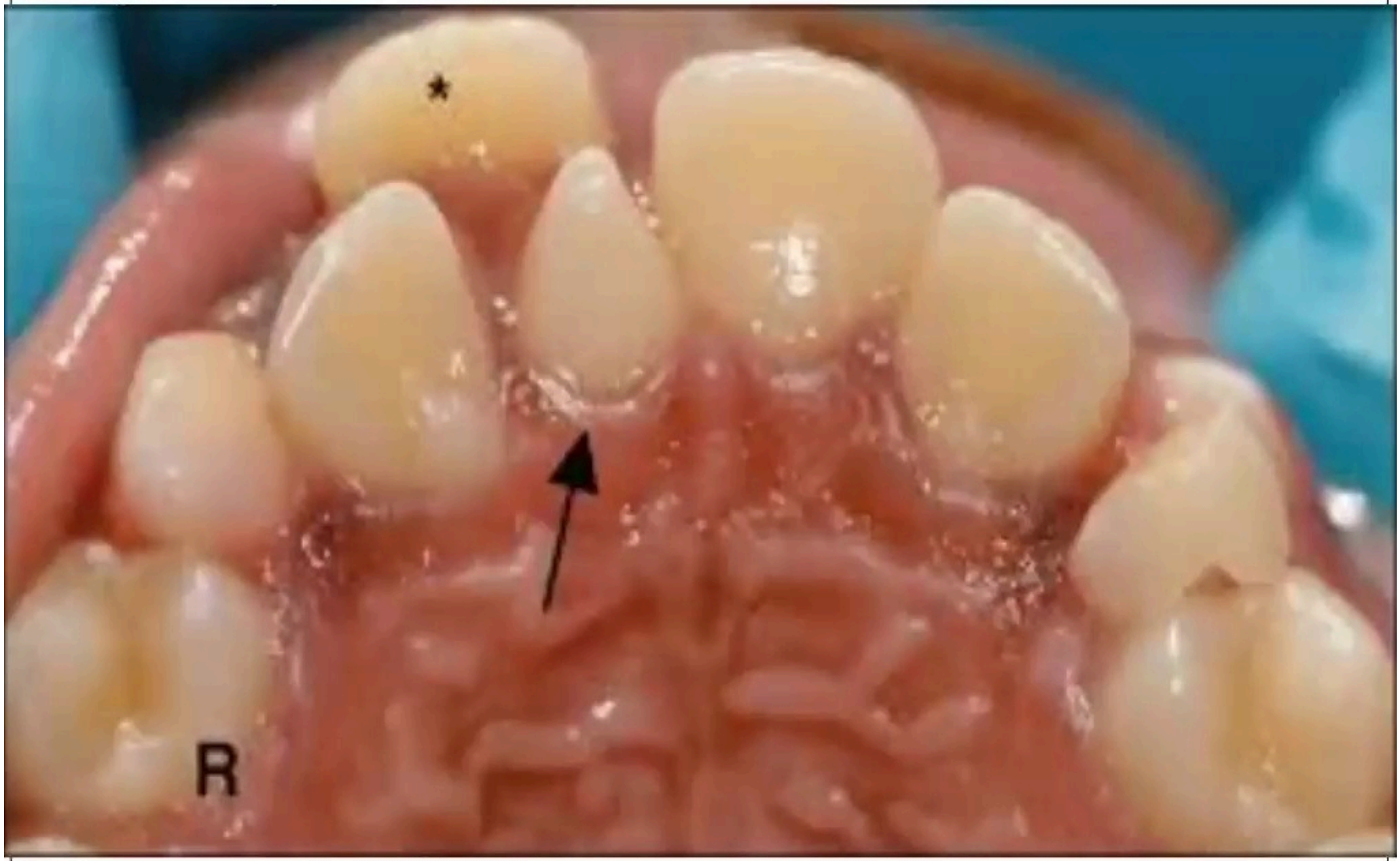
## SUPERNUMERARY TEETH (SN)

Definition:

A SN tooth is one that is additional to the normal series

## AETIOLOGY

- Dichotomy of the tooth bud
- Hyperactivity of the dental lamina
- Hereditary-common in relatives of affected children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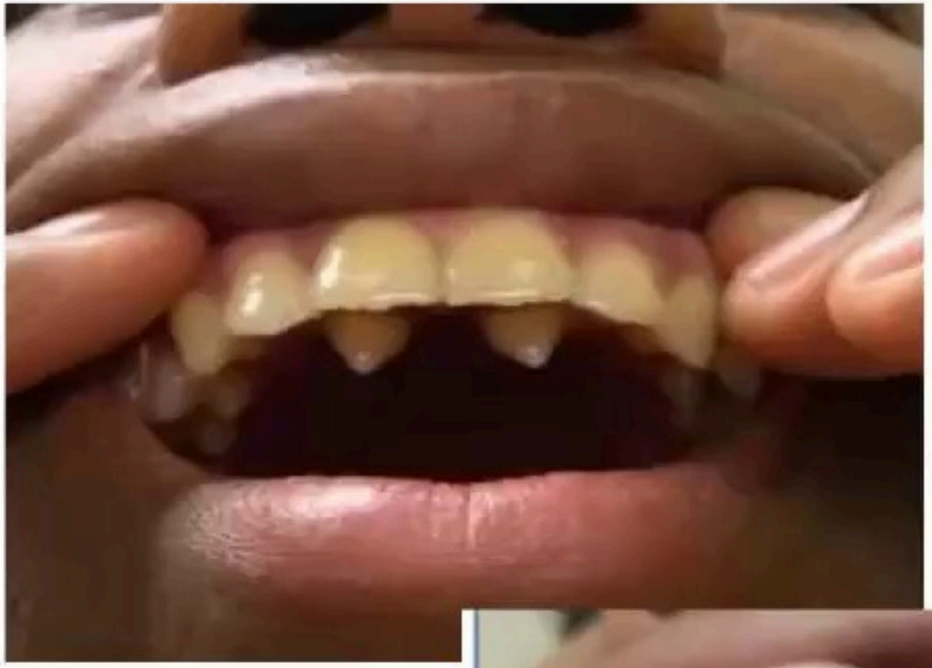
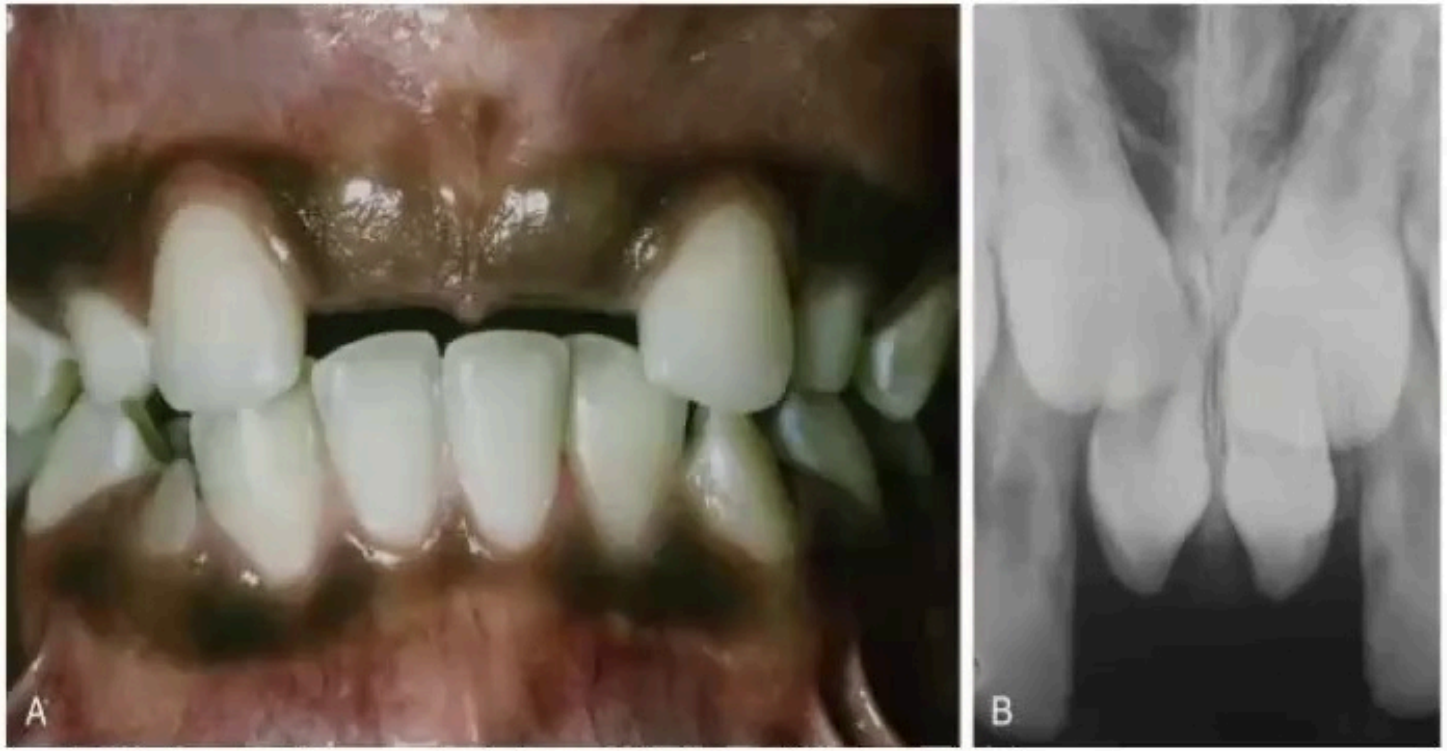


CLINICAL IMPLICATIONS OF SN teeth:

- Aesthetically displeasing
- Causes failure of eruption -most common cause of failure of eruption of maxillary permanent incisors.
- Displacement- of adjacent teeth teeth causing crowding of the dentition.
- Pathology- (Dentigerous cyst formation)
- Resorption of roots of adjacent teeth
- Asymptomatic- no adverse effects-chance finding on a radiograph.


A
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# MANAGEMENT OF SN TEETH

Extractions if interfering with the development of the dentition

Timing of extraction of SN is important


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## HYPODONTIA & OLIGODONTIA

- Terms represent agenesis of teeth, which is one of the most common of human developmental dental anomalies.

Definitions:

- Hypodontia is the congenital absence of 5 or fewer teeth excluding 3rd molars.
- Oligodontia (severe hypodontia) is the congenital agenesis o f 6 or more permanent teeth excluding 3rd molars.
- Anadontia is the congenital absence of all deciduous & permanent teeth.


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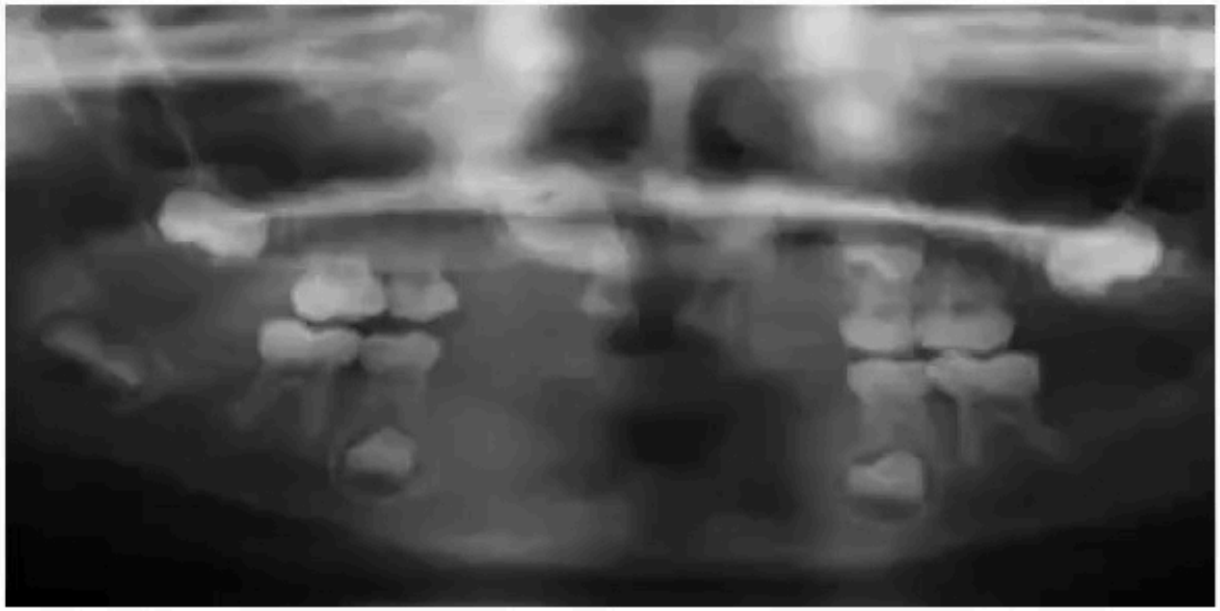

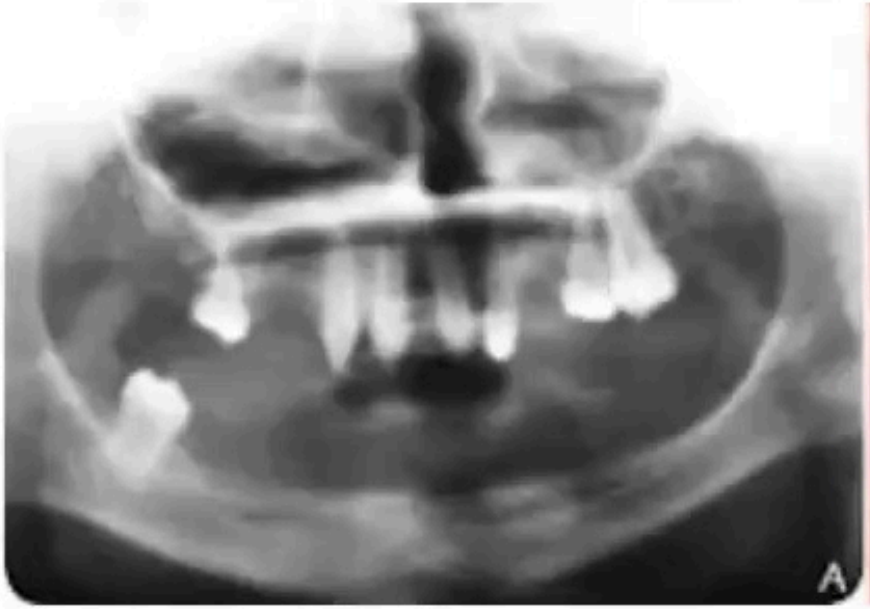
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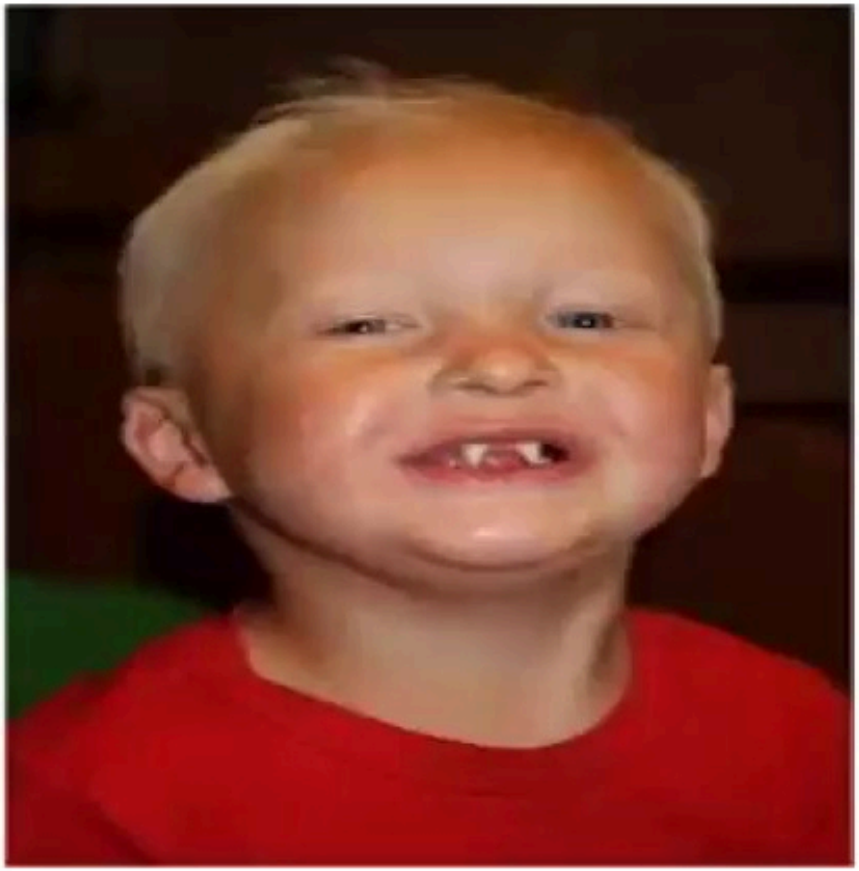

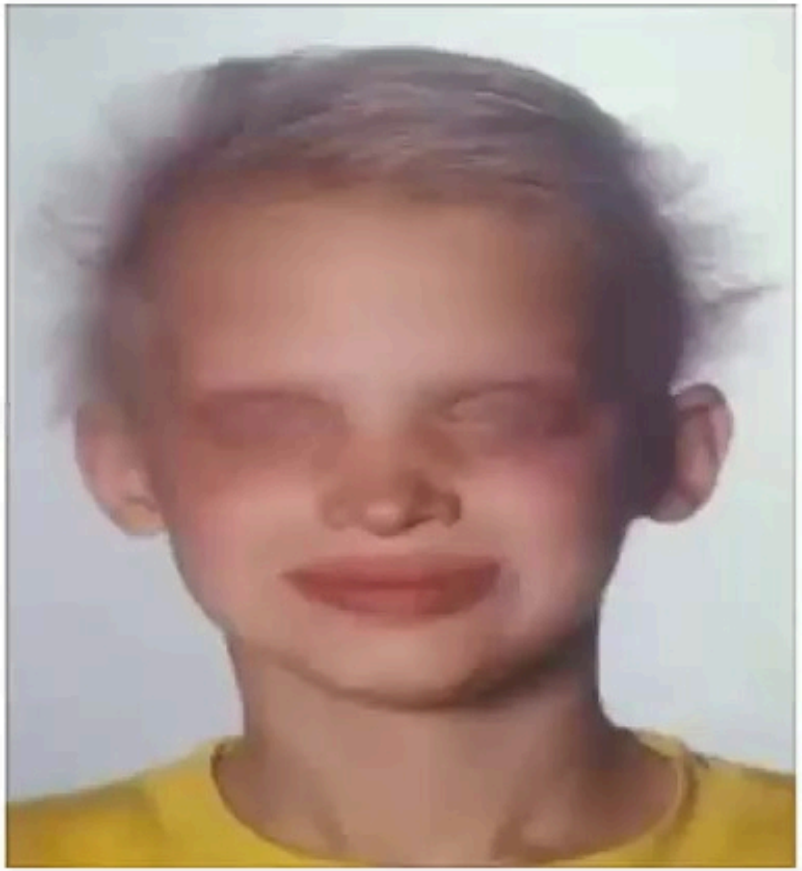

# CLINICAL IMPLICATIONS OF HYPODONTIA & OLIGODONTIA

- Aesthetic & psychological problems which begin at an early age
- Loss of vertical height due to lack of development of the alveolar bone that support the teeth
- Loss of function of the dentition eg masticatory function

# MANAGEMENT OF HYPODONTIA & OLIGODONTIA

Multidiscplinary approach- combinations of orthodontic space opening or closure, restorative work & prosthodontic management to restore function.

Definitive treatment carried out in adulthood when growth is complete

# ABNORMALITIES OF TOOTH STRUCTURE

## DEFECTS OF ENAMEL

Defects of enamel can either be **genetic** or **environmental** in origin

**Genetically determined enamel defects**

-May be **confined to the dentition**

-May be part of a **complex syndrome** in which enamel is but one of a number of tissues involved

**AMELOGENESIS IMPERFECTA (AI)**

Genetically determined enamel defects that are confined to the dentition

AI classified (gene anomaly)

Hypoplasias

Hypocalcification

Hypomaturation

Case-1

Case-2

Case-3

Case-4


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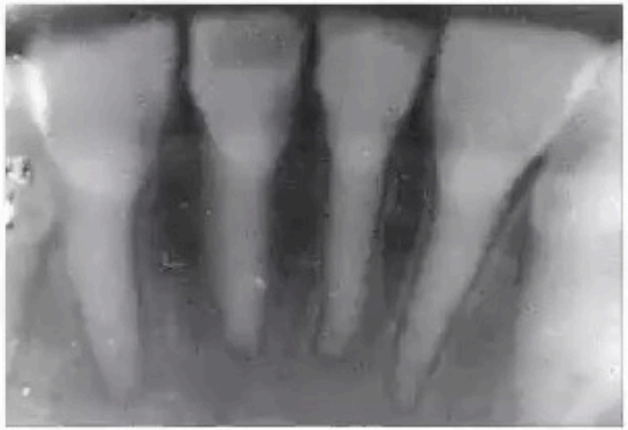
## DENTINOGENESIS IMPERFECTA (DI)

Dentine defects tend to be less well documented than the corresponding anomalies of enamel largely because they lend themselves less for inspection

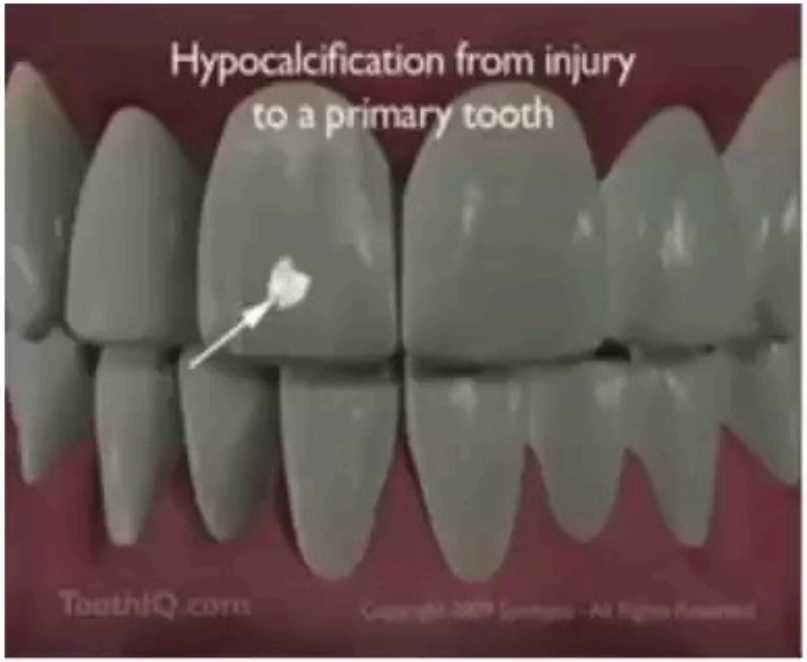
- Hereditary Opalescent dentine
- Coronal dentine dysplasia
- Fibrous dysplasia of dentine
- Shell teeth(thin dentine with enormous pulp chamber)



## ENVIRONMENTALLY DETERMINED ENAMEL DEFECTS

- Environmental disturbances sometimes interfere with enamel formation
- These may be localized or generalized defects

# LOCALIZED ENAMEL DEFECTS (TRAUMATIC INJURY)




# METABOLIC DISTURBANCES

## DENTAL FLUOROSIS

Environmental induced enamel defects

- Endemically induced mottled enamel
- Arises from chronic ingestion of excessive fluoride in water
- Usually observed in a well defined geographical location with a high concentration of fluoride in the water supply (borehole water)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## CLINICAL IMPLICATIONS

- Poor aesthetics
- Psychological distress due to poor appearance of teeth
- Sensitivity & pain due to loss of enamel
- Gingivitis due to plaque accumulation on the rough surfaces
- Loss of vertical height due to breakdown of enamel & poor masticatory function

# TREATMENT OF ENAMEL DEFECTS (AI/DENTAL FLUOROSIS)

Emergency

Intermediate/ Transitory

Definitive

## *TREATMENT OF DI:*

- Difficult
- Teeth are poorly supported by thin roots reducing their suitability for crowning
- In young patients, over-dentures are recommended

  to maintain the alveolar ridge
- Eventually extraction of teeth and provision of dentures becomes necessary