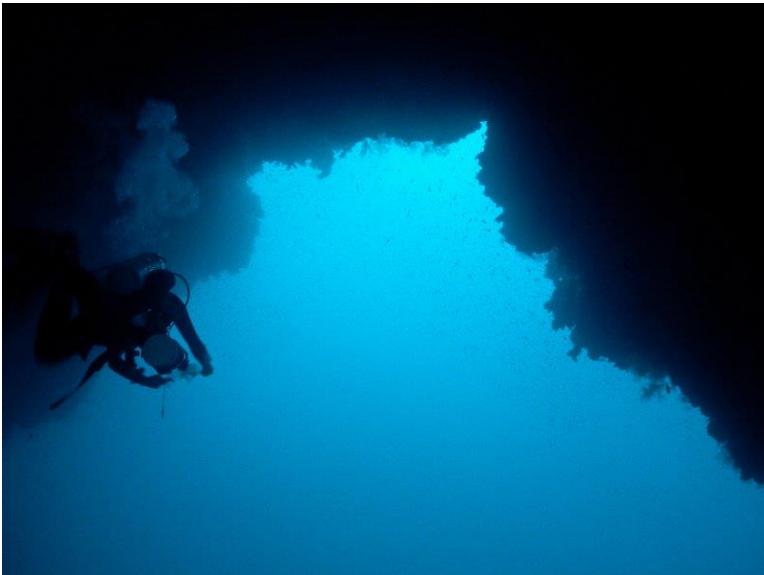


فَاللَّوْا سِيِّدُنَا إِنَّكَ لَا تَعْلَمُ لَنَا إِلَّا  
مَا عَلِمْتَنَا إِنَّكَ أَنْتَ الْعَلِيهِ  
**الْمَكِيمُ**

آية 32 من سورة البقرة

# Anomalies in Nature



Dahab, Red Sea, Egypt.

Scuba divers call this structure “  
“the death trap”

Ask a geologist what caused it, he may  
Answer you...It's **DEVELOPMENTAL**  
Because it was formed during  
the formation of earth



# Anomalies in Nature



Red algae over growth is a natural anomaly that resulted from global heating and uncontrolled CO<sub>2</sub> emissions.



A scientist may explain it as an ACQUIRED anomaly!!!

## Death Valley, Eastern California, USA



These several Tons  
stones just move  
spontaneously !!!  
No reason..  
No mechanism.  
No one pushing them.



Again ask a geologist, he may answer you ...  
this is Ideopathic !!! .... “I don’t know!!!”

# Mankind is part of nature!

TIME Magazine World



SCIENTIFIC  
AMERICAN™

How RNA evolved from  
ordinary clay.

Accordingly, man is  
subjected to have  
Anomalies

- Developmental.
- Acquired.
- Just of Unknown Reason.



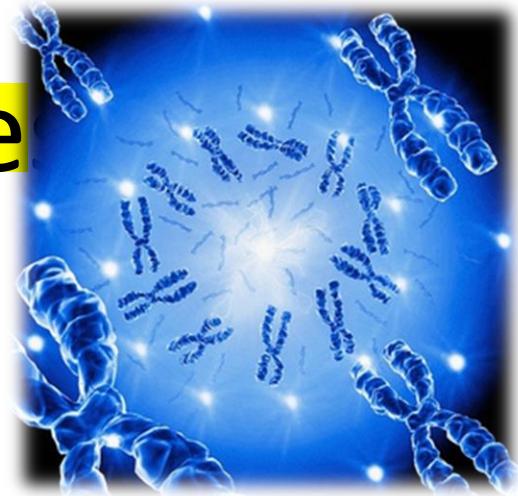
# DENTAL ANOMALIES

---

Dr. Hisham Y. El Batawi PhD



# Dental Anomalies



► Might be.....

A) Genetic.

B) Associated with a syndrome “that’s *another form of genetic*”.

C) Acquired. “*environmental*”.

D) Idiopathic.

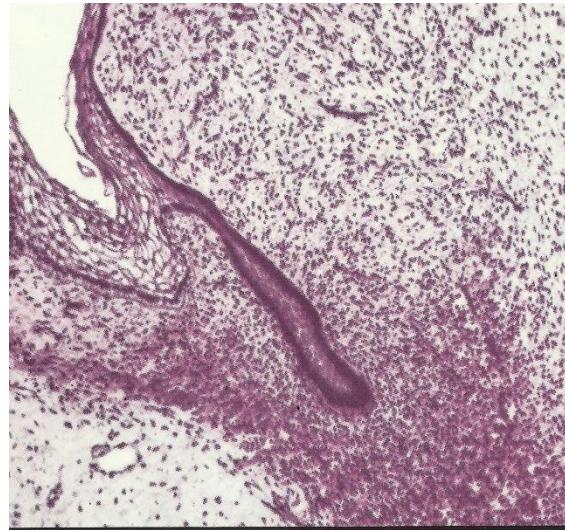
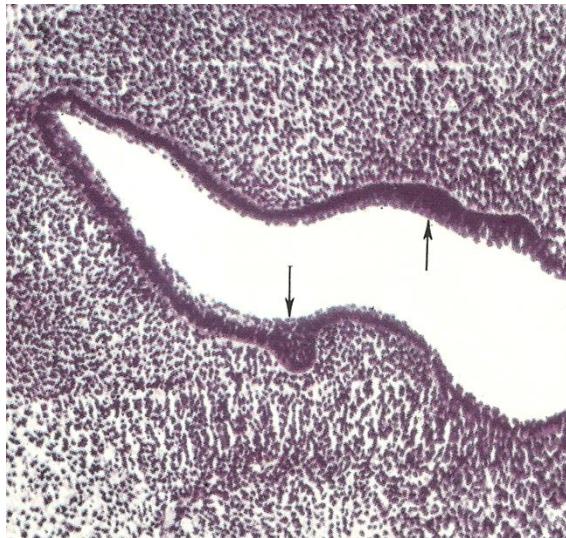


# How Dental Anomalies Occur? (Pathogenesis), *“each chapter in the life story of a tooth is subjected to anomalies”*

- ❖ Initiation
- ❖ Morphodifferentiation.
- ❖ Apposition.
- ❖ Calcification.
- ❖ Maturation.
- ❖ Eruption.



# Initiation



- Disturbances in number
- Hypodontia, anodontia.
- Hyperdontia.



Hypodontia patients are missing one or more teeth, and their teeth are conical and small (microdontia)

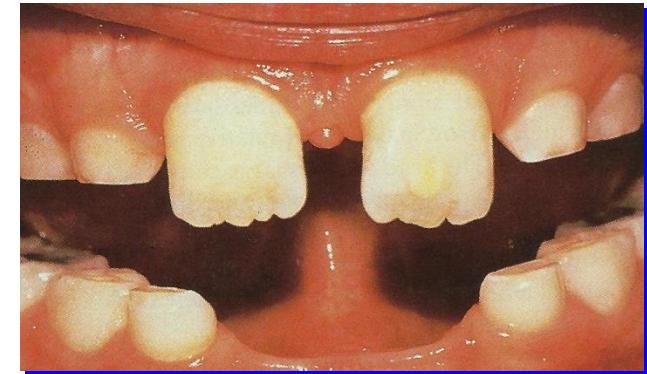
Hypodontia: 1 or more

Oligodontia: few teeth (most are missing)

Anodontia: no teeth

# Hypodontia

- Agenesis of one or more teeth
- Other related terms:
  - Oligodontia (**few** teeth)
  - Anodontia (**no** teeth)
- Associated findings:
  - microdontia,
  - conical teeth
  - Part of a syndrome



Most common sites are laterals  
and 2<sup>nd</sup>. premolars

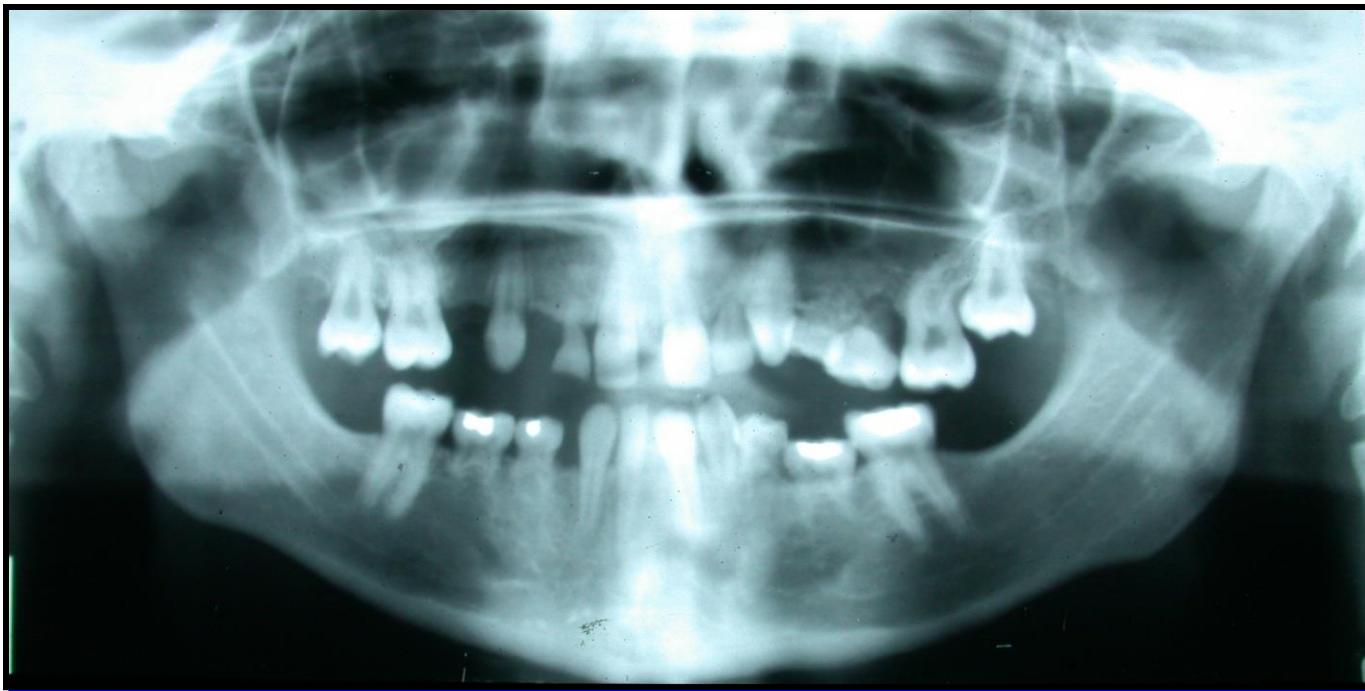
# Etiology of Hypodontia (Partial anodontia)

Either Single or multiple

- Systemic factors
  - e.g. low birth weight, multiple birth & increase maternal age
  - Systemic disease e.g. rubella (German Measles).
  - Cleft palate
- Syndrome related
  - e.g. Ectodermal dysplasia
  - Down syndrome

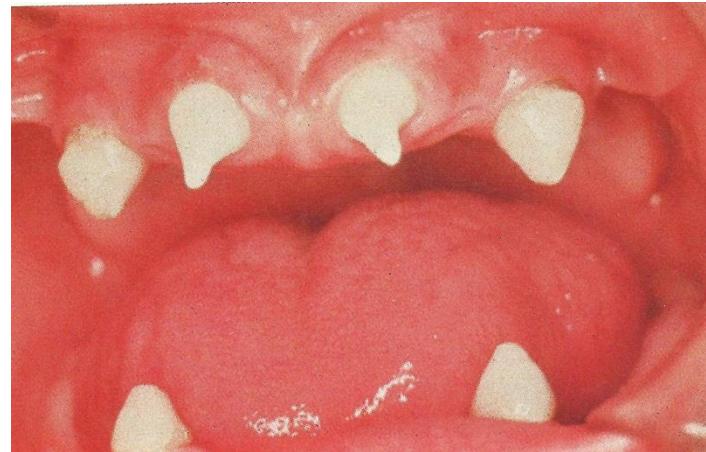


# Hypodontia in a radiograph.

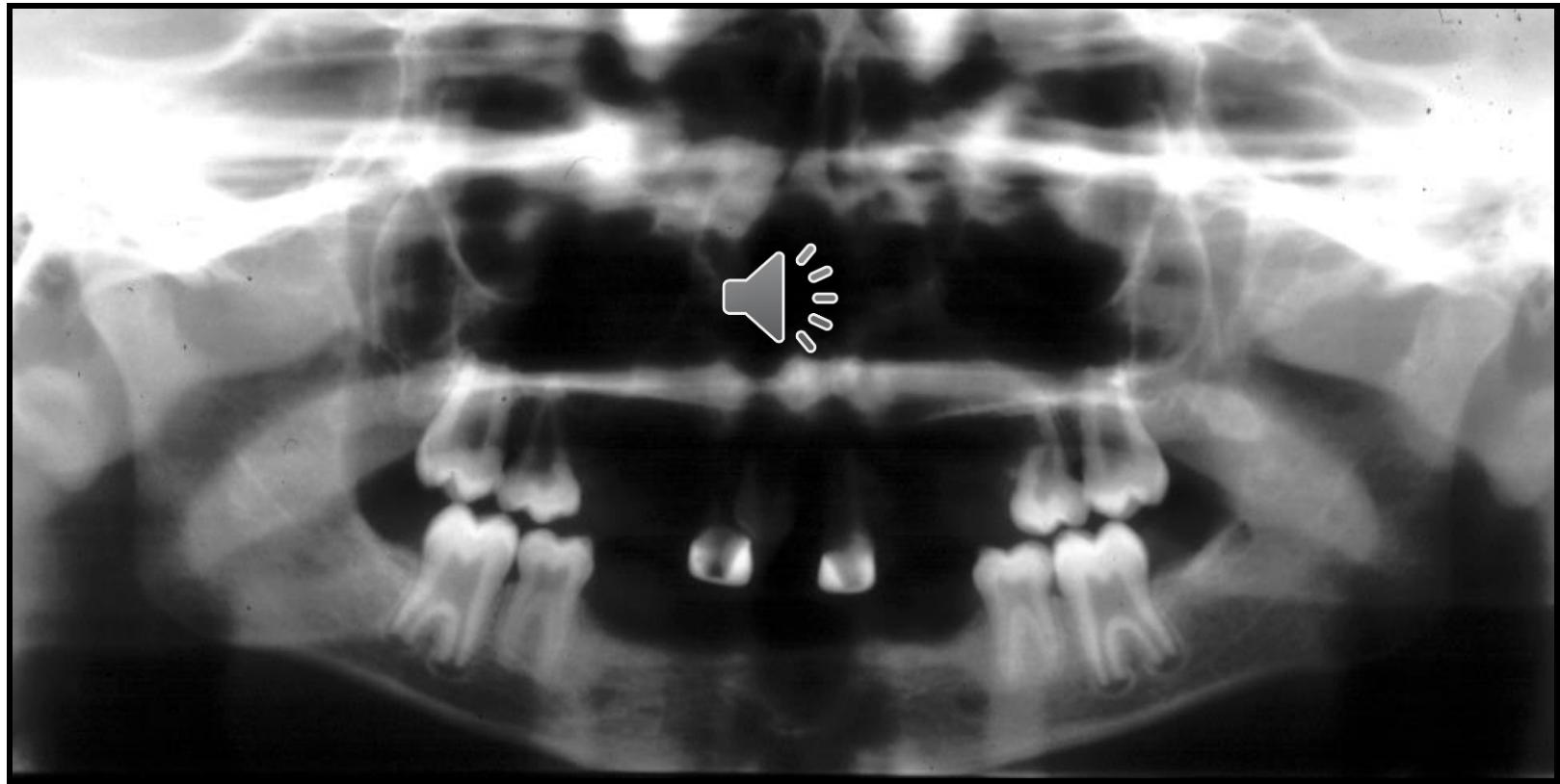


# Ectodermal Dysplasia

- ▶ **Dysplasia or aplasia of ectodermally derived structures.** Includes hair, nails, teeth, skin, sebaceous glands
- ▶ Inherited as a **X-linked recessive trait.** more common in males
- ▶ **Hypodontia or anodontia**
- ▶ **Smooth dry skin, scanty hairs** and **partial or total absence of sweat glands** leading to **hyperthermia**



# Ectodermal Dysplasia



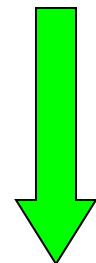
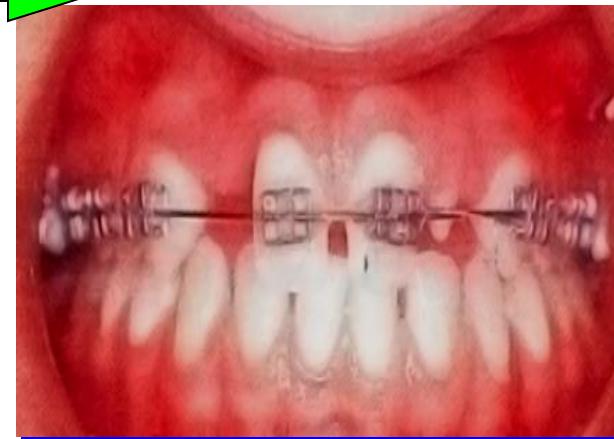
# Management of Hypodontia

- Team work, of pediatric dentist ,orthodontist prosthodontist. May require speech therapy, Psychologist.



In a crowded arch

# Management of Hypodontia



In a spaced arch

# Hyperdontia

## Possible Causes ...

- Might be genetic.
- On both sides of a cleft.
- Part of a syndrome (Cleido Cranial Dysostosis, Gardner Syndrome).
- Complete division of a tooth bud



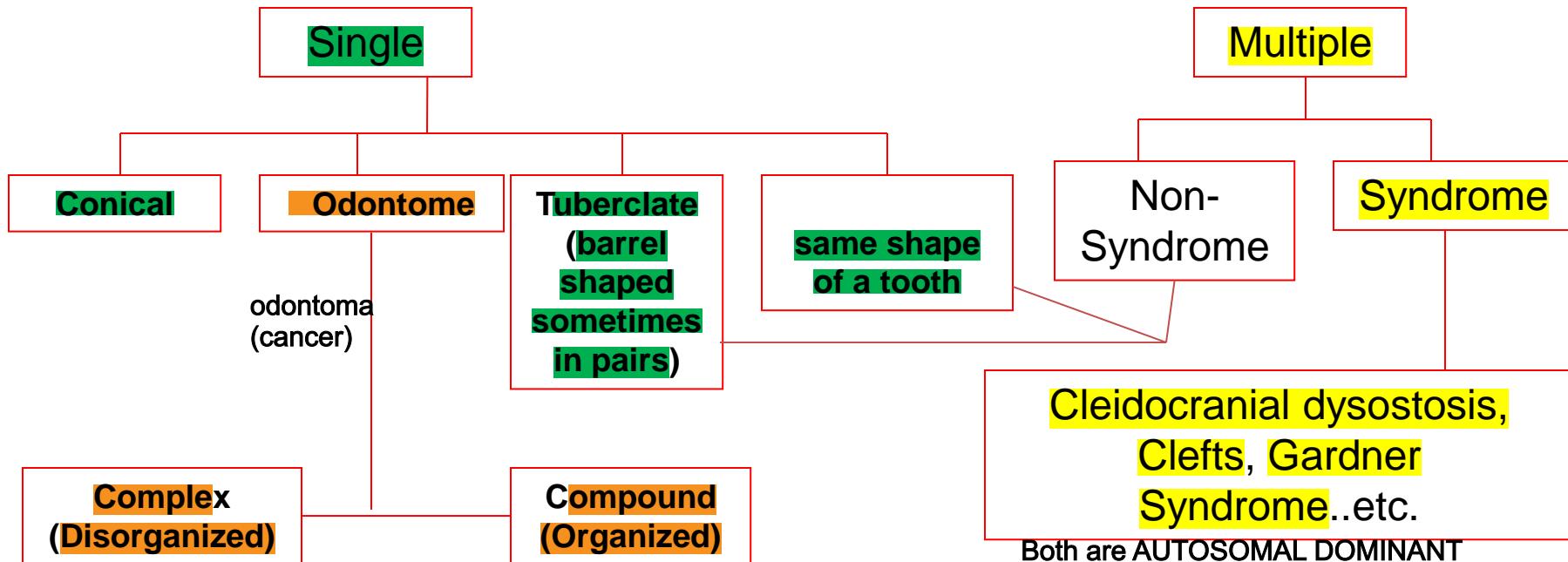
# Supernumerary teeth (nomenclature)

- Extra normal tooth.
- Supplemental tooth (an extra tooth usually smaller than normal that has normal enamel, dentin and cementum).
- Mesiodense (supplemental tooth between central incisors).
- Paramolar/ Distomolar.

Paramolar: extra teeth lingual to premolars & molars



# Classification of Supernumeraries



The left supplemental tooth was oblique and the tip was so close to the nasal floor

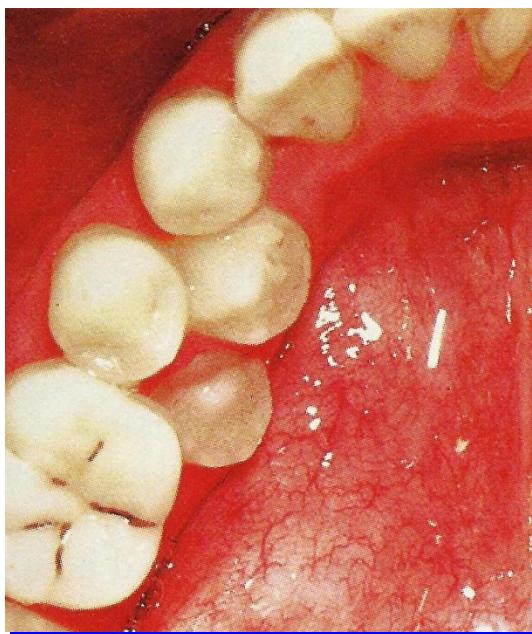




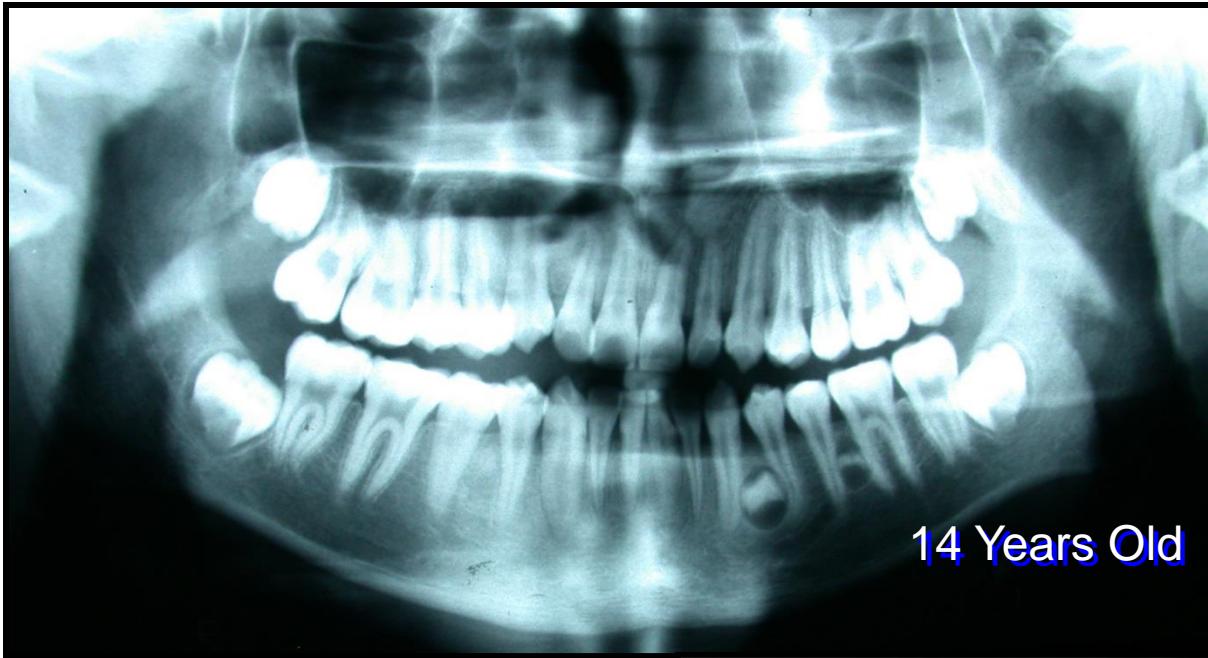
Composite compound  
odontome



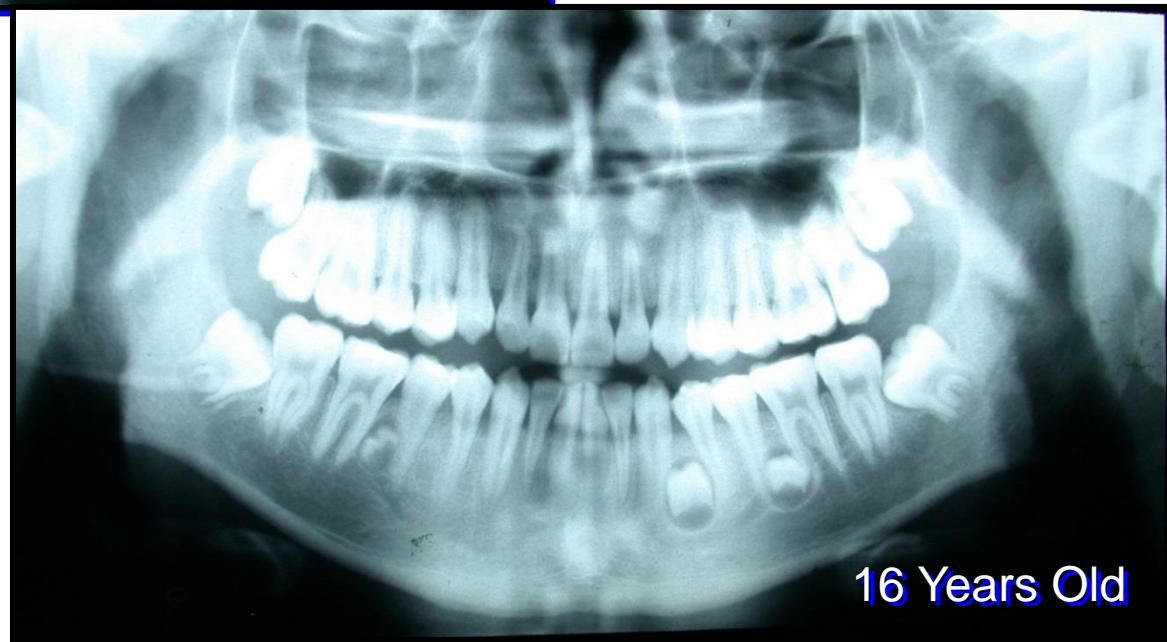
**Mesiodense**



**Paramolar**



14 Years Old



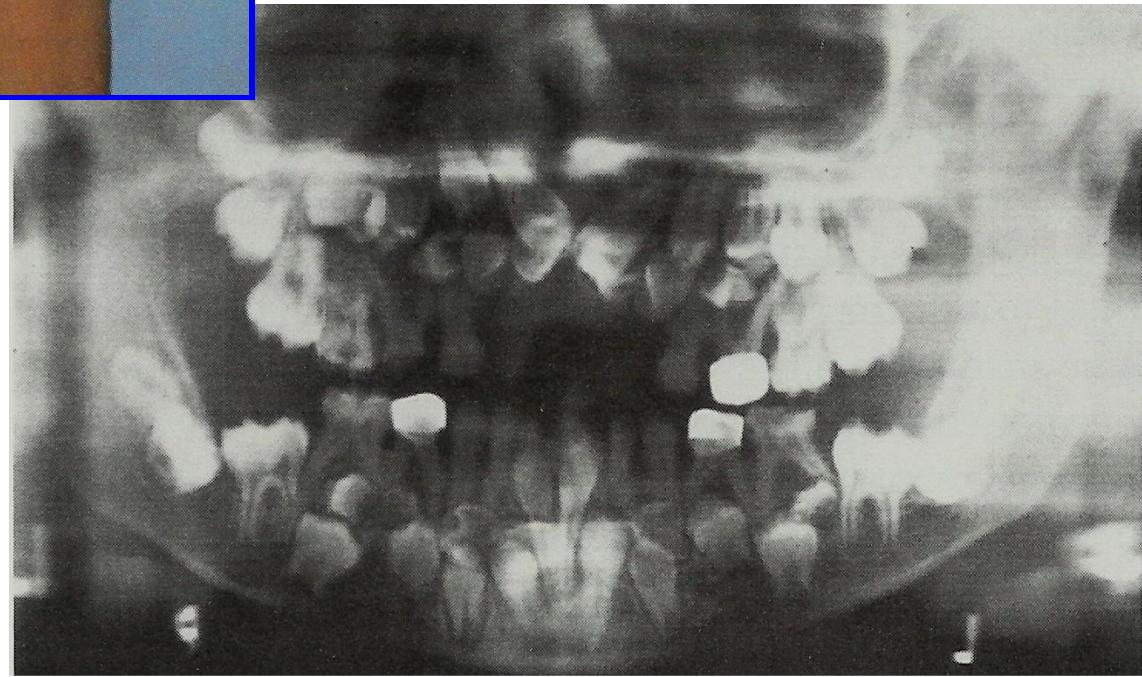
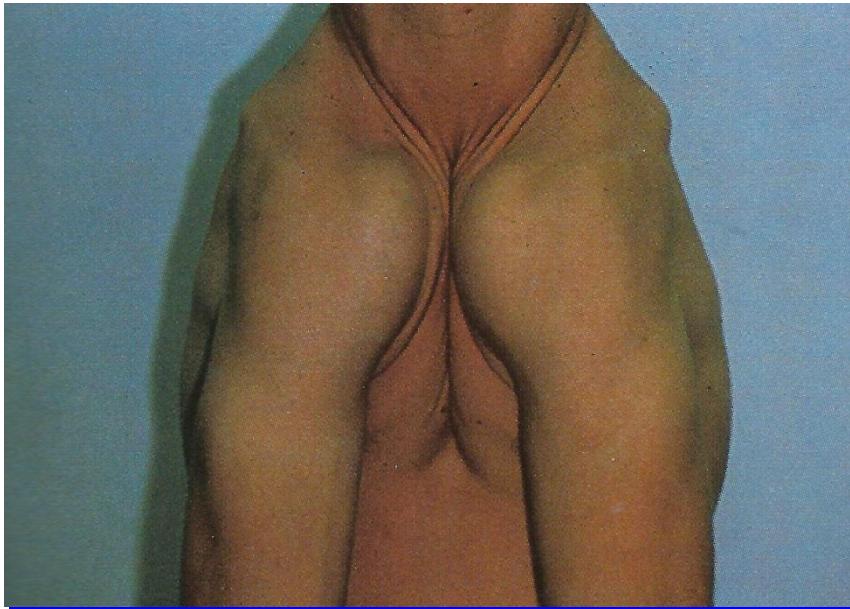
16 Years Old

# Cleidocranial Dysostosis

Syndrome causing multiple supernumerary teeth

- Autosomal dominant condition, most cases are inherited, although some cases can occur through spontaneous mutation
- Defective ossification of the clavicles and cranium.
- Delayed fontanelle closure
- Underdeveloped maxillae, high narrow palate and mandibular prognathism
- Cleft palate formation
- Prolonged retention of the primary dentition, supernumerary teeth, short roots and abnormal cementum.



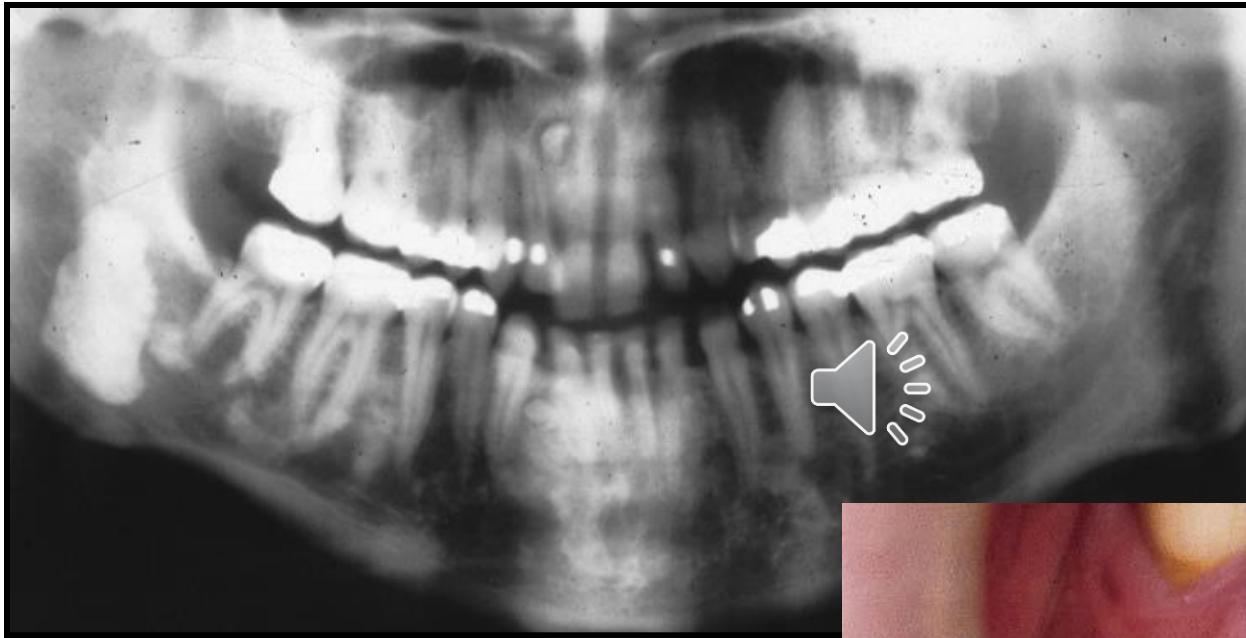


# Gardner's Syndrome

Syndrome causes multiple supernumerary teeth

- Autosomal dominant condition
- Orofacial features including hyperdontia, impacted supernumerary teeth, odontomas and jaw osteomas
- Also get other problems such as epidermal cysts, dermoid tumour and intestinal polyps

# Gardner's Syndrome



# Management of Supernumerary Teeth

- Removal, either by simple extraction or surgical extraction.



*Why?*

1. To prevent ectopic eruption.
2. To prevent disturbed eruption of normal teeth.
3. To prevent cystic degeneration.



*Central incisors which fail to erupt before lateral incisors should be radiographed.*



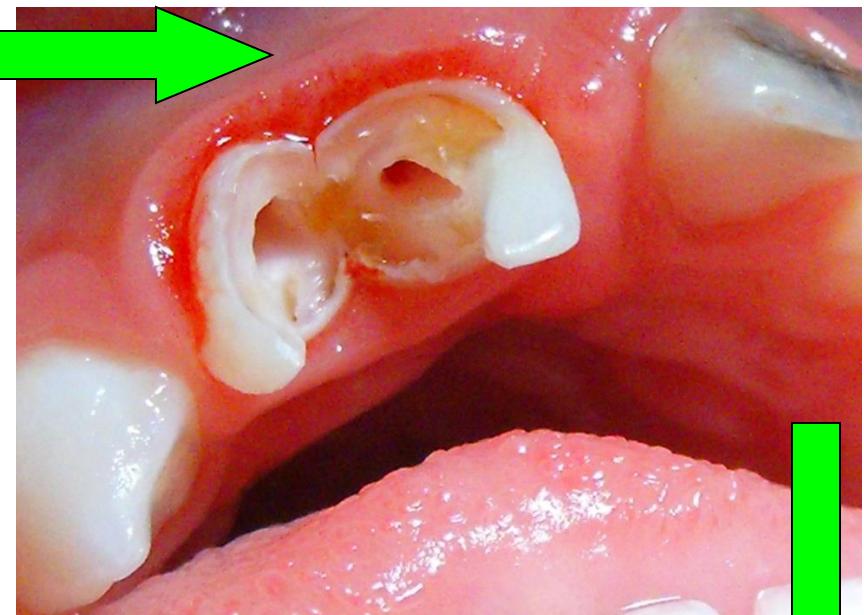
“Radiography has its **limitations**,  
**Those mini teeth were too thin to look**  
**Radio opaque. It took me one year to**  
**Realize the nature of the problem”**



# Double Teeth (fusion)



- Union between dentin and-or enamel of two separately developed teeth
- One tooth missing
- Radiographically, roots appear separate.



Three problems:

- Early Childhood Caries.
- Mal-alignment.
- Fusion!

# Double Teeth (gemination)

Different than Double Teeth (fusion) --> Fusion is 2 different roots

- Incomplete division of single tooth bud.
- Notching of the incisal edge.
- One root
- Double teeth are common in the primary dentition.



# Morphodifferentiation



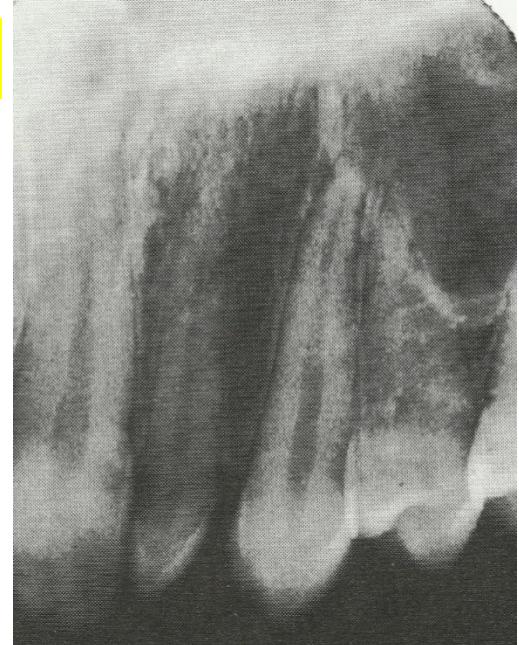
Disturbances during that stage may be blamed for:

1. Abnormal size.
2. Abnormal crown shape.
3. Abnormal root shape.



# Microdontia

- One or more teeth are smaller than normal
- Could be associated with hypodontia
- Single: Lateral I, Upper 3<sup>rd</sup> molar
- Generalized:  
Ectodermal dysplasia & pituitary dwarfism





## Sanjad Sakati Syndrome

- Dwarfism (Hypoparathyroidism).
- Mental retardation.
- Microdontia.
- High arched palat.
- Deep sunk eyes.
- Big ears.
- Micrognathia.
- Repeated chest infection.



# Macrodontia



- Any tooth larger than normal for that particular tooth type
- Affecting single tooth
- Idiopathic, Unknown etiology, Pituitary gigantism.



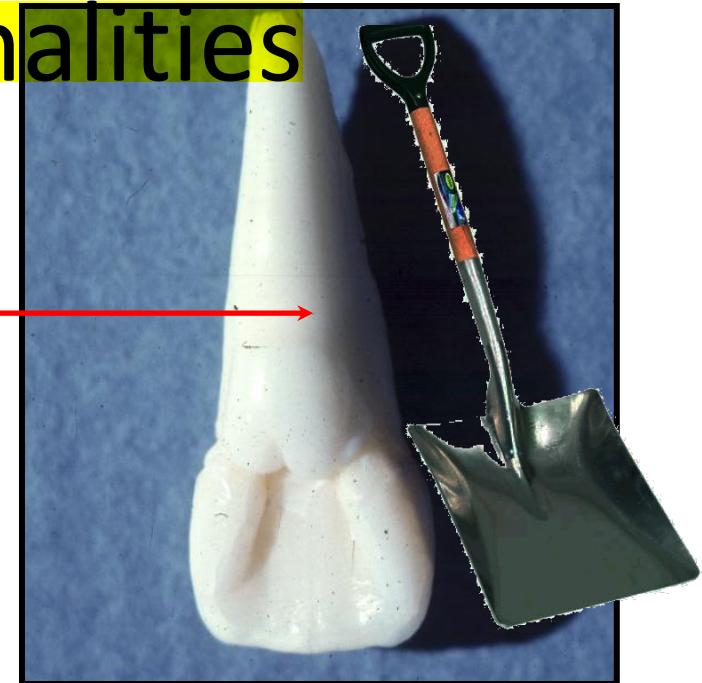
# Management of micro and macrodontia

- For **microdontia**, Build up when available space is convenient, consider extraction and orthodontic treatment.
- For **macrodontia**, crown reduction to 1 mm is acceptable. Consider extraction and prosthesis, implants and or orthodontic treatment.



# Crown Abnormalities

- Shoveling
- Peg-shaped teeth
  - e.g. lateral incisors



## Abnormal cusps

- Dens evaginatus
- Accessory buccal cusp
- Mulberry molars and abnormal incisors of syphilis
- Talon cusp
- Enlarged cingulum
- Palatal pits
- *Dens in dente. Dens invaginatus*



# Dense evaginatus

- An enamel covered tubercle projecting from the occlusal surface of a premolar or less commonly, from a canine or molar tooth.



# Dense invaganatus (dense in dente)

- A developmental invagination of the cingulum pit with only a thin hard tissue barrier between the oral cavity and the pulp

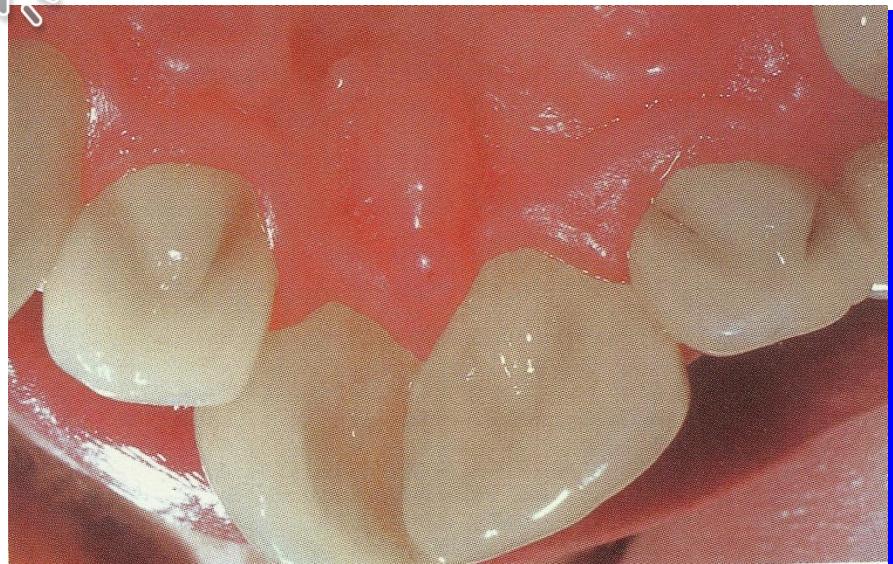
Cingulum ==> Only Anteriors



# Talon cusp

Cingulum ==> Only Anteriors

- A horn like projection of the cingulum of the maxillary incisor teeth. It may reach and contact the incisal edge of the tooth.



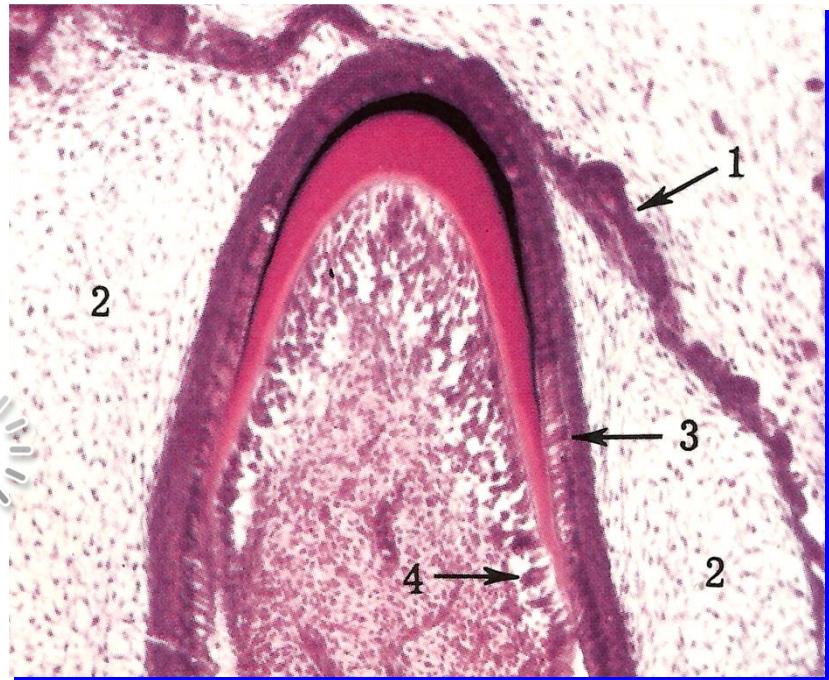
# Management

- **Dens invaginatus:**
  - Fissure seal as early as possible
- **Dens evaginatus:**
  - Composite build-up to support the tubercle
  - Gradual enamel reduction
- **Supernumerary cusps:**
  - If occlusal interference present: gradual reduction of enamel or elective pulpotomy or RCT



# Apposition, Mineralization, Maturation

- ▶ Hypoplasia
- ▶ Hypocalcification.



1. Outer Enamel epithelium.
2. Stellate reticulum.
3. Ameloblastic layer.
4. Odontoblastic layer.

# Abnormalities of Enamel

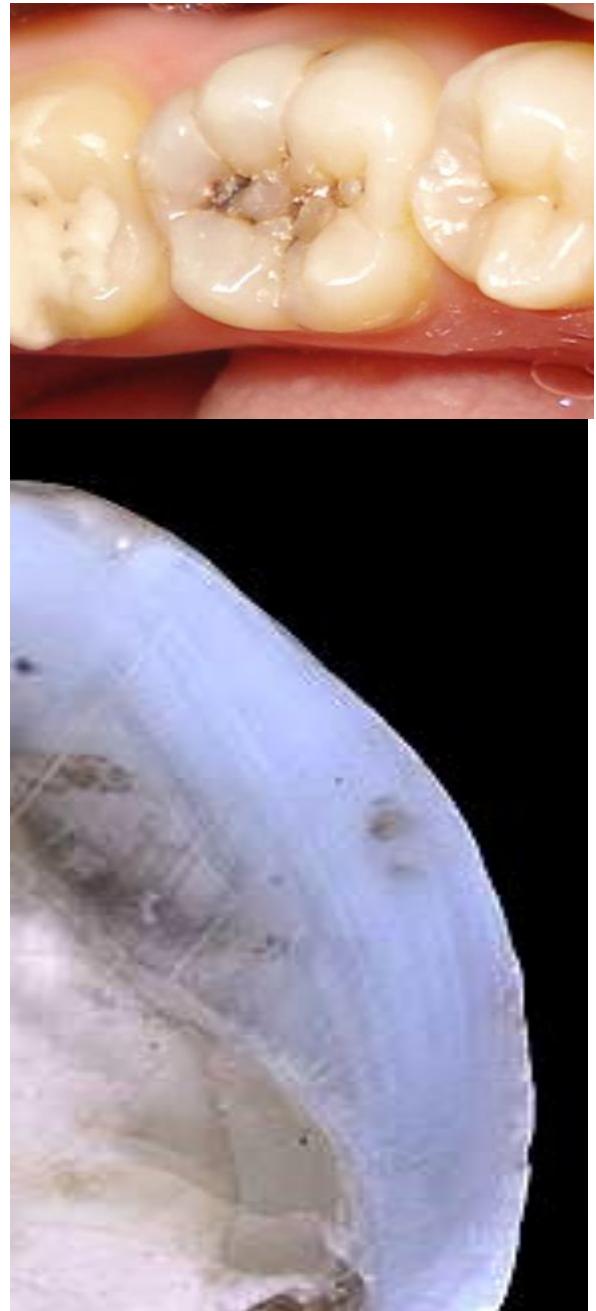
may be

- Microscopic
  - Pathologic Striae of Retzius, Neonatal line
- Macroscopic
  - localised or generalised defects



# Clinical Significance

- Pathologic striae and neonatal line are microscopic entities
- Localised pits and spots usually of little significance clinically although occasionally problems with aesthetics and differentiation from caries
- Generalised defects (e.g. Amelogenesis Imperfecta) provide significant clinical problems



# Aetiology/Pathogenesis of Enamel Defects

Injury to ameloblasts could be

- Genetic
  - e.g. Amelogenesis Imperfecta
- Chemical
  - e.g. Fluorosis
- Physical trauma
  - e.g. Turner tooth, dilaceration
- Metabolic disorders
  - e.g. Rickets
- Infection
  - e.g. Syphilis



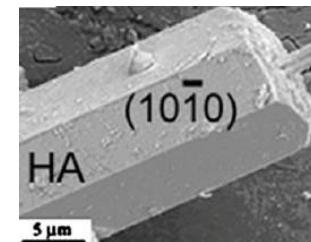
# Clinical Expression

Regardless of whether enamel abnormalities are local or generalized, the clinical expression of the abnormality will be either

- enamel hypoplasia
  - defective **quantity** of enamel
- enamel hypocalcification or hypomineralisation
  - defective **quality** of enamel
- combination of above

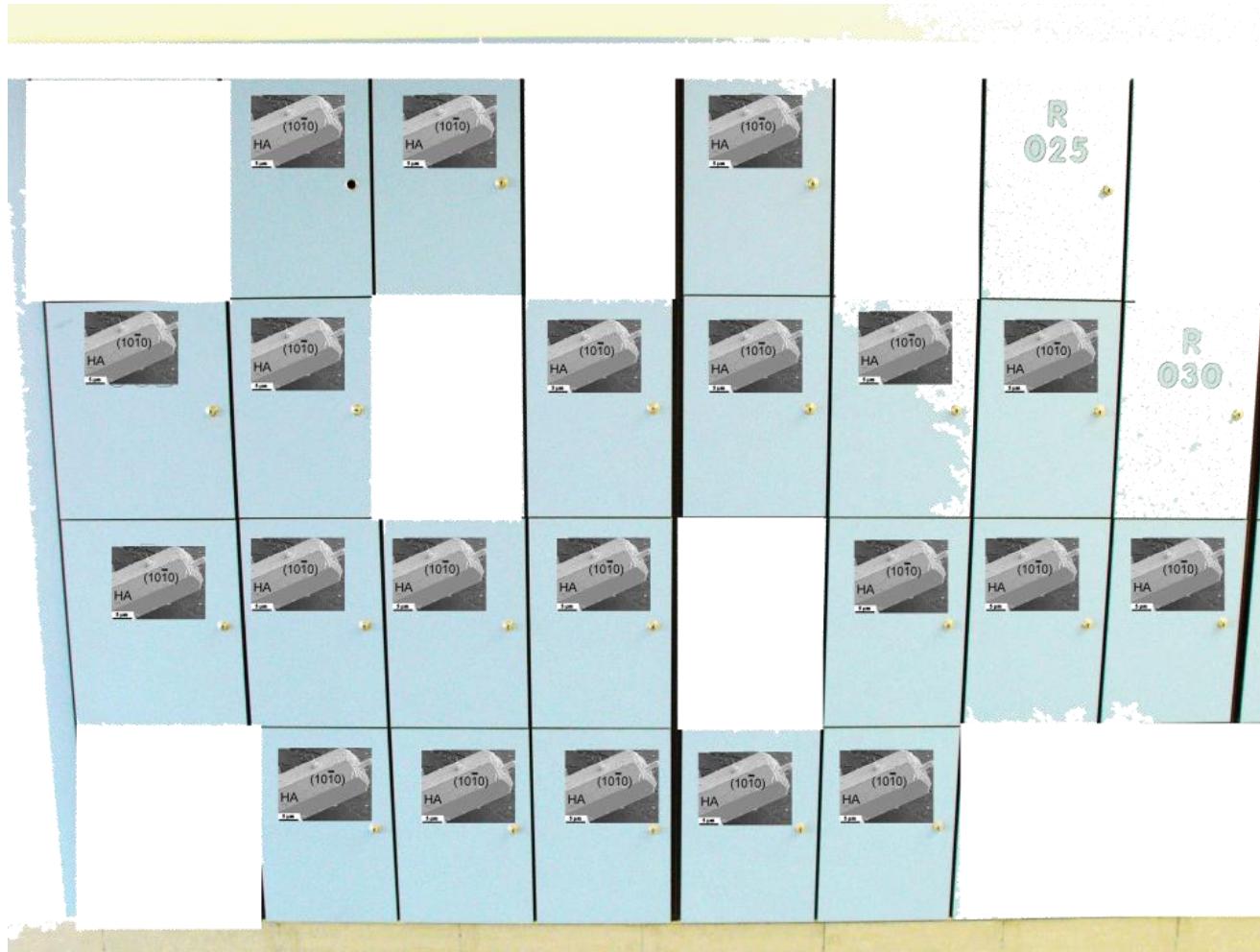


# Difference between Hypocalcification and Hypoplasia.



Imagine that your  
lockers are the enamel  
matrix

Hypoplasia will look like this



# While Hypocalcification will look like that



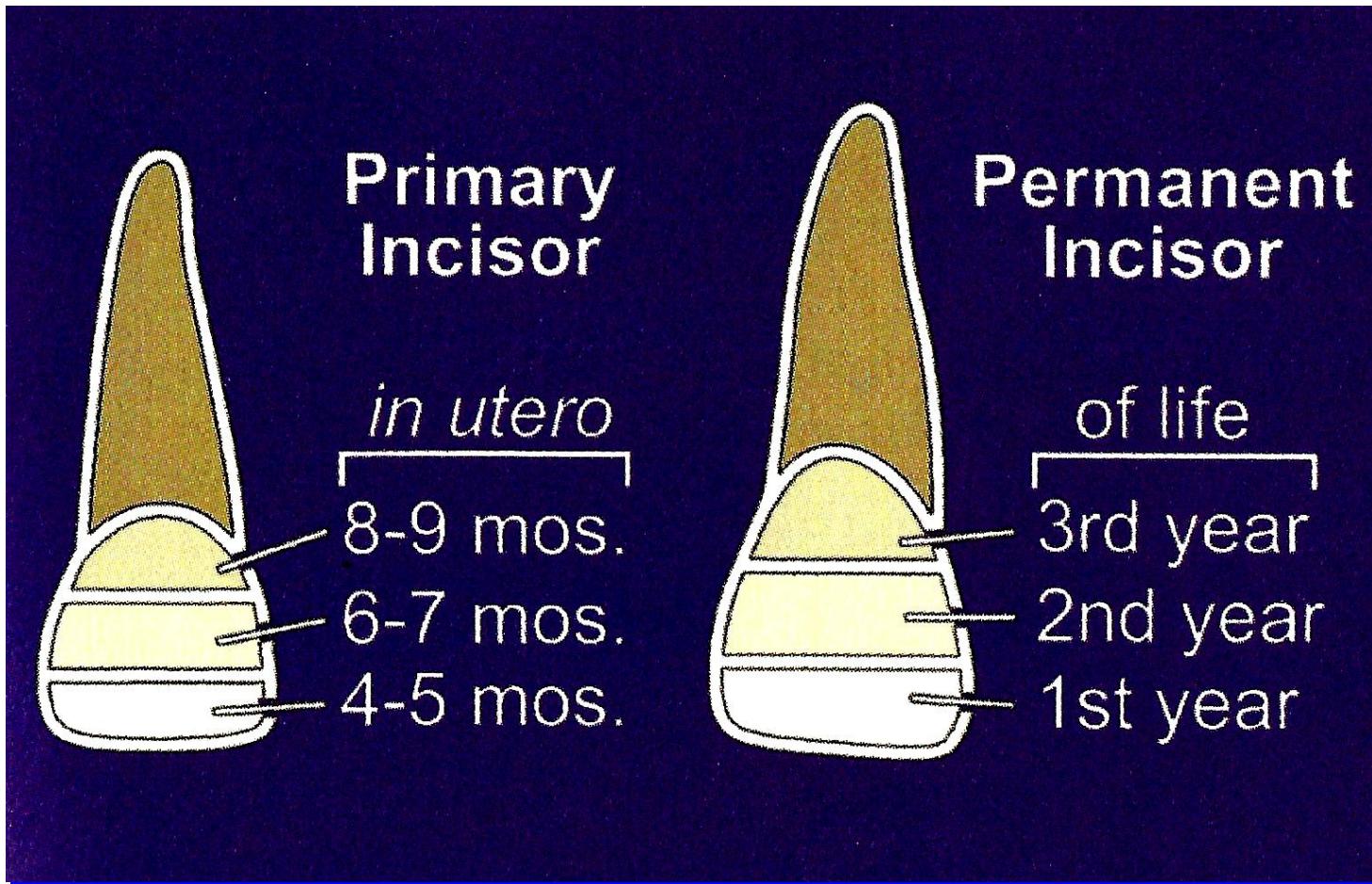
# Normal Enamel will look like this



# Localized Enamel Defects

- common and affect mostly permanent teeth
- may affect one or more teeth depending on cause
- may present as:
  - hypoplastic pits or grooves
  - hypomineralised spots or lines ranging in colour from chalky white to yellow/brown.





- position of defect/s on crown reflects stage of tooth development at which injury occurred.



# Turner's hypoplasia

- Localised infection or trauma to a deciduous tooth affects enamel formation of the underlying permanent tooth.
- May affect matrix formation or calcification
- Localised opacity, pits, or single irregular hypoplastic crown.
- Common in maxillary Incisors, premolars



# Generalized Enamel Defects

Rare and usually affect both dentitions

Causes include:

- Idiopathic *i.e.* I don't know.
- Amelogenesis Imperfecta
- Fluorosis
- Metabolic disorders
  - e.g.* Rickets
- Association with certain syndromes
  - e.g.* Ectodermal Dysplasia.



# Fluorosis



- Due to excess (>1.6-2.0 ppm) systemic intake of fluoride ion during odontogenesis
- Endemic in some regions. (*God bless G.V Black*). 
- Can affect both dentitions but more common in permanent.
- Clinical appearance varies from patchy white spots to yellow/brown marks and is sometimes associated with enamel hypoplasia.

# Amelogenesis Imperfecta



teeth have:

- normal size and shape.
- normal dentine and pulp.
- abnormal enamel hypoplastic/  
hypomineralised or both.

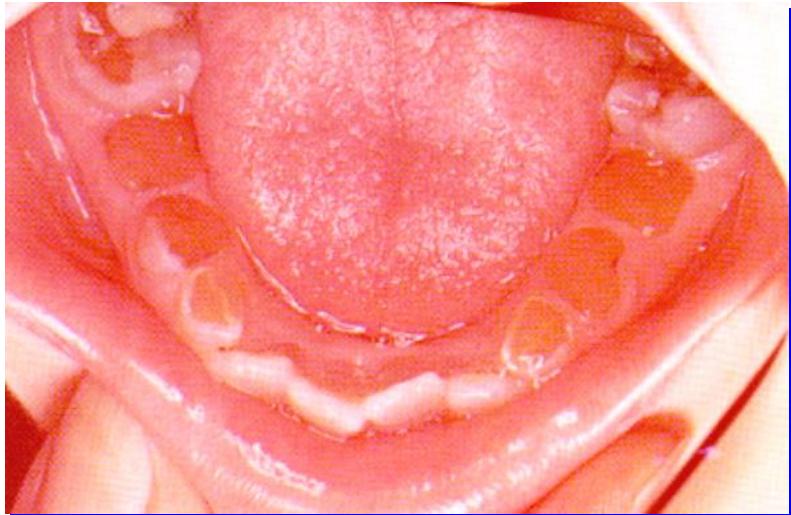


# Abnormalities of Dentine-Pulp

- Most clinically significant disturbances of dentine-pulp complex have a **genetic** aetiology
- Metabolic disturbances affecting calcification (e.g. rickets and hypoparathyroidism) may also produce abnormal dentine
- Defect of collagen formation transmitted as an autosomal dominant trait
- Affects both dentitions



# Abnormalities of Dentine-Pulp



Include:

- Dentinogenesis imperfecta.
- Dentinal Dysplasia.
- Odonto dysplasia (Ghost teeth).



# Dentinogenesis imperfecta(DI)

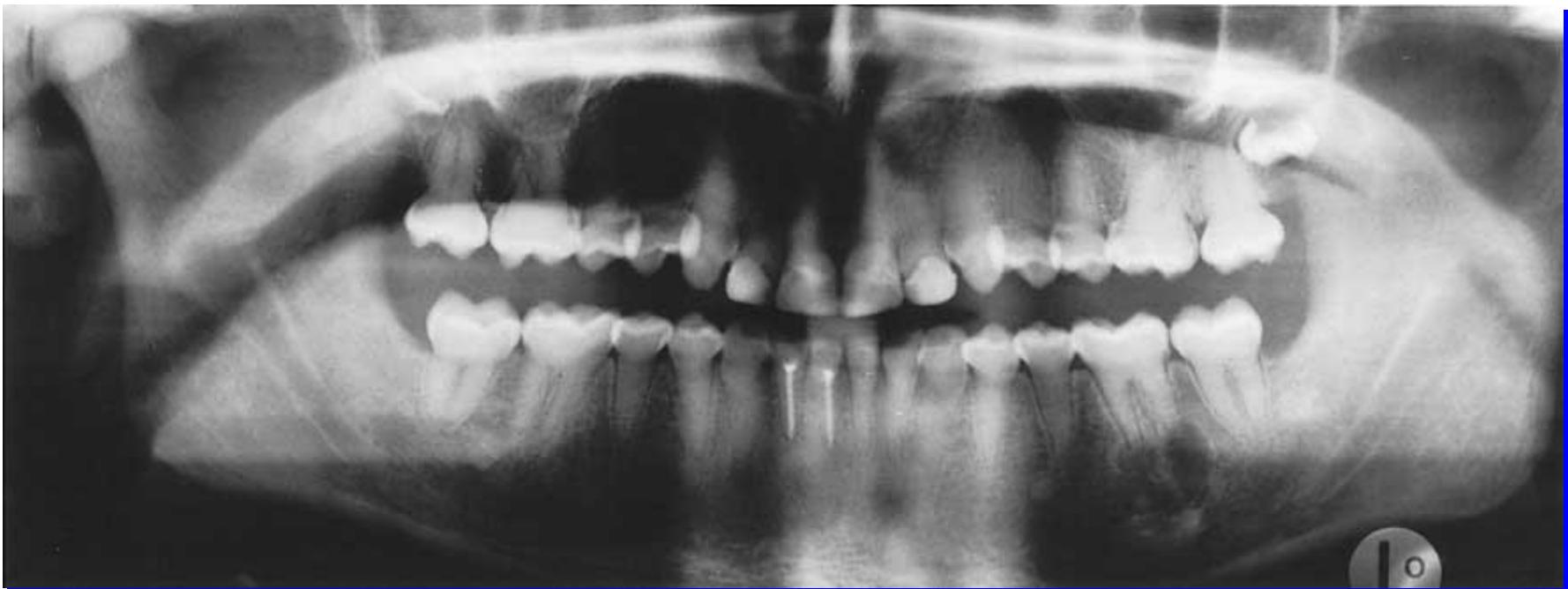


- Clinically teeth have normal contour at eruption, but present with a distinctive amber-like hue
- Although enamel is normal, it is weakly attached to the dentine and is rapidly lost meaning the teeth show marked attrition

# Types of Dentinogenesis imperfecta(DI)

- It is a hereditary developmental disturbance of the dentin that may be seen alone or in conjunction with the systemic hereditary disorder of the bone, osteogenesis imperfecta.
- Type 1 – DI with osteogenesis imperfecta.
- Type 2 – DI “*stand alone*” with no systemic involvement.
- Type 3 – Brandywine type with large pulp chambers.

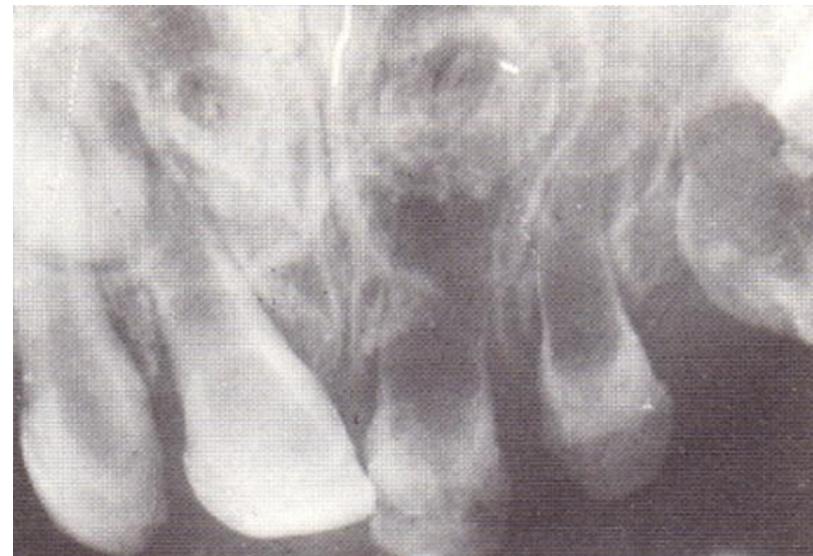




Reminder:  
in dentinal  
dysplasia the teeth  
are rootless.

# Regional odontodysplasia

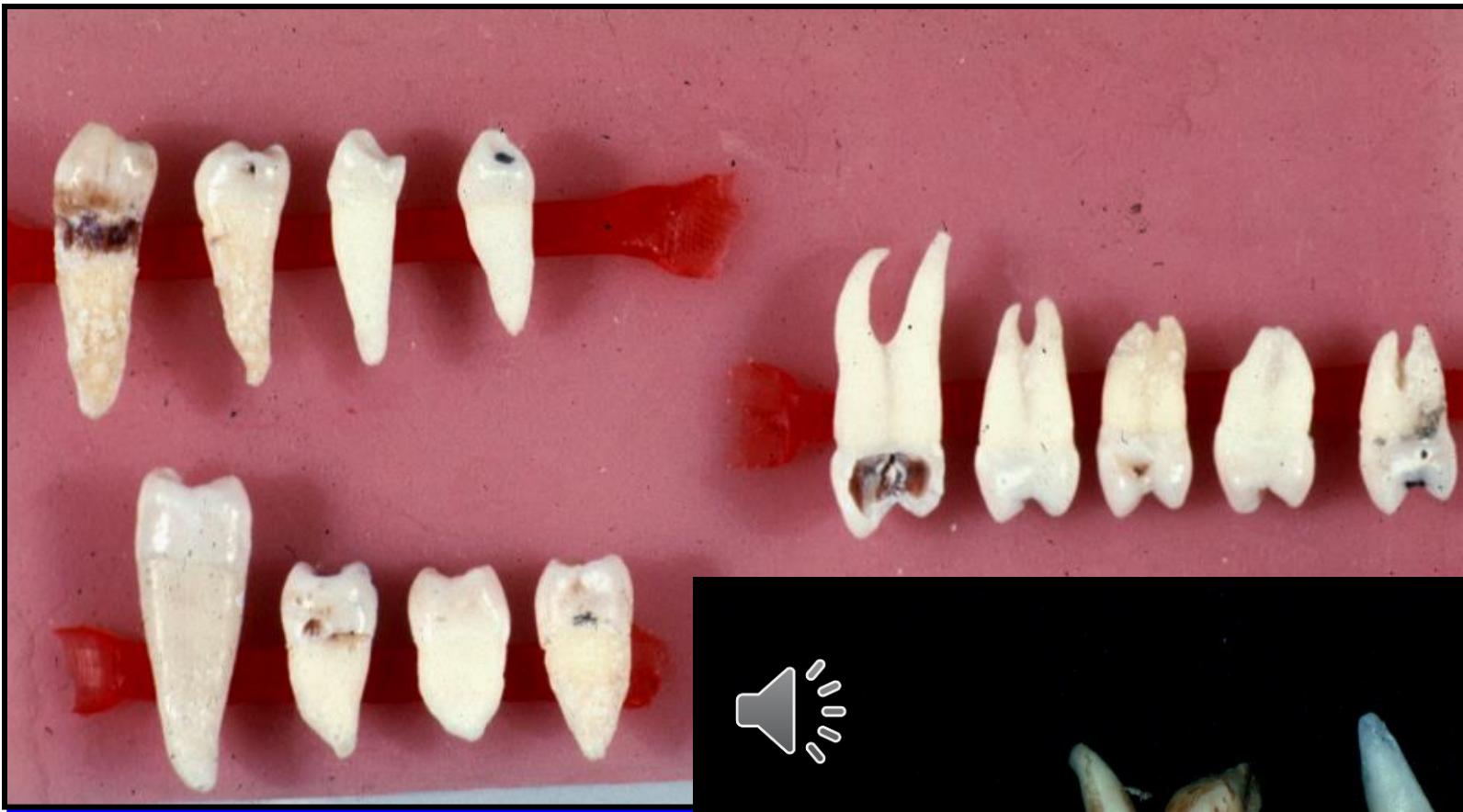
- Affects both primary and secondary dentitions.
- Seen most commonly in anterior maxilla and is usually unilateral.
- Yellowish brown crown.
- Delayed eruption.
- Tooth has an irregular shape.
- Poorly mineralized enamel.
- Dentin is thinner.
- Root apex wide open.
- Pulp stones present.



# Root Abnormalities

1. Shape
2. Size
3. Number
4. Taurodontism
5. Dilaceration
6. Concrescence
7. Hypercementosis





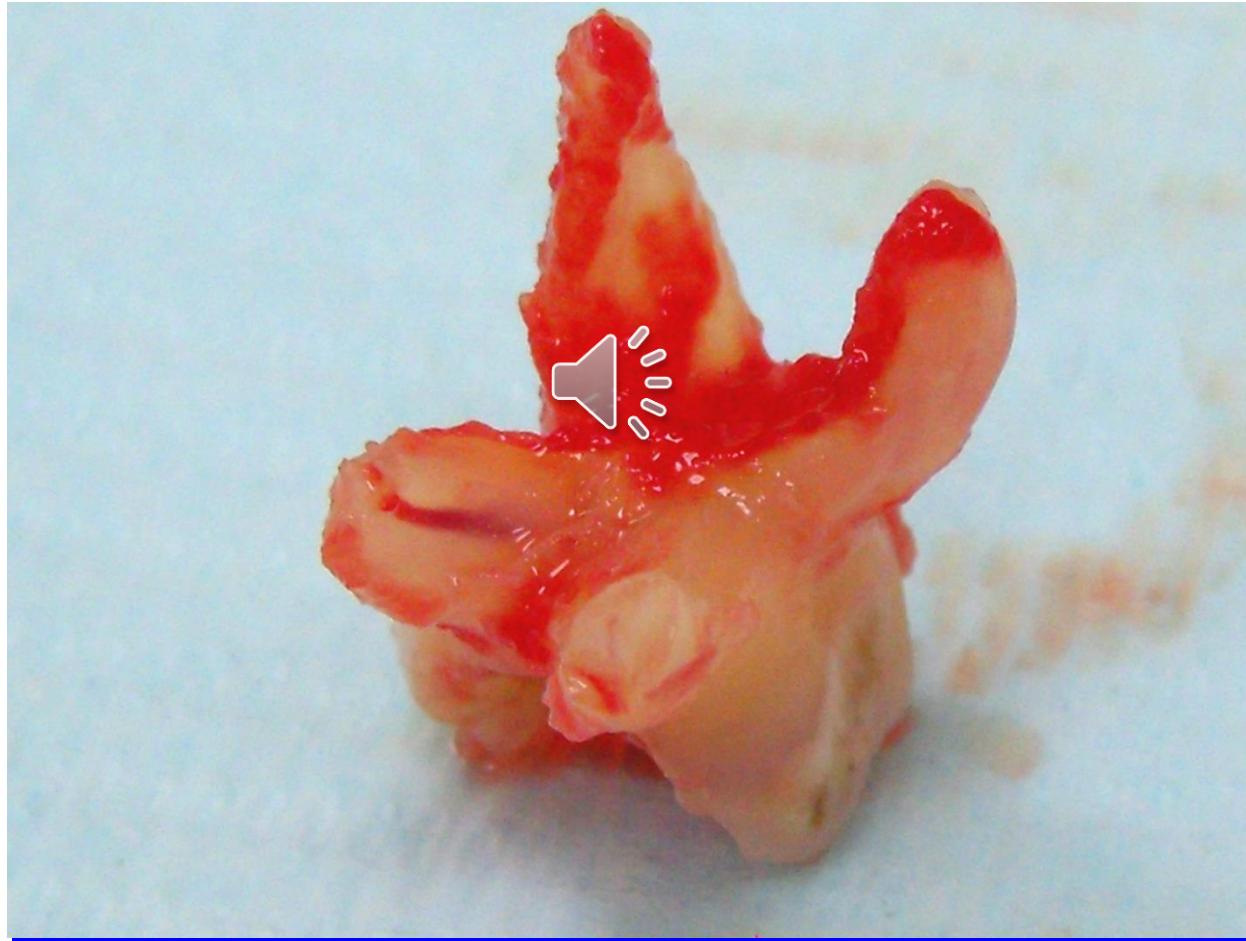
Abnormal Shapes and Sizes



Two premolar crowns  
joined with one root

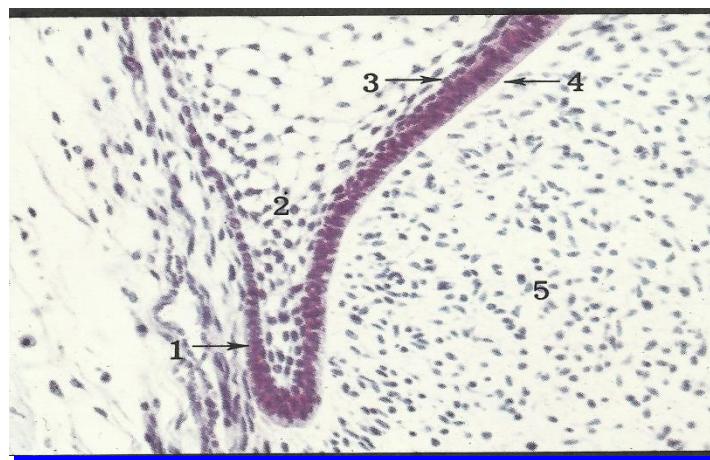


# Four rooted tooth # 65



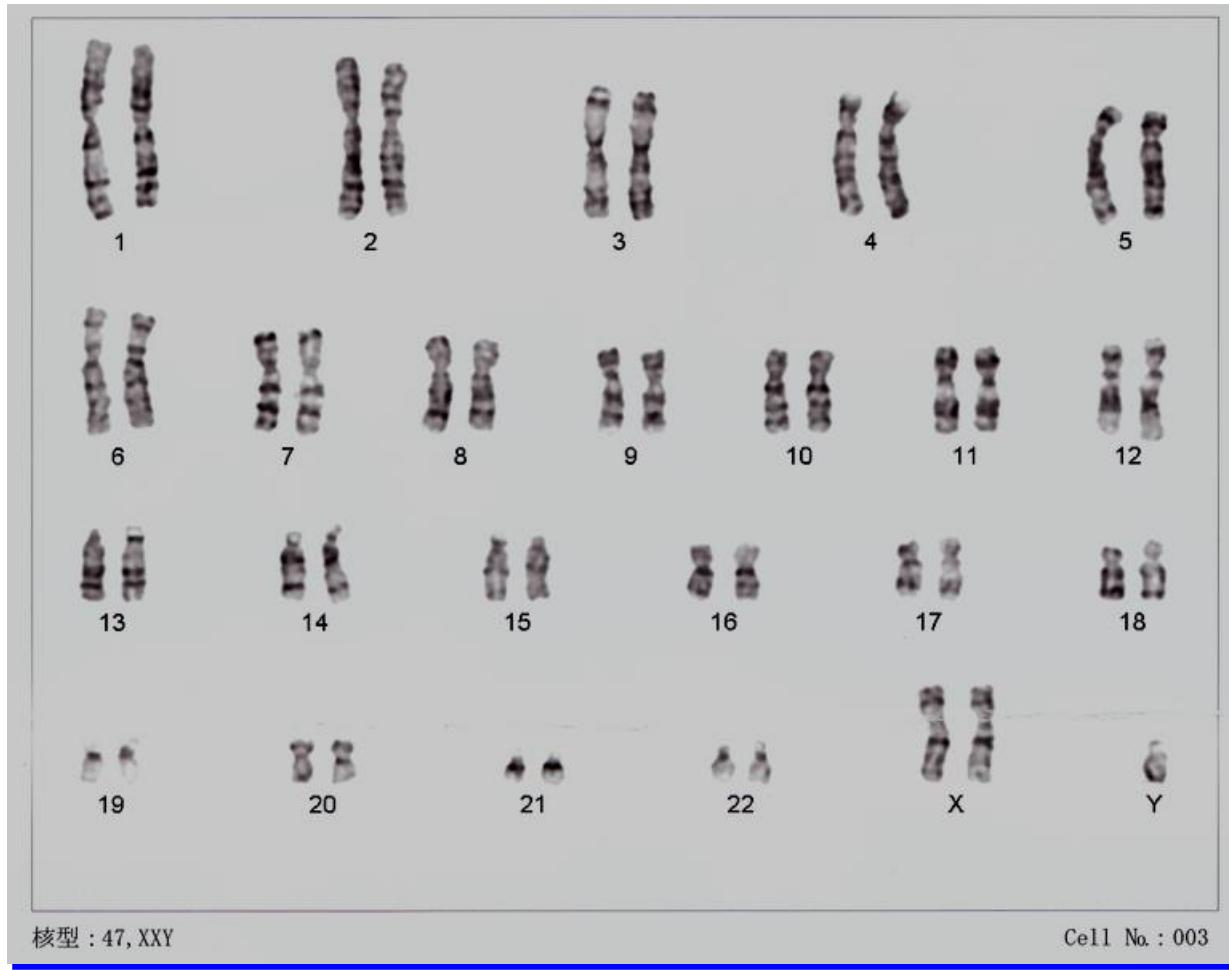
# Taurodontism (Bull-like tooth)

- Enlarged pulp chamber with greater apico-occlusal height than in normal teeth
- No constriction at the amelocemental junction
- Failure of hertwigs epithelial root sheath to invaginate at the horizontal level
- They are present in association with klinefelter and poly-X syndromes



# Turner Syndrome

1. Hypoplastic teeth.
2. Calcified pulps.
3. Abnormal roots.
4. Taurodontism.
5. Extremely small mandible.

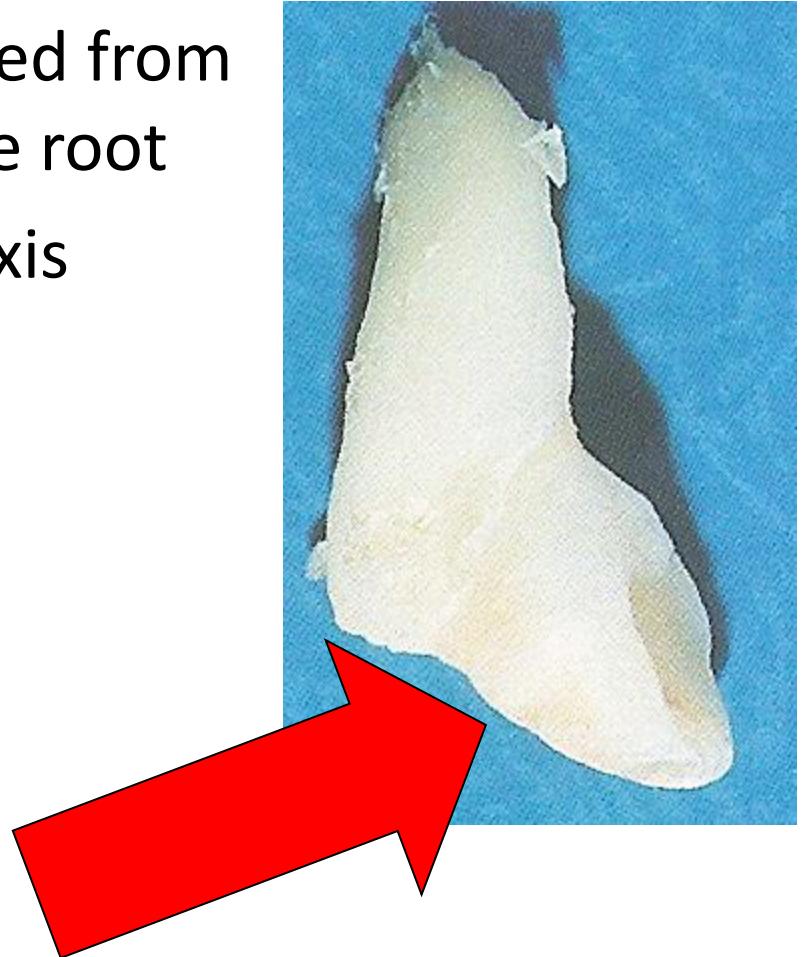


# Dilaceration

- Crown of the tooth is displaced from its normal alignment with the root
- Tooth is bent along its long axis
- Result of acute trauma

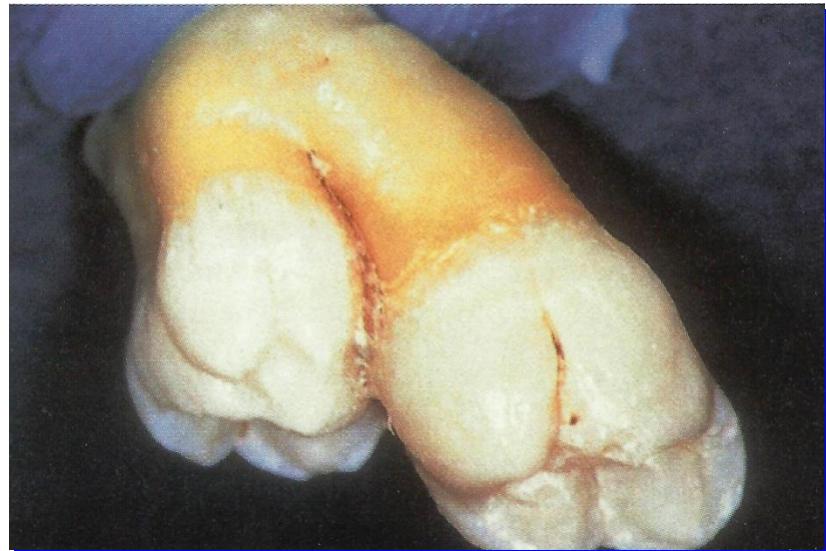


How did it happen?  
When did it happen?

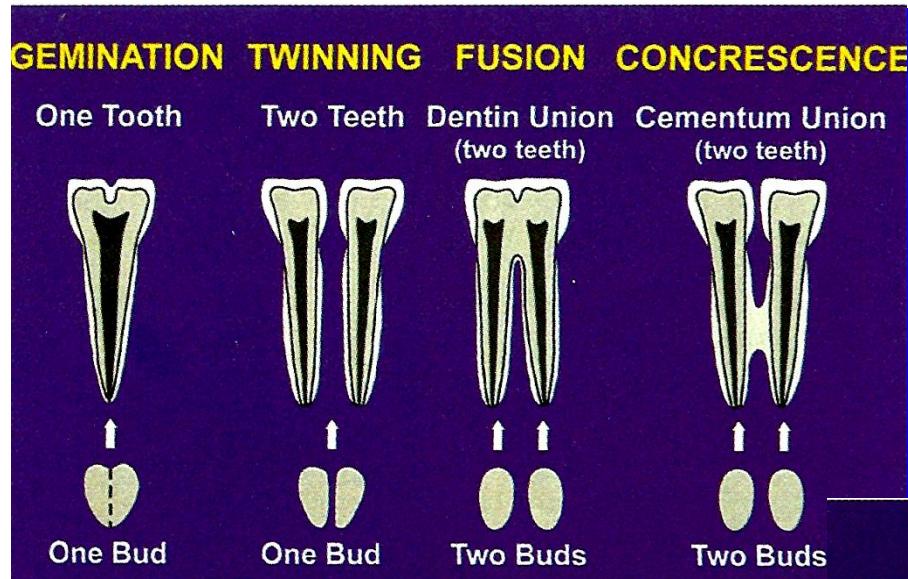


# Concrescence

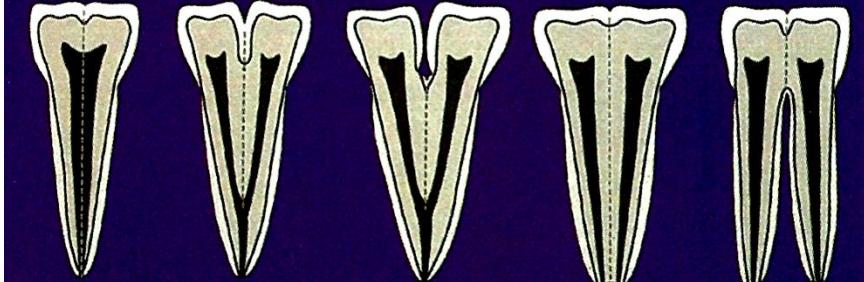
- Roots of one or more teeth are united by cementum
- Frequently seen in the permanent dentition



# Reminder



## TYPES OF GEMINATION



# Eruption (abnormal eruption time)

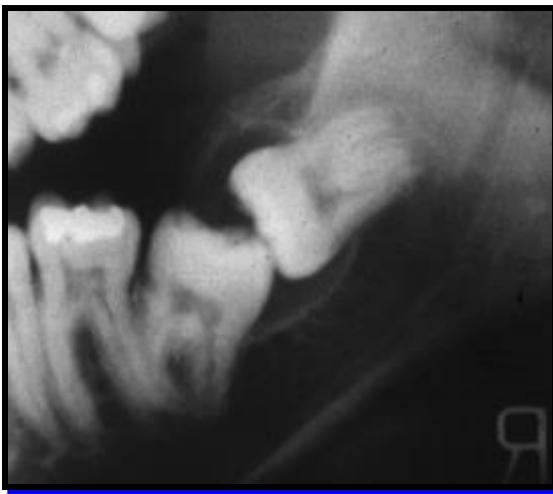
## Precocious (Early)

- “Natal teeth” (may be normal or supernumerary)

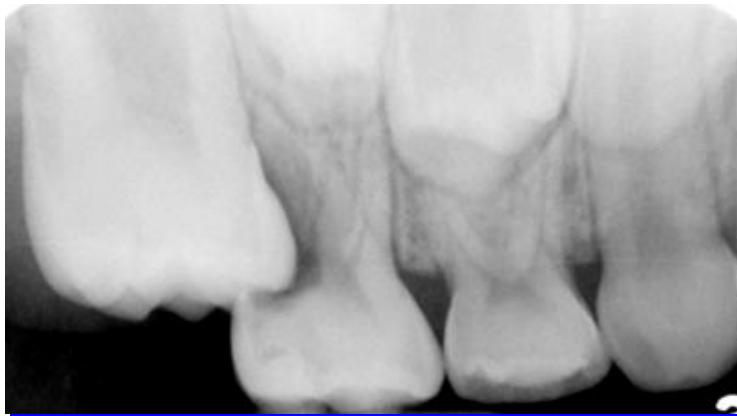


My youngest child patient ever in my career  
“2 hours old Saudi girl”

# Eruption (abnormal eruption time)



Eruption (abnormal eruption place )  
(ectopic eruption of teeth).

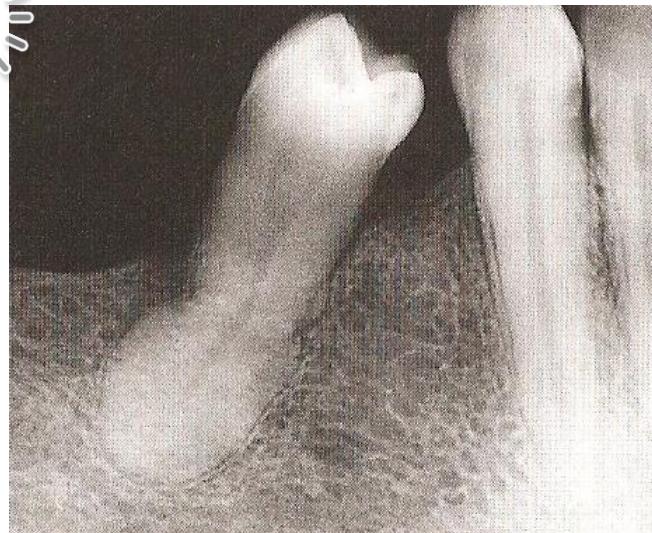


# Abnormalities of Cementum

In certain circumstances the process of cementogenesis may be abnormally high producing hypercementosis

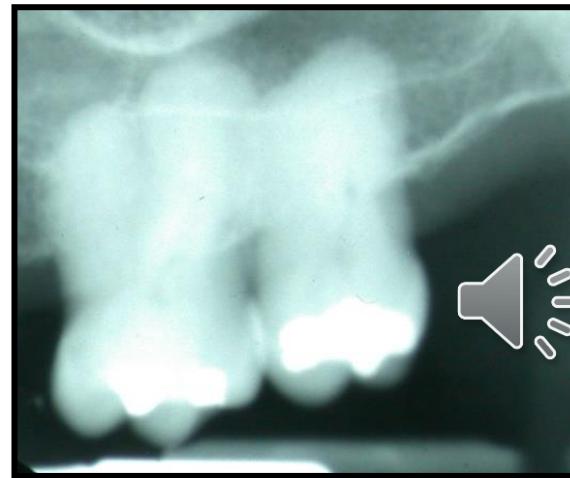
Causes include

- Periapical inflammation
- Mechanical stimulation
- Functionless teeth
- Paget's disease
- Idiopathic



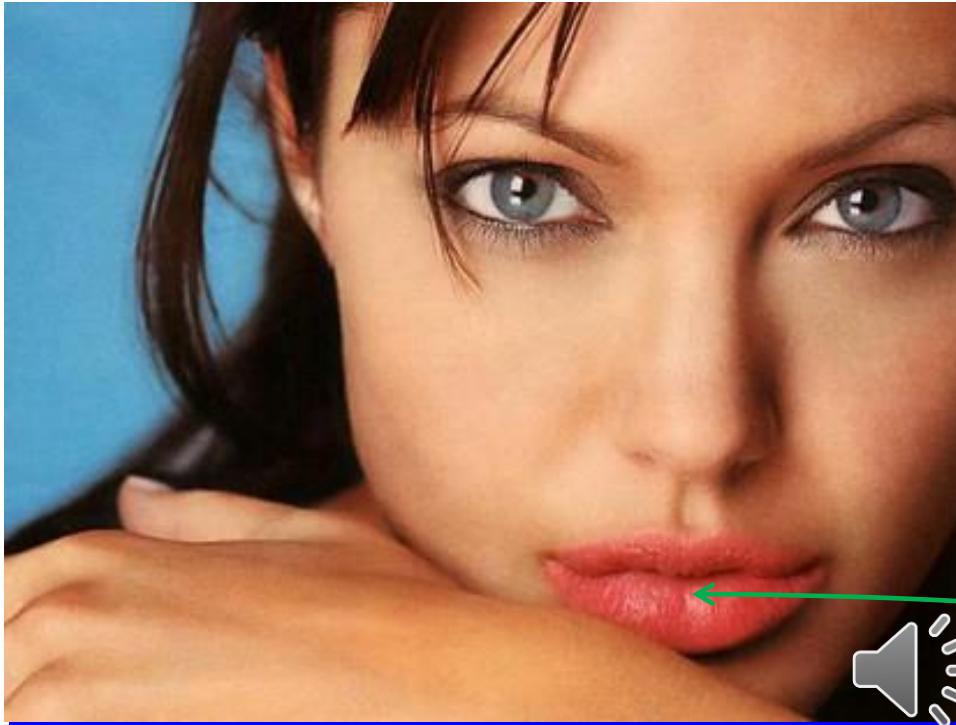
Hypercementosis may also be associated with

- Root concrescence (i.e. fusion of teeth by cementum)
- Ankylosis (i.e. when cementum is directly continuous with alveolar bone)



# Hypocementosis

- Hypoplasia or aplasia of cementum are uncommon
- Has been reported in some conditions including cleidocranial dysostosis and hypophosphatasia



angelina jolie

Sometimes, it's not bad to have an oral anomaly.

This is my last lecture, for this academic year. Whenever you  
Have doubts, questions, or just need a staff to talk to,  
please don't hesitate to ask.

I'm "ALL EARS".

After all, BIG EARS are not considered "*anomalous*" If I use them to listen to  
you ☺