DEVELOPMENTAL DISTURBANCES OF THE ORAL REGION

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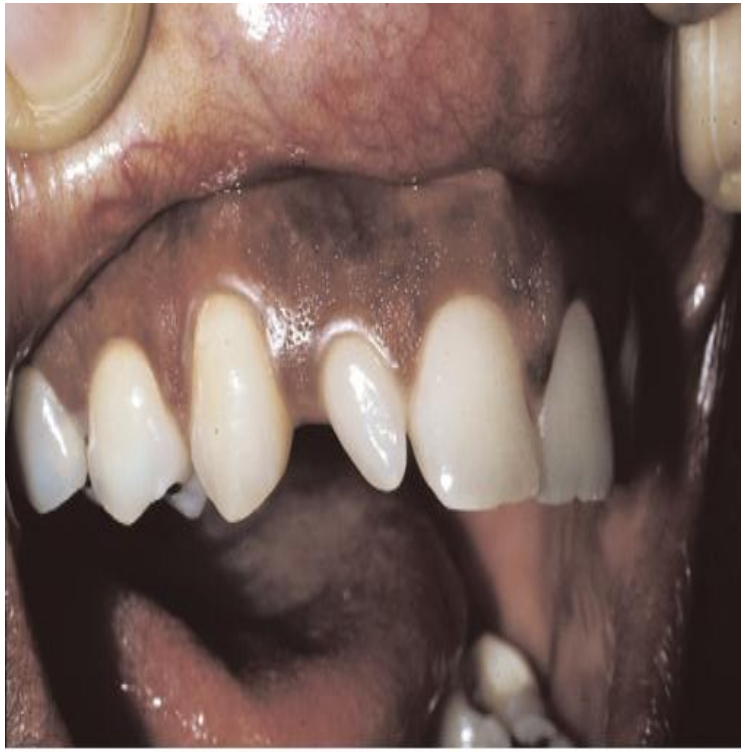
- **Developmental disturbances of the oral region are discussed under three broad categories:**
- **(1) developmental disturbances affecting teeth**
- **(2) developmental disturbances limited to soft tissue**
- **(3) developmental disturbances affecting bone.**

DEVELOPMENTAL DISTURBANCES AFFECTING TEETH

DISTURBANCES IN SIZE

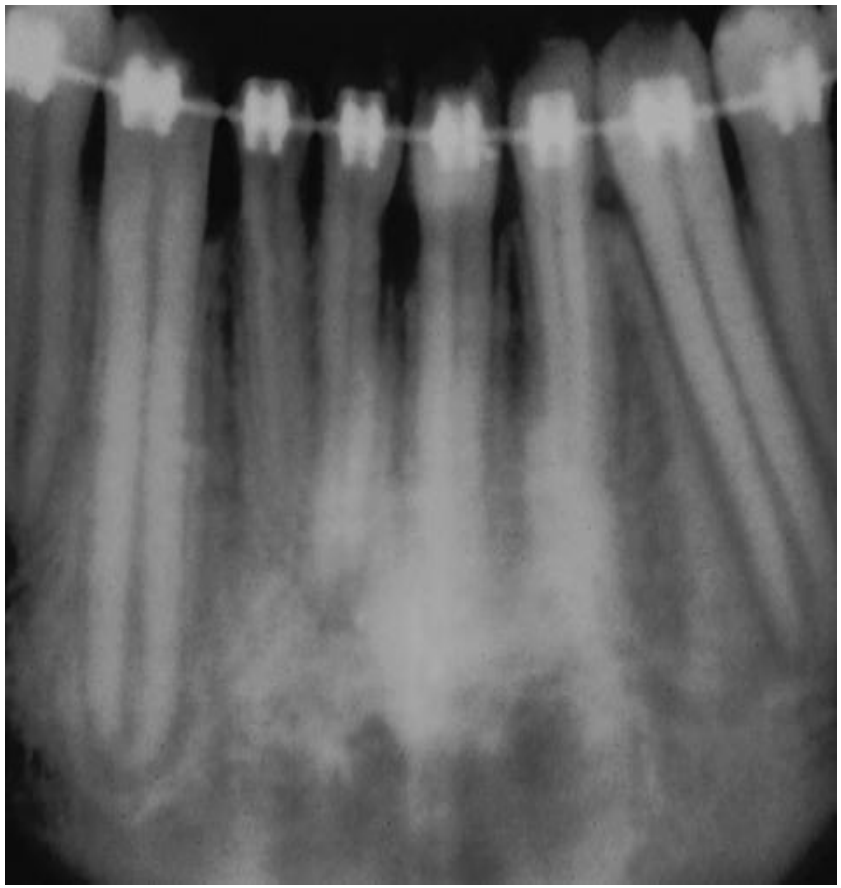
- **MICRODONTIA: One or more teeth that are smaller than normal. Teeth most frequently affected by microdontia are the maxillary lateral incisors (peg laterals), maxillary third molars. The tooth appear as miniature with conical shape crown.**



- **Generalized microdontia:** When all teeth in both arches are smaller than normal.
- **True generalized microdontia:** all the teeth are uniformly smaller than normal (pituitary dwarfism)
- **Relative generalized microdontia:** when the mandible and maxilla are somewhat larger than normal but the teeth are of normal size, giving the illusion of generalized microdontia and the teeth are spaced.

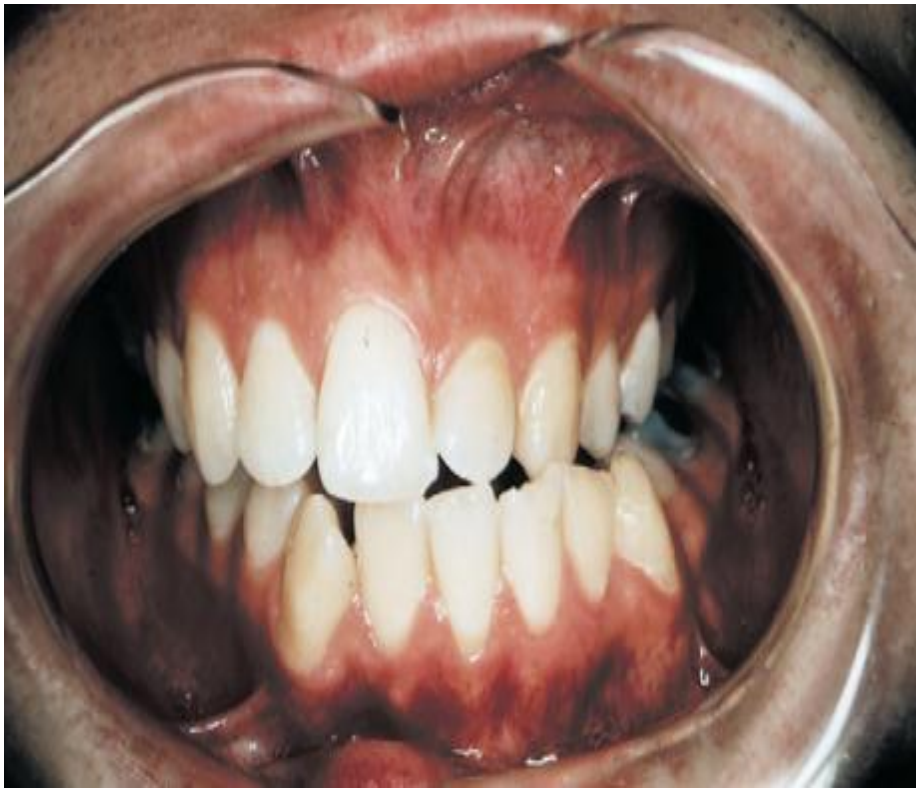
- **MACRODONTIA:** One or more teeth that are larger than normal.
- **True generalized macrodontia:** all teeth in both arches are measurably larger than normal (pituitary gigantism).
- **Relative generalized macrodontia:** is used to describe a condition in which the mandible, the maxilla, or both are somewhat smaller than normal but the teeth are normal in size, it appear as crowding of teeth.

- **Regional macrodontia:** is seen in patients with hemifacial hypertrophy.
- **Rhizomegaly or radiculomegaly:** is an uncommon type of macrodontia in which the root or roots of a tooth are considerably longer than normal.This condition most commonly affects the roots of the mandibular cuspid teeth



DISTURBANCES IN NUMBER

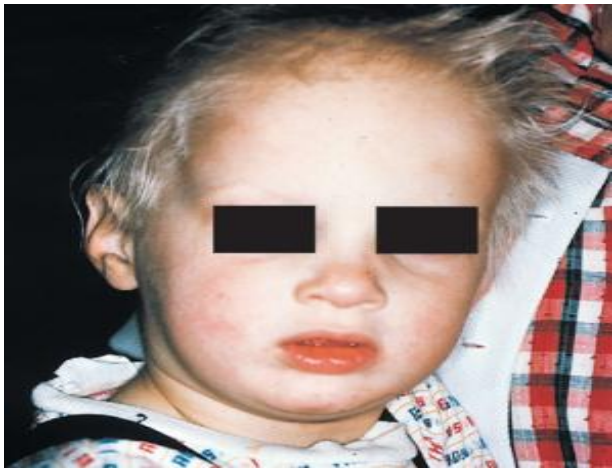
- **PARTIAL ANODONTIA (HYPODONTIA or OLIGODONTIA): Congenital absence of one or more teeth. Although any tooth can be congenitally absent, certain teeth tend to**

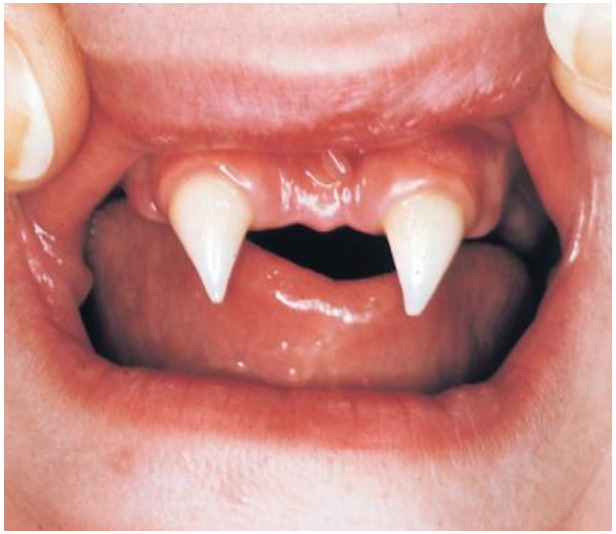


- **TOTAL ANODONTIA: Congenital absence of all teeth.**
- **Total anodontia is a rare condition in which the patient has no deciduous and no permanent teeth.**
- **It usually occurs in association with a generalized disorder such as hereditary ectodermal dysplasia.**

Hereditary ectodermal dysplasia

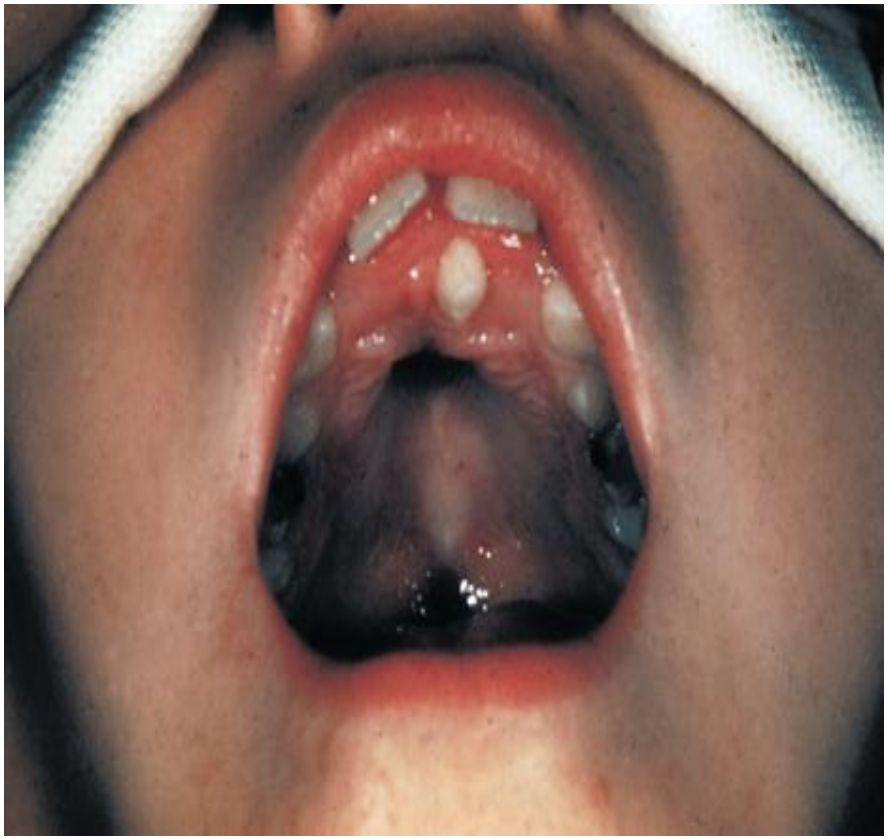
- **Is a genetic disorder affecting essentially males (X-linked) and in other families transmitted as an autosomal recessive disorder affecting males and females. Affected gene encode a transmembrane protein that is expressed in keratinocytes, teeth, hair follicles, and sweat glands.**
- **The hair may be absent or lanugo type**
- **Reduction or absence of sweat glands results in the inability to regulate body temperature.**
- **Hypodontia.**



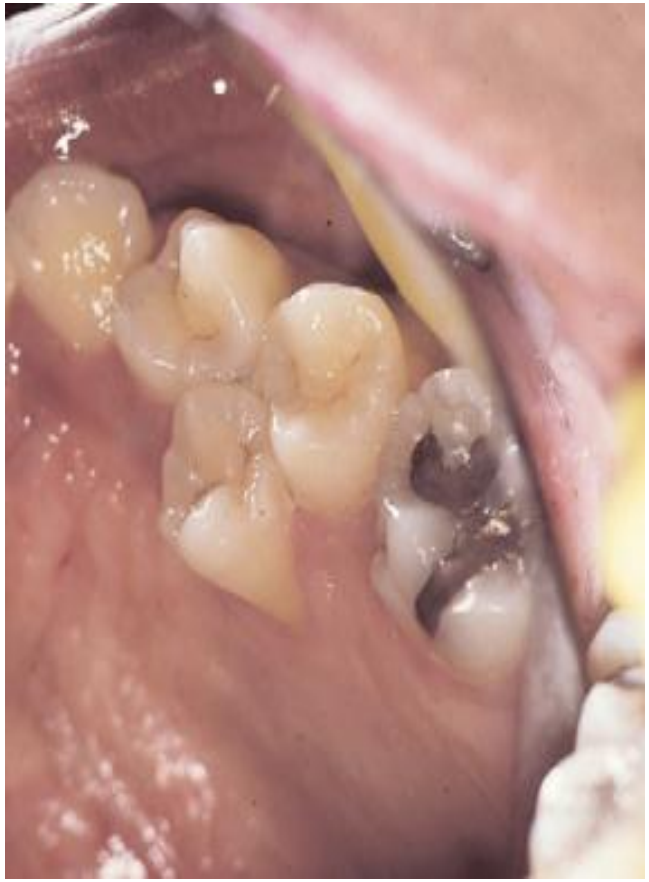


SUPERNUMERARY TEETH:

- Teeth in excess of the normal number. They are far more common in the maxilla (90%) than in the mandible (10%).
- **Mesiodens:** a supernumerary tooth located between the maxillary central incisors (most common)
- **Paramolars:** a supernumerary tooth appear as maxillary fourth molars.

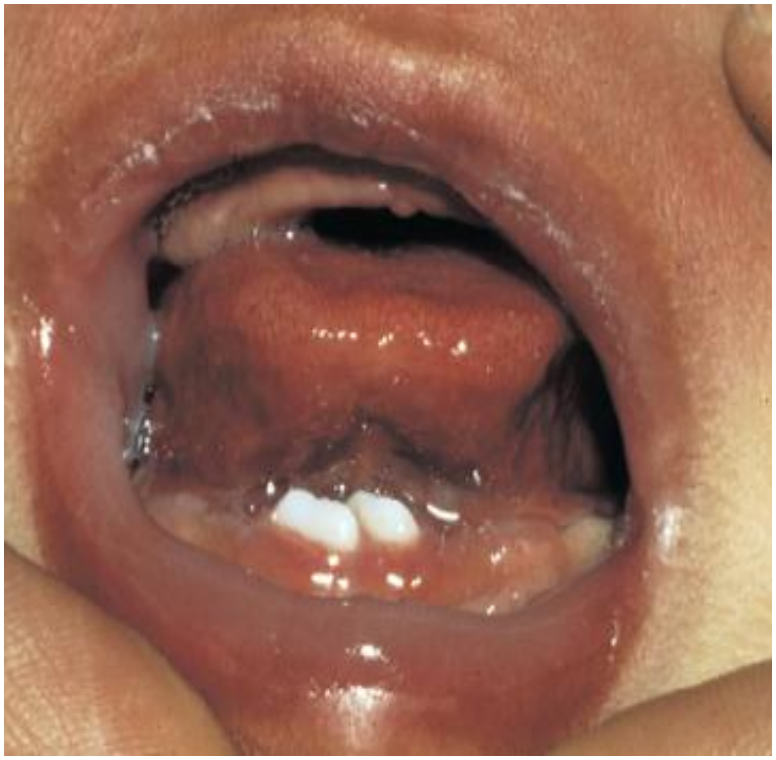


- **Other affected teeth are maxillary lateral incisors.**
- **A supernumerary tooth may resemble the corresponding normal tooth, or it exhibit conical crowns.**
- **Supernumerary deciduous teeth are uncommon**
- **Supernumerary teeth may be single or multiple and erupted or impacted. Multiple supernumerary teeth, which are generally impacted, are characteristically seen in cleidocranial dysplasia and Gardner syndrome.**



DISTURBANCES IN ERUPTION

- **The eruption times for deciduous and permanent teeth are variable. It is therefore difficult to assess the eruption times for any given individual. Only when the eruption time or sequence is obviously outside of the normal range can one consider that an eruption abnormality exists.**



Premature Eruption

- **Natal teeth:** **Erupted deciduous teeth present at birth.**
- **Neonatal teeth:** **Deciduous teeth that erupt during the first 30 days of life.**
- **The cause of this phenomenon is unknown, a familial pattern is sometimes observed.**
- **Natal teeth and neonatal teeth are usually part of the normal complement of deciduous teeth; they are not supernumerary teeth and should therefore be retained if possible.**

- **Premature eruption of permanent teeth is usually a consequence of premature loss of the preceding deciduous teeth.**
- **In the event that the entire permanent dentition is obviously erupting prematurely, the possibility of an endocrine dysfunction such as hyperthyroidism should be considered.**

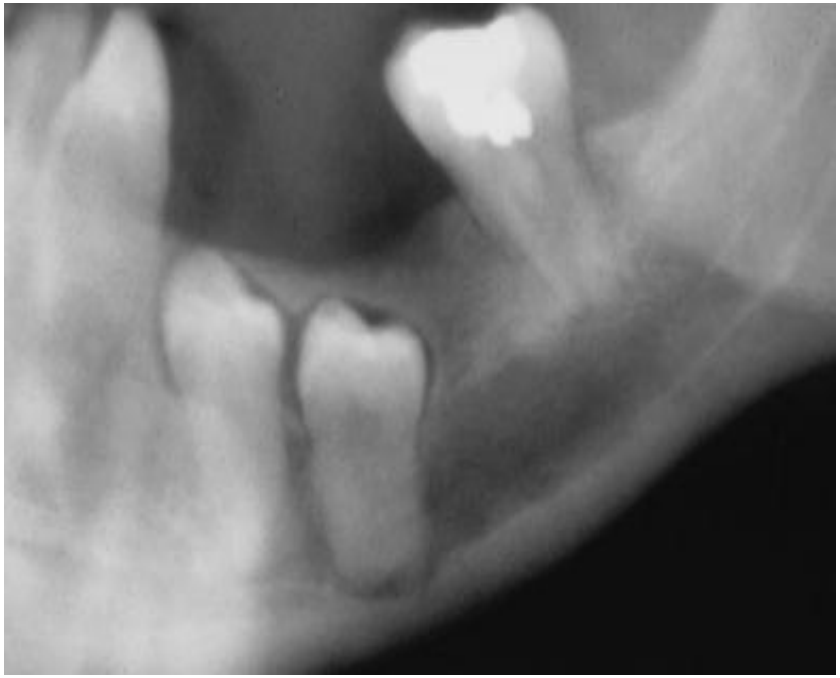
Delayed Eruption

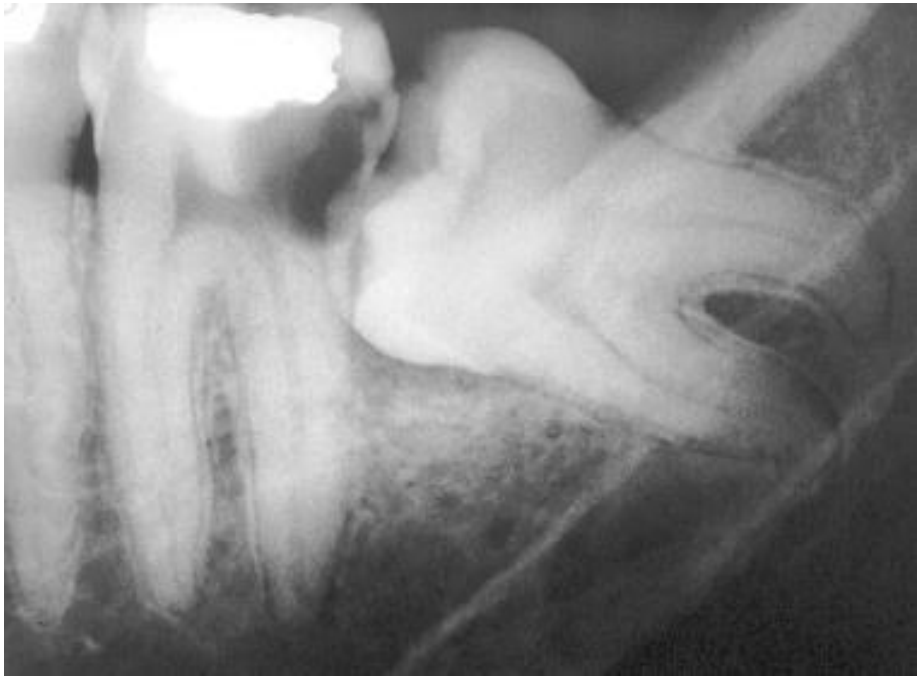
- **Delayed eruption of deciduous teeth relative to the normal age range is usually idiopathic or associated with certain systemic conditions such as rickets, cleidocranial dysplasia, or cretinism.**
- **Local factors such as gingival fibromatosis (dense fibrous connective tissue impedes tooth eruption) can result in delayed eruption of the deciduous dentition.**
- **Treatment : control systemic or local factors.**
- **Delayed eruption of permanent teeth may result from the same local and systemic conditions that give rise to the delayed eruption of deciduous teeth.**

Impacted Teeth:

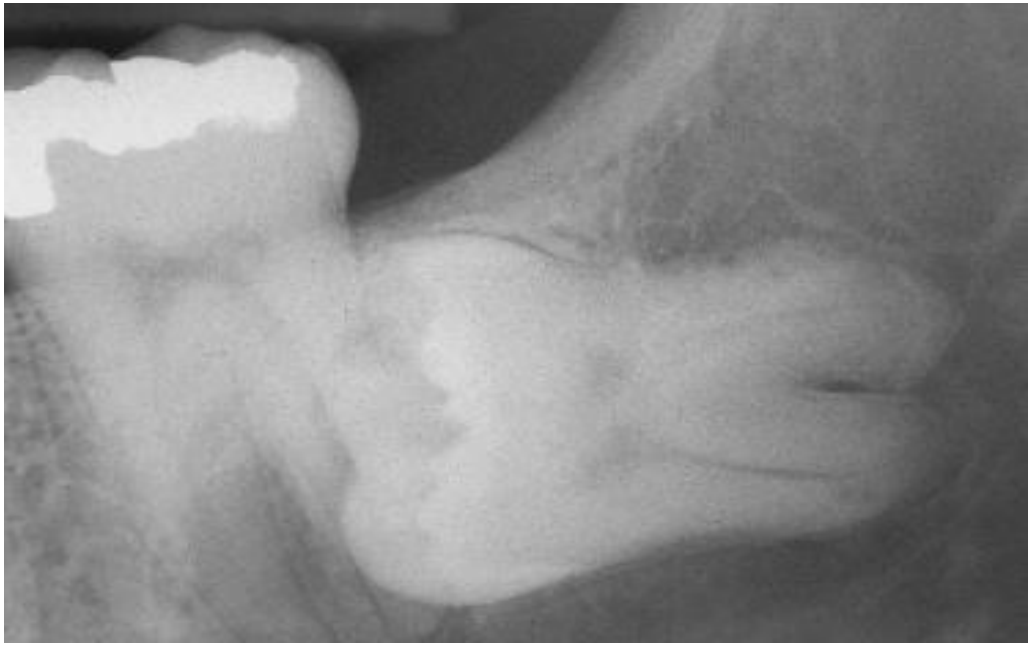
- **Teeth that fail to erupt as a result of physical barrier (crowding, supernumerary teeth, some odontogenic cysts, and odontogenic tumors).**
- **The most common impacted teeth are mandibular and maxillary third molars and maxillary cuspids, followed by the mandibular second premolars and supernumerary teeth.**
- **Impacted third molars have been classified according to their orientation within the dental arch into mesioangular, distoangular, horizontal, and vertical impactions.**

- **An impacted tooth that is totally surrounded by bone is considered to be completely impacted, whereas one that is partly in bone and partly in soft tissue is considered to be partially impacted that predisposing the impacted tooth to pericoronal infection and dental caries.**





- **A tooth that is completely impacted does not communicate with the oral cavity and is therefore not vulnerable to infection or dental caries. Individual teeth that fail to erupt for no apparent reason have sometimes been termed embedded teeth.**

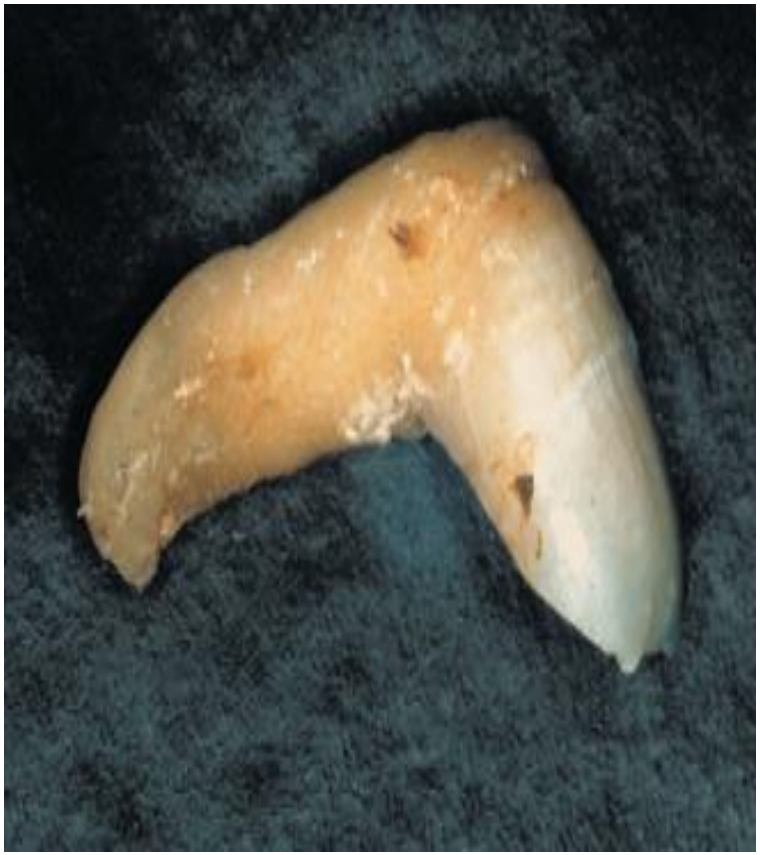


The common complications of impacted teeth are

- External resorption of the impacted tooth.
- Root resorption of adjacent normal teeth
- Infection and Pain
- Dentigerous cyst formation.
- **The treatment of impacted:** the removal of the causative barrier and surgically removal

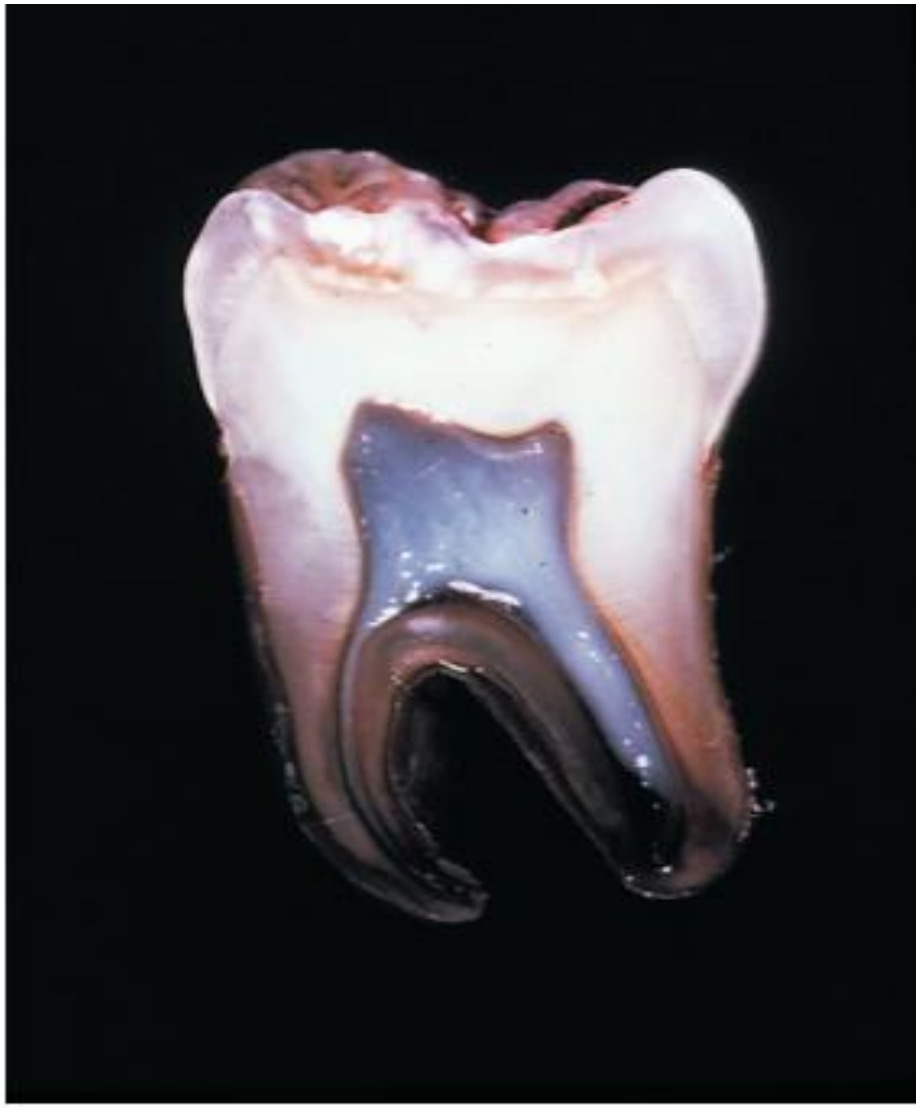
DISTURBANCES IN SHAPE

- **DILACERATION:** **A sharp bend or angulation involving the root of a tooth result from trauma during tooth development (continued root formation during a curved or tortuous path of eruption). It complicate tooth extraction, underlining the importance of securing preoperative radiographs before extracting a tooth**



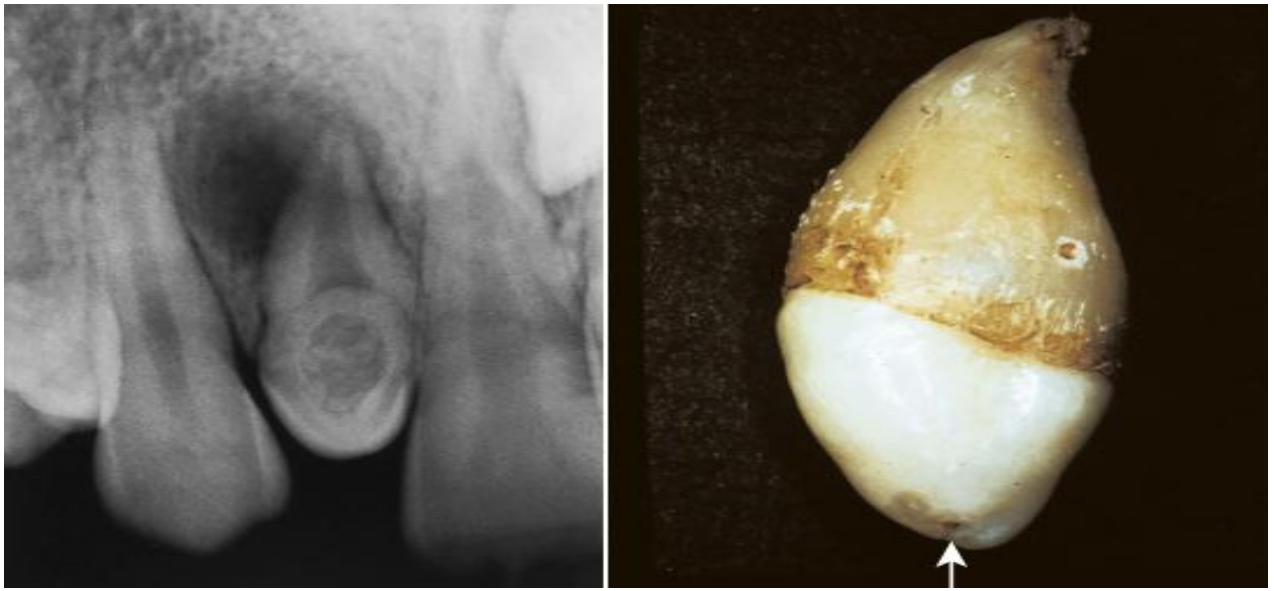
TAURODONTISM:

- **A molar with an elongated crown and apically placed furcation of the roots, minimal definition of the cervical margin, an extremely large pulpal chamber that can complicating factor during root canal treatment procedures.**



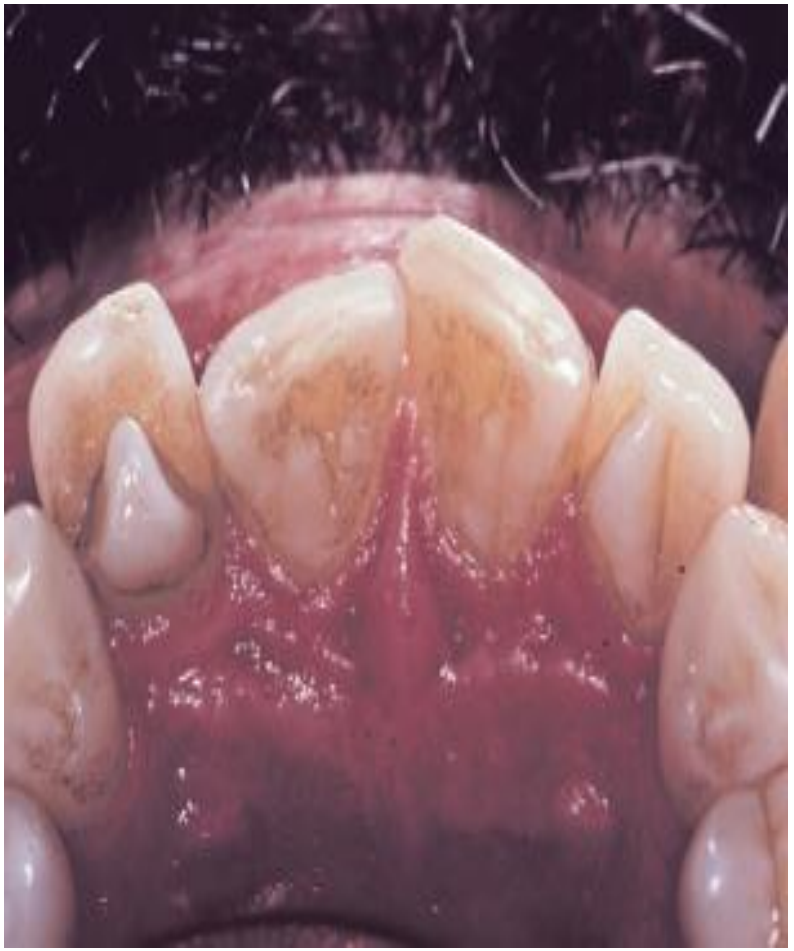
DENS INVAGINATUS (dens in dente)

- **A developmental dental anomaly characterized by a deep enamel-pit that extends for varying depths into the underlying dentin, displacing the pulp chamber and sometimes altering the shape of the root.**
- **Permanent maxillary lateral incisors**



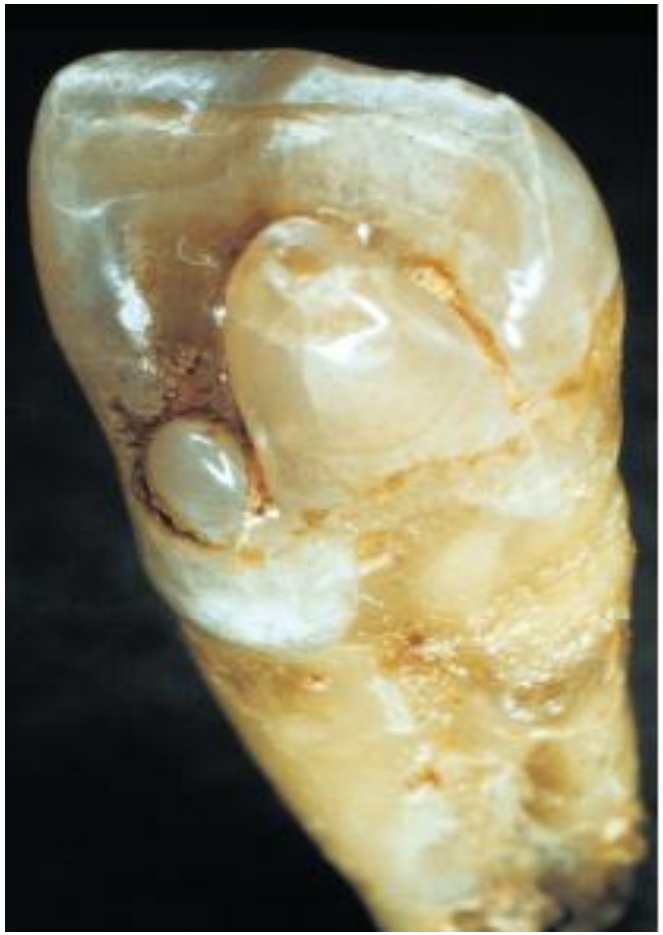
Supernumerary Cusps

- **Certain teeth exhibit supernumerary cusps that result in clinical problems that may require treatment. Examples of such supernumerary cusps are Carabelli cusp, dens evaginatus and talon cusps.**



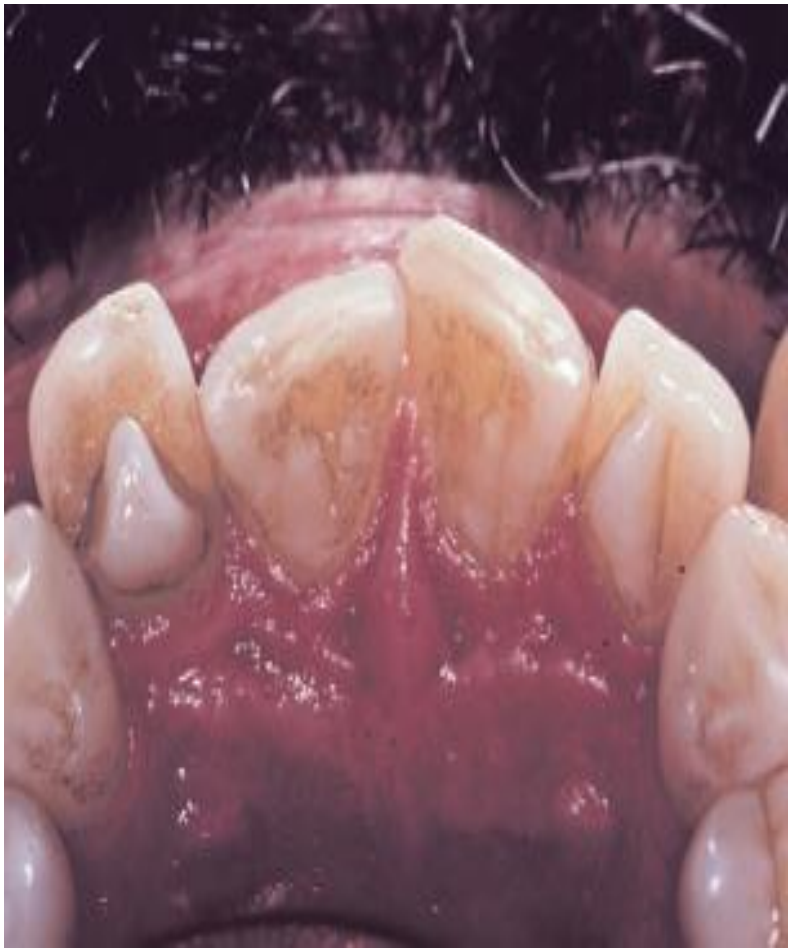
DENS EVAGINATUS:

- **A developmental anomaly characterized by a cusp-like focal enamel protrusion on the occlusal or lingual surface of the premolar teeth.**
- **The dentist should be aware that it usually contains a pulp horn that can be readily exposed as a result of functional attrition or if mechanical reduction or removal of the cusp is attempted.**



Talon cusp

- **supernumerary cusp typically seen on the lingual aspect (cingulum portion) of maxillary central incisors. If the cusp interferes with normal occlusion, preventive care that includes endodontic and restorative treatment of the affected tooth may be required.**

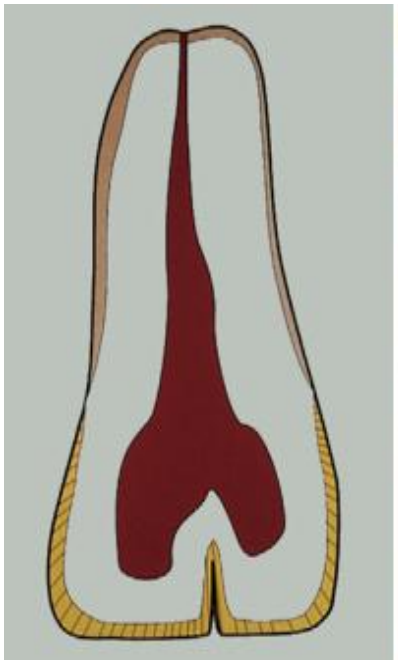


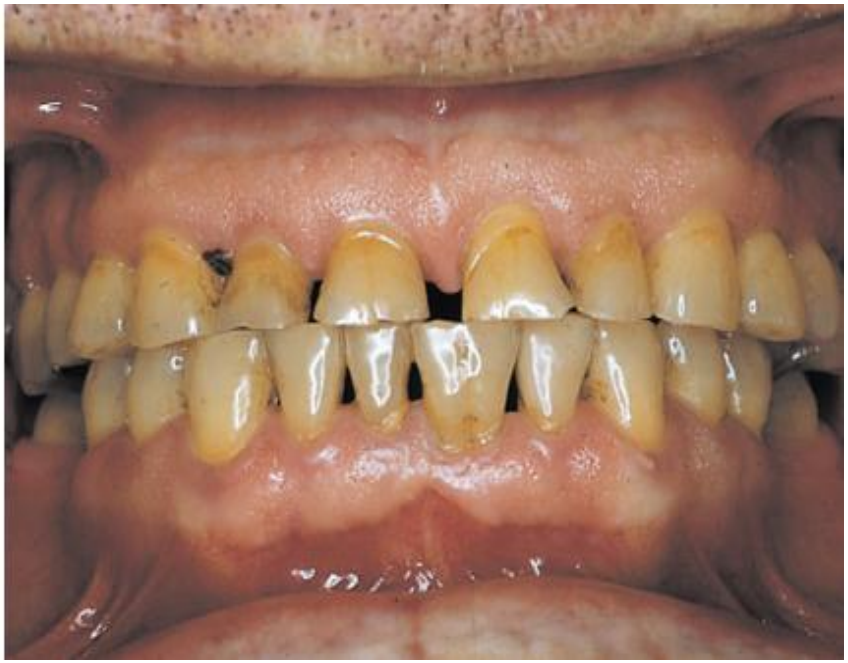
Supernumerary Roots

- **Additional roots (more than the expected number).**
- **It is most often seen in mandibular premolars, maxillary and mandibular third molars.**

GEMINATION

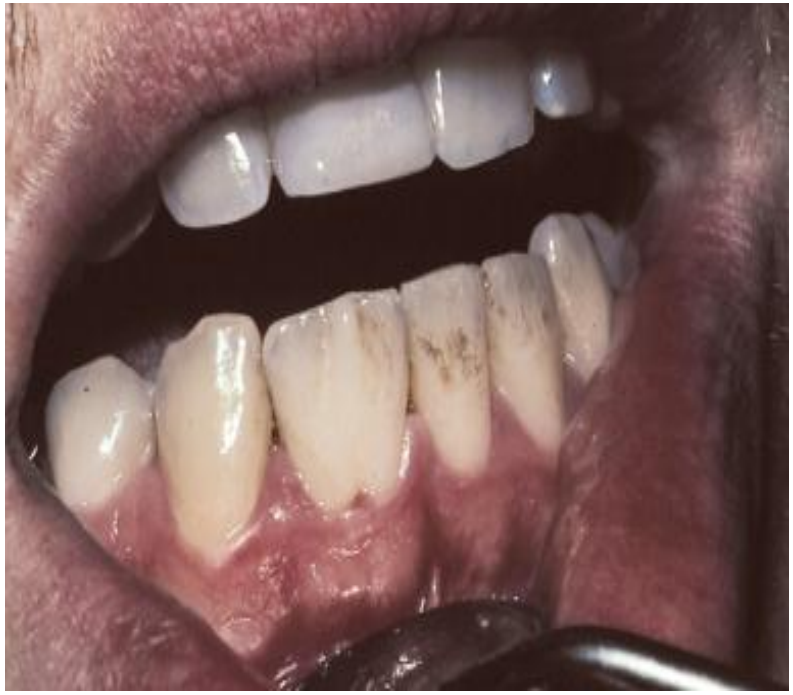
- **A developmental dental anomaly characterized by a single-rooted tooth with a wide, partly-divided crown or two separate crowns as a result of an incompletely divided tooth germ.**





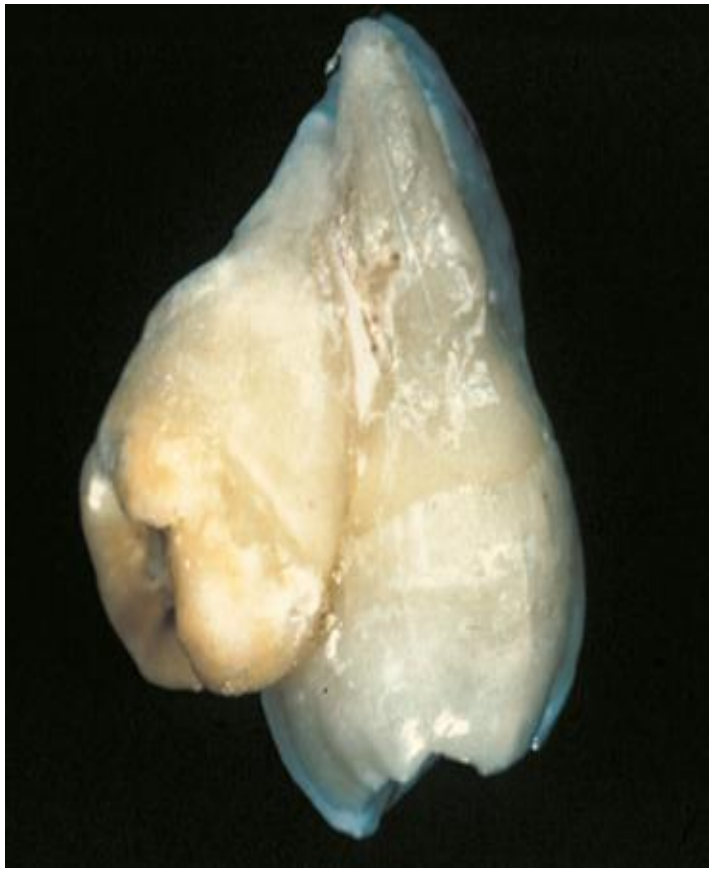
FUSION:

- **Union of two normally separate tooth germs. Fusion can be complete or incomplete, and its extent will vary with the stage of development that a tooth has reached at the time of fusion. If the union begins at a later stage of tooth development, then the affected teeth may have separate crowns and the fusion may be limited to the roots. The pulp canals may be either fused or separate.**



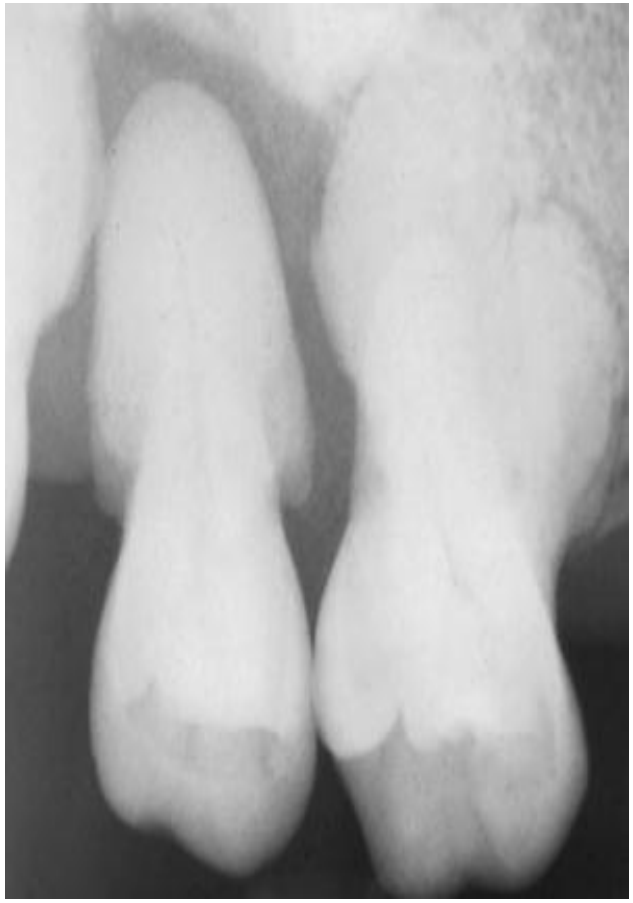
CONCRESCENCE:

- **Union of the roots of two or more normal teeth caused by confluence of their cementum. It results of traumatic injury to the area or crowding with interseptal bone loss, resulting in close approximation of the tooth roots.**
- **Failure to recognize its presence can result in the extraction of two teeth when a single extraction was intended.**



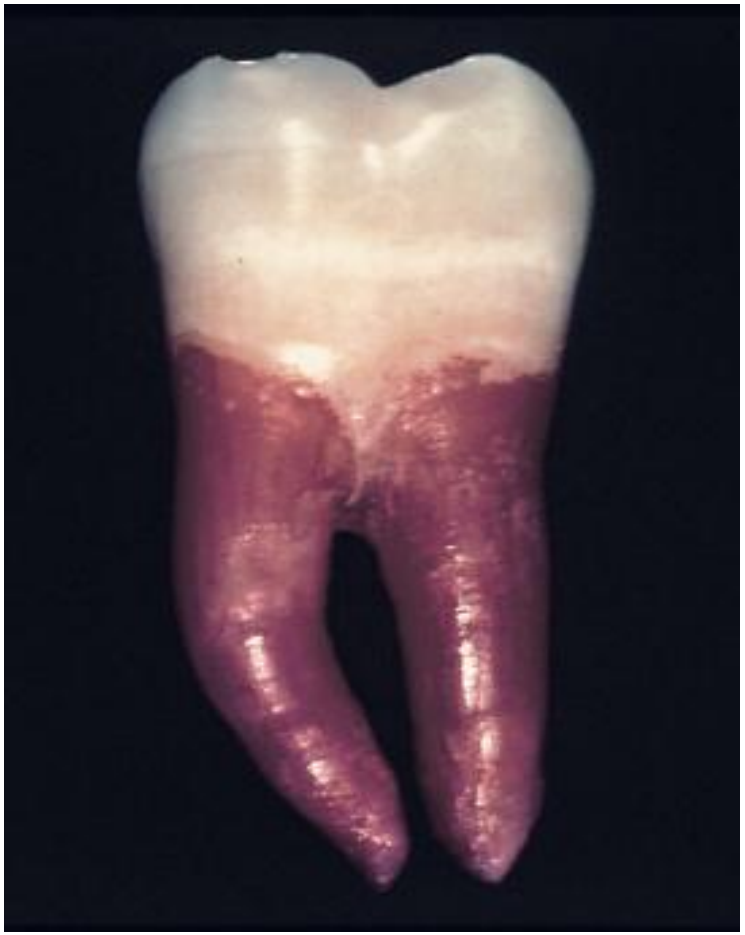
Hypercementosis

- **Excessive deposits of cementum on the root of teeth. Such deposits complicate extraction without surgically removing significant amounts of the surrounding bone.**
- **Hypercementosis is common in teeth that are subjected to occlusal forces, Paget disease or hyperpituitarism, and on adjacent teeth in areas of chronic inflammation. Because these changes are clinically undetectable, radiographic evaluation is a valuable aid before tooth extraction.**

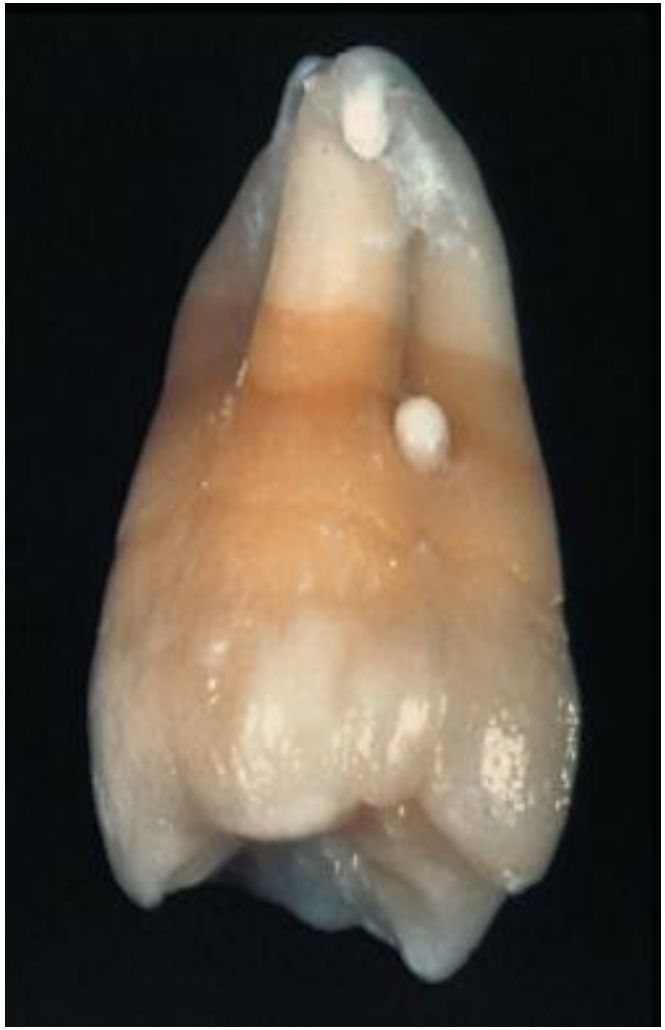


Cervical Enamel Projection

- **Focal apical extensions of the coronal enamel beyond the normally smooth cervical margin (cementoenamel junction) and onto the root of the tooth. Their clinical significance relates to the fact that they could contribute to periodontal pocket formation, periodontal disease, and buccal bifurcation cyst.**



- **Cervical enamel projections differ from the ectopic droplets of enamel that primarily occur in the bifurcation or trifurcation areas on the roots of molars. These are termed enamel pearls or enamelomas.**

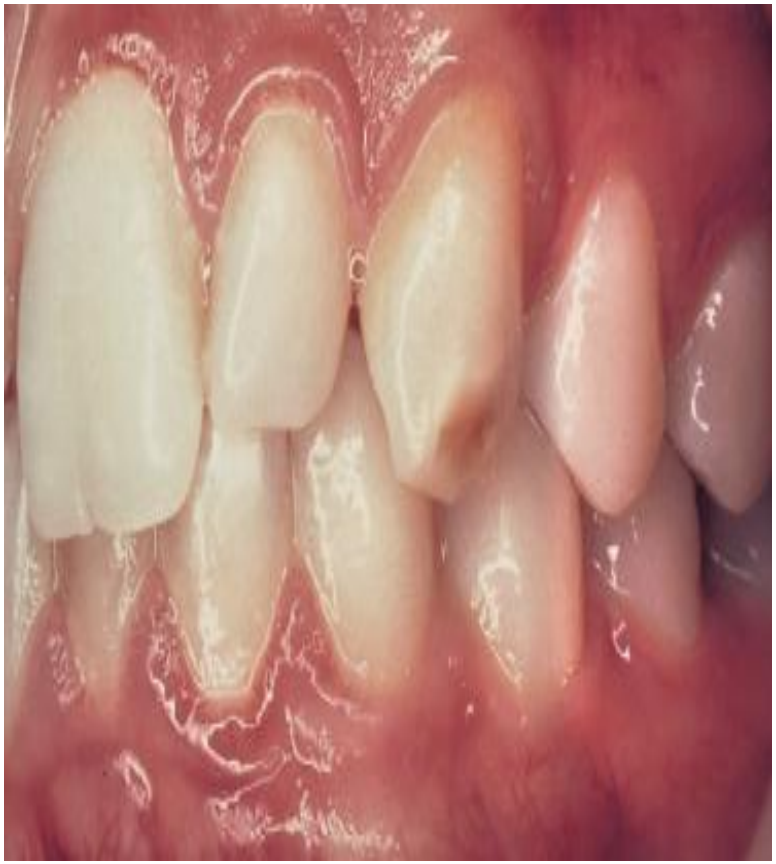


DISTURBANCES IN STRUCTURE OF ENAMEL

- **It occurs as a result of environmental or hereditary factors. The environmental factors are infections, inflammation, nutritional deficiencies, chemical injuries and trauma.**
- **The enamel disturbance may be localized or generalized. The defect is related to the nature of causative factor, the duration of the injury, and the stage of enamel formation at the time of the injury.**
- **Environmental factors usually affect either the deciduous or the permanent dentition and often damage both types of hard tissues.**

Focal enamel hypoplasia

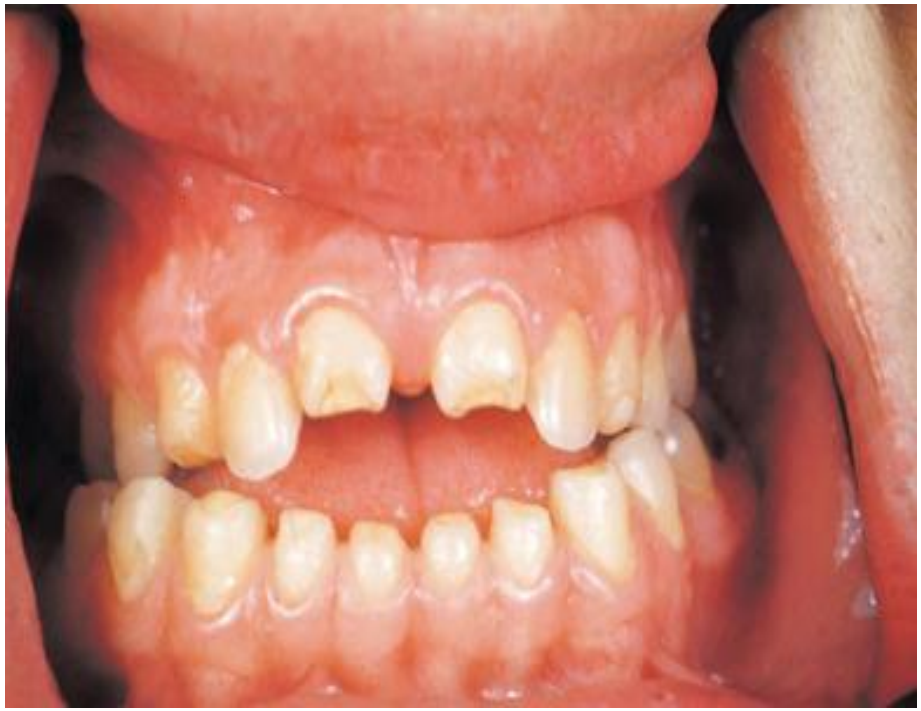
- **Turner tooth: is a common form of focal enamel hypoplasia results from localized inflammation or trauma during tooth development (caries related abscess that damages the underlying developing permanent successor). The affected crown may have pitted areas with yellowish or brownish discoloration**



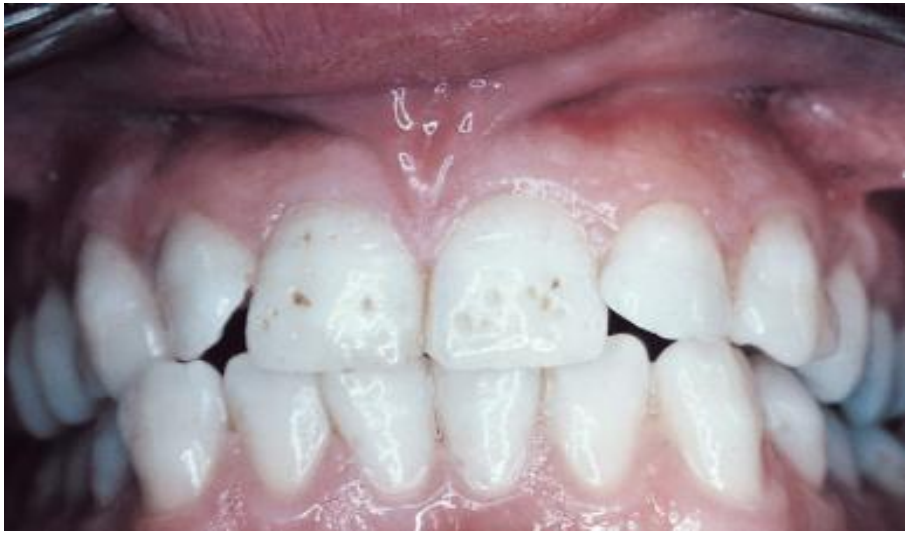
Generalized enamel hypoplasia

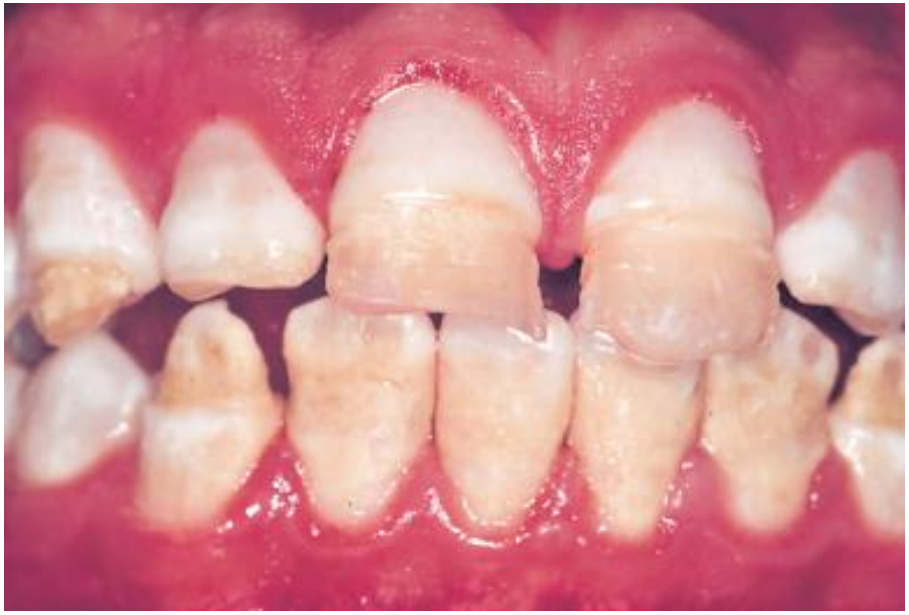
- **Systemic environmental factors inhibit functioning ameloblasts at a specific period during tooth development**
- **They are manifested clinically as a horizontal line, small pits or grooves on the enamel surface that correspond to the time of development and the duration of the insult.**
- **Clinical studies indicate that most cases of generalized environmental hypoplasia involve teeth that are formed in infants during the first year of life; thus the teeth that are most often involved are the permanent incisors, cuspids, and first molars.**

- **Congenital syphilis resulting enamel hypoplasia affect the incisal edges of the permanent incisors (Hutchinson incisors) and the occlusal surfaces of the permanent first molars (mulberry molars).**



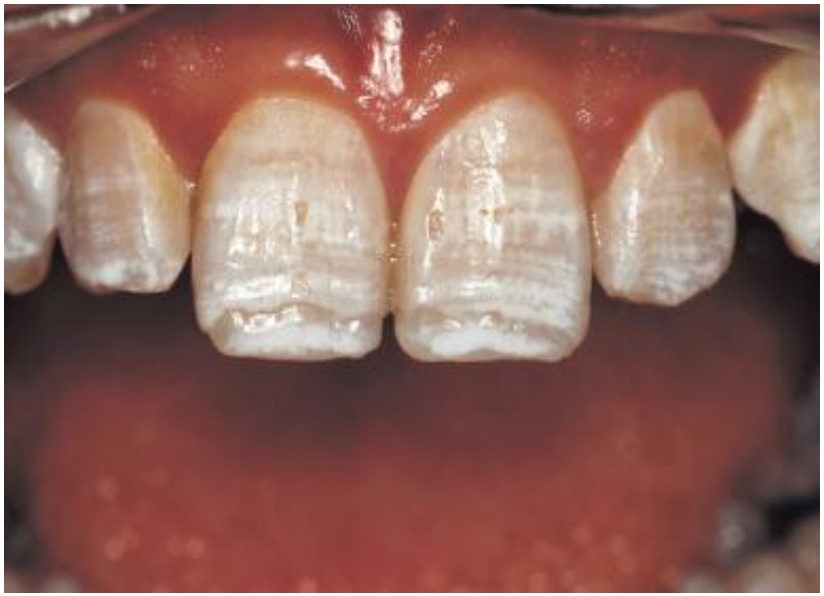
- **Enamel hypoplasia that results from hypocalcemia secondary to vitamin D deficiency is usually of the pitted type. It is clinically indistinguishable from enamel hypoplasia caused by exanthematous diseases such as measles, chicken pox, and scarlet fever and by vitamin A and C deficiencies.**

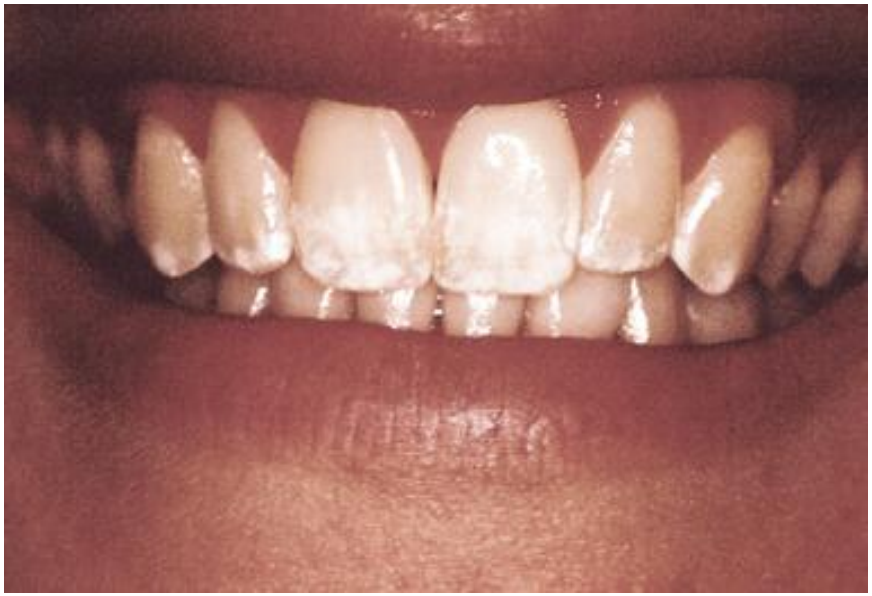


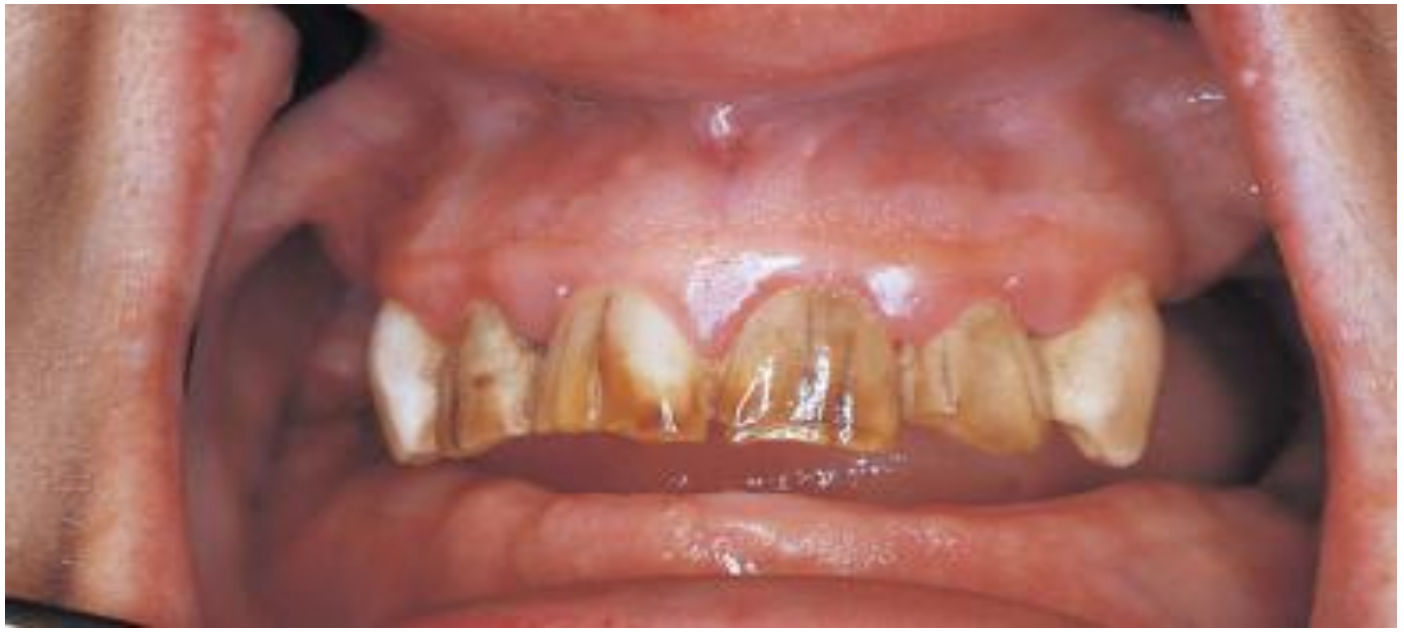


Mottled teeth :

- **A well-recognized example of chemically induced generalized enamel hypoplasia results from the ingestion of fluoride.**
- **Increased amounts of fluoride in the drinking water more than 1.0pm , the resultant enamel hypoplasia becomes progressively evident. Increased fluoride levels interfere with ameloblastic function, which adversely affects both enamel matrix formation and enamel matrix calcification , affected teeth are largely resistant to dental caries but subjected to excessive wear and fracturing of the incisal and occlusal surfaces.**







AMELOGENESIS IMPERFECTA

- **Amelogenesis imperfecta is a hereditary disorders of enamel formation affecting both the primary and permanent dentitions.**
- **These disorders are confined to the enamel; the other components of the teeth are normal.**
- **Normal enamel formation progresses through three stages:**
  (1) enamel matrix formation (functioning ameloblasts)
  (2) mineralization of the enamel matrix (primary mineralization)
  (3) enamel maturation (secondary mineralization).

- **Three basic types of amelogenesis imperfecta correlate with defects in these stages:**
  (1) the hypoplastic type (focal or generalized), which exhibits decreased enamel matrix formation caused by a disturbance in the functioning of the ameloblasts
- **(2) the hypocalcified type, which exhibits a severe defect in mineralization of the enamel matrix.**
- **(3) the hypomaturation type, which exhibits a less severe alteration in mineralization with focal or generalized areas of immature enamel crystallites.**
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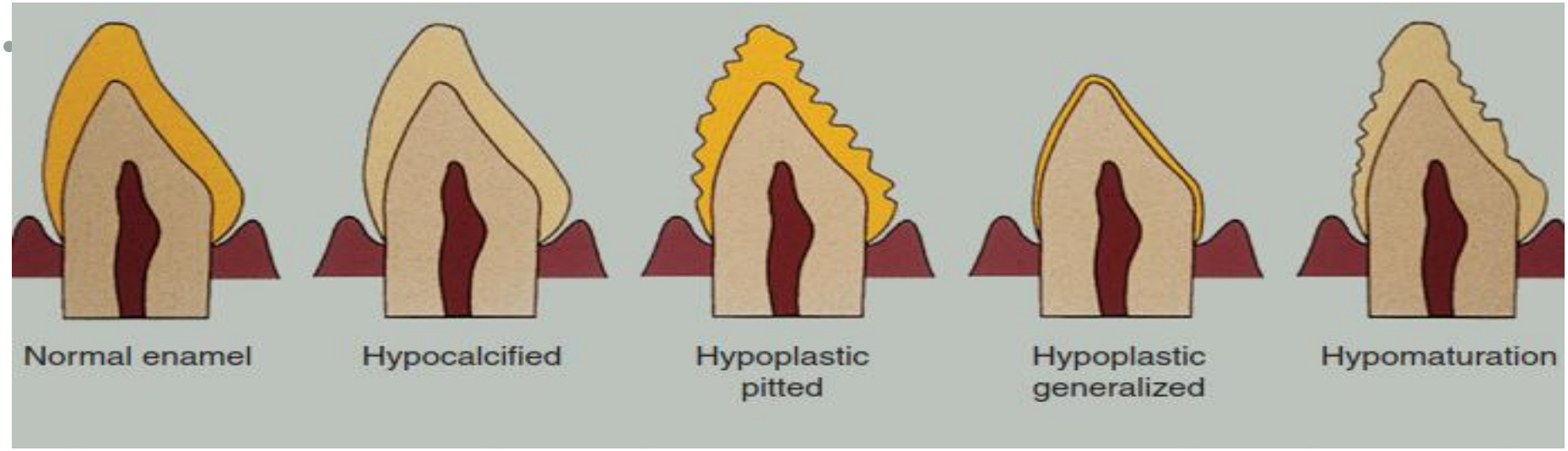
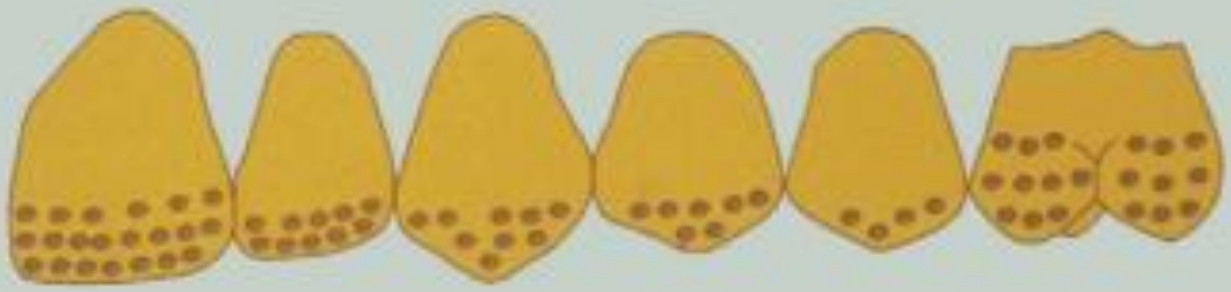


Amelogenesis imperfecta (hypoplastic, pitted)

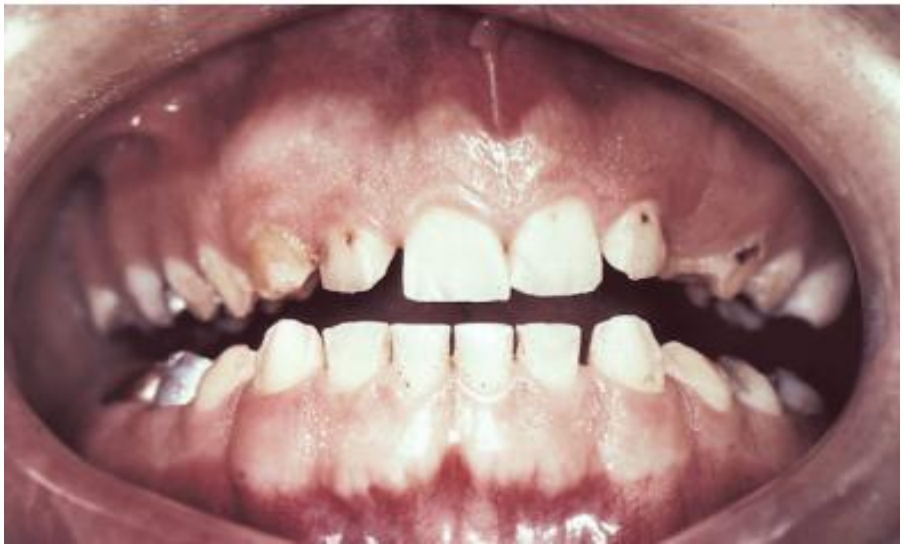
Acquired enamel hypoplasia

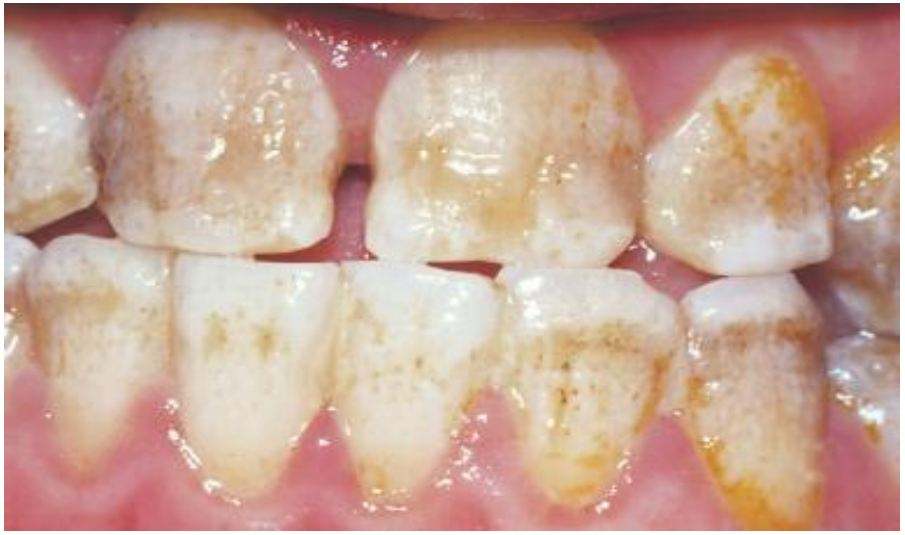


Amelogenesis imperfecta (snow-capped)

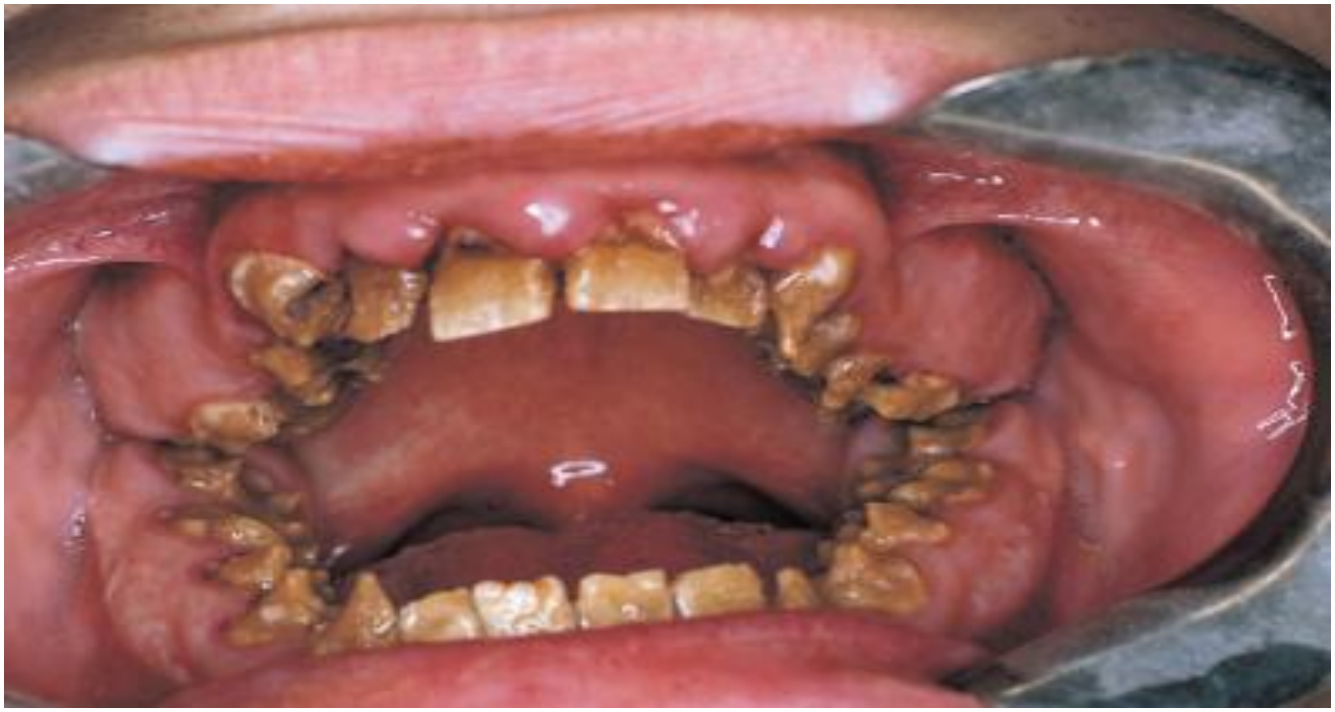
The following are clinical features useful for differentiating the three basic types of amelogenesis imperfecta:

- **Hypoplastic type: The enamel is thinner than normal in focal or generalized areas ; the radiodensity of the enamel is greater than that of dentin.**

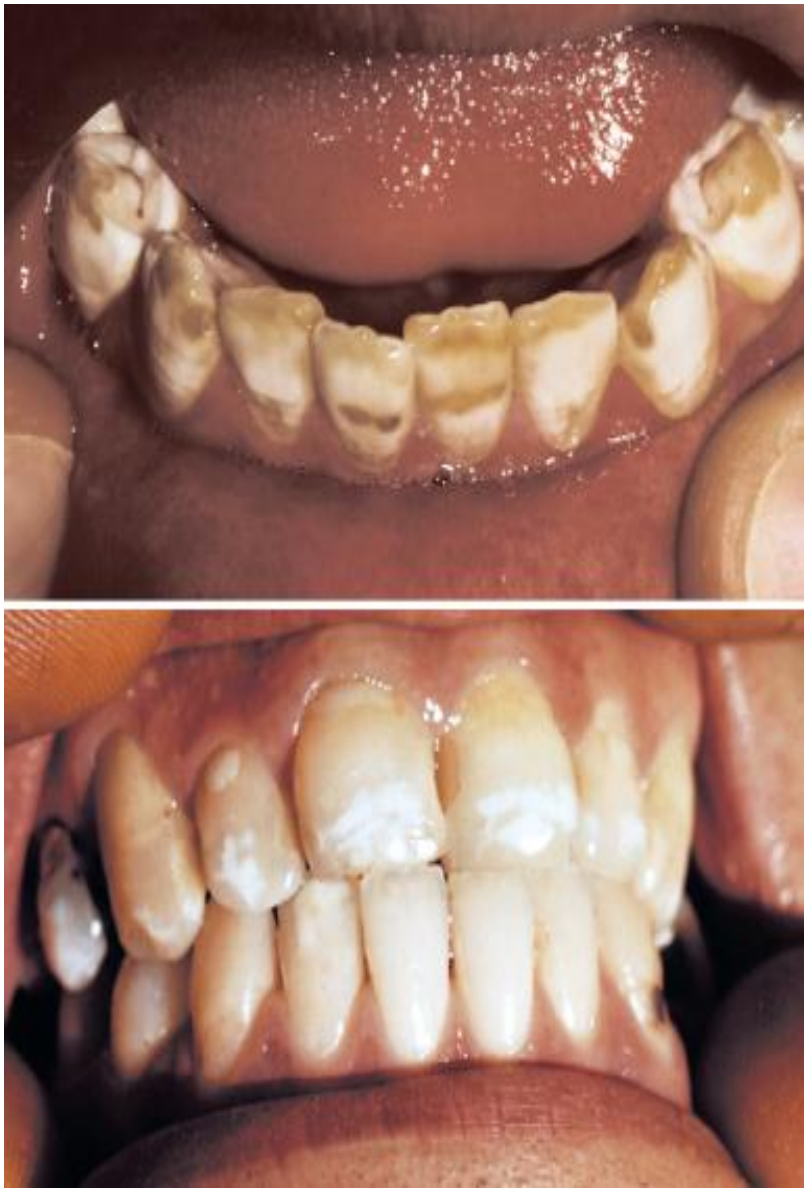




- **Hypocalcified type: The enamel is of normal thickness but softer than normal and can be easily removed with a blunt instrument; the enamel is less radiodense than dentin.**



- **Hypomaturation type: The enamel is of normal thickness but not of normal hardness and translucency; enamel can be pierced with the point of a dental explorer with firm pressure and can be chipped away from the underlying normal dentin; enamel radiodensity is about the same as dentin. The mildest form of the hypomaturation type exhibits enamel of normal hardness and has white opaque flecks in the incisal areas of the teeth (snow-capped teeth).**



DISTURBANCES IN STRUCTURE OF DENTIN

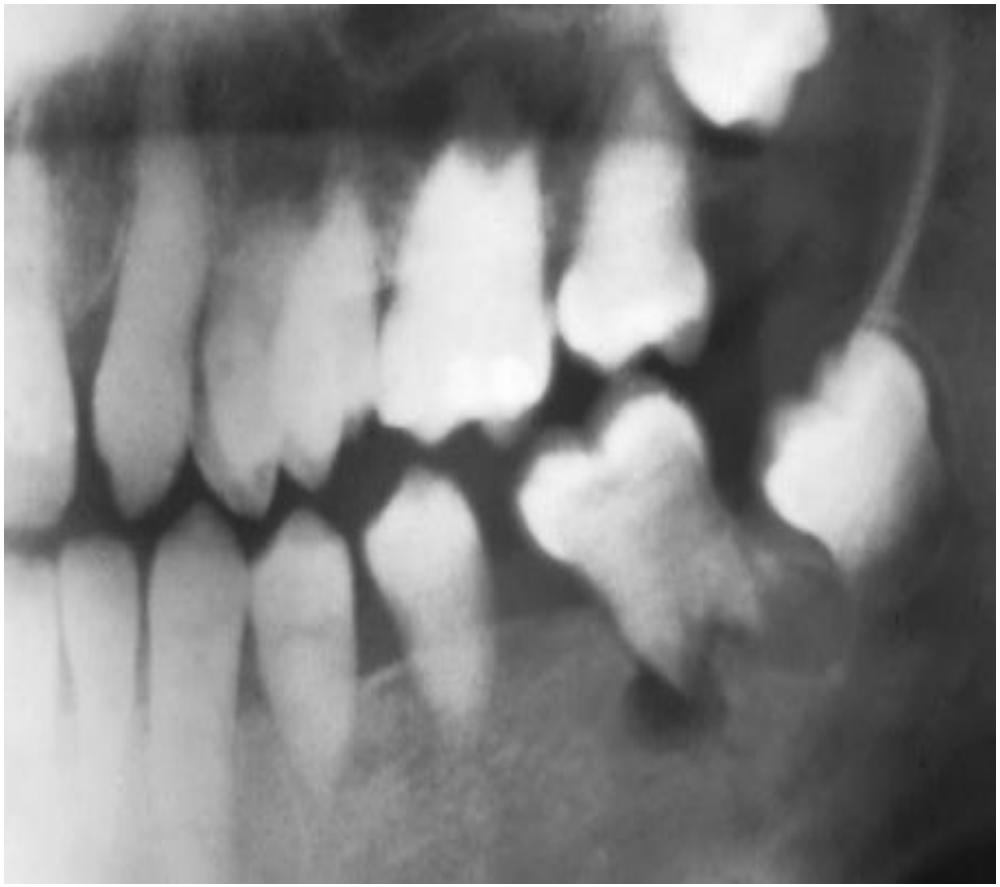
Dentinogenesis Imperfecta

- **DI is an inherited disorder of dentin formation, This disorder has been classified into three types:**
- **Type I: DI associated with osteogenesis imperfecta**
- **Type II: DI that is not associated with OI. **
- **CLINICAL FEATURES: Both dentitions are affected, the teeth are opalescent with the color ranging from bluish-gray to brown to yellowish. The dentin is abnormally soft, providing inadequate structural support to the overlying enamel. Although the enamel is normal, it fractures or chips away easily, exposing the occlusal and incisal dentin. The exposed soft dentin often undergoes rapid and severe functional attrition.**

- **The treatment of DI is directed toward preventing excessive loss of enamel and dentin though attrition and toward improving the teeth esthetically by appropriate restorations such as metal and porcelain composite crowns.**
- **Teeth affected by DI do not make good abutments for partial dentures, because root fractures may occur from the functional stress.**

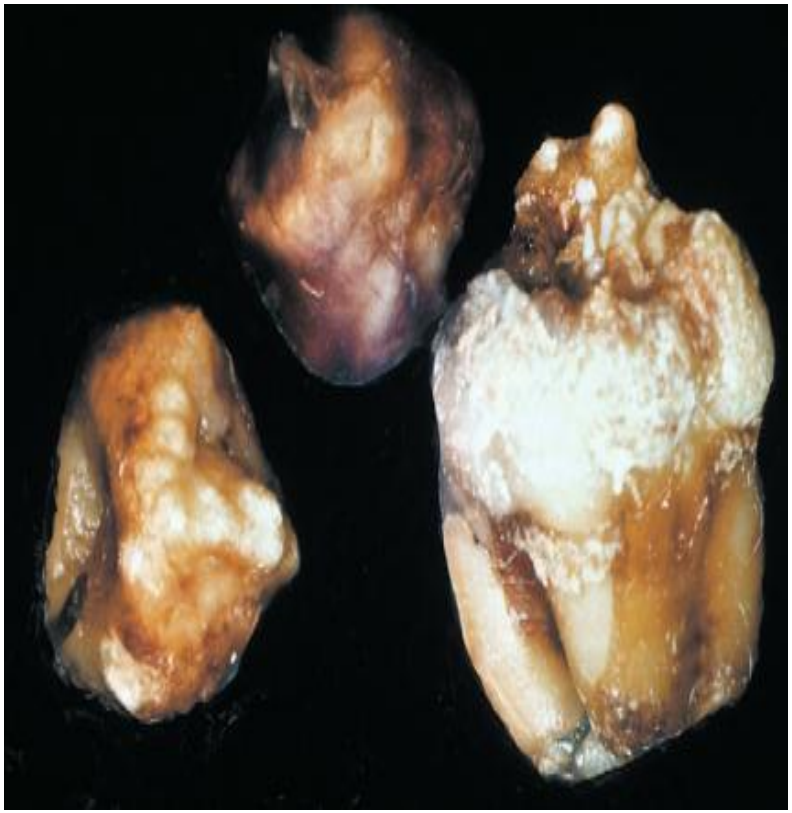
DENTIN DYSPLASIA

- **A hereditary defect in dentin formation in which the coronal dentin and tooth color are normal; the root dentin is abnormal with shortened and tapered roots “rootless teeth”.**



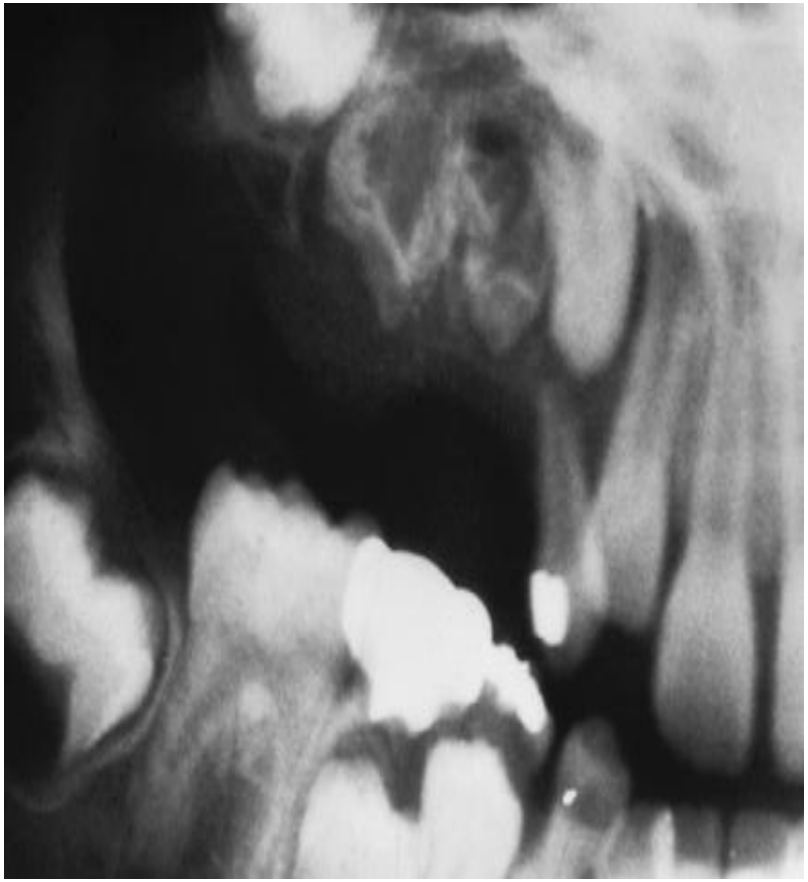
REGIONAL ODONTODYSPLASIA:

- A developmental disturbance of several adjacent teeth in which the enamel and dentin are thin and irregular and fail to adequately mineralize; surrounding soft tissue is hyperplastic and contains focal accumulations of spherical calcifications and odontogenic rests.



RADIOGRAPHIC FEATURES:

- The teeth have been described as **ghost teeth** because of the marked decrease in radiodensity. The enamel and dentin are very thin and indistinct; the pulpal chambers are extremely large. Pulp stones may occasionally be visible.



DISTURBANCES IN STRUCTURE OF CEMENTUM

- **Hypophosphatasia:** is an inherited disorder of bone mineralization caused by a deficiency in alkaline phosphatase in serum and tissues.
- **The disorder is characterized by:**
- Delayed formation and eruption of the dentition
- Premature loss of primary teeth, and the spontaneous loss of permanent teeth
- The premature loss of teeth is related to the absence of dental cementum. Oral radiographs reveal that the teeth in these patients exhibit enlarged pulp chambers and pulp canals; however, the enamel is normal.

Suggestive Reading

Brad W Neville, Douglas D Damm, Carl M. Allen, Jerry E Bonguot. Oral And Maxillofacial Pathology, 4th Edition, Elsevier, 2015


Thank
You!