Lec. 13 ***Dr. Ali H. Murad***

DEVELOPMENTAL DEFECTS OF THE ORAL AND MAXILLOFACIAL REGION

1- DEVELOPMENTAL DISORDERS OF TEETH
2- DEVELOPMENTAL DEFECT OF THE SOFT TISSUE
3- DEVELOPMENTAL DEFECT OF THE JAW BONES.
4- DEVELOPMENTAL CYST.

1- Developmental Disorders of Teeth Developmental Alterations of Teeth

1- Developmental alteration in the size of teeth.
2- Developmental alteration in the number of teeth.
3- Developmental alteration in the shape of teeth.
4- Developmental alteration in the eruption of teeth.
5- Developmental alteration in the structure of teeth.

1- Alteration in size of teeth

Microdontia

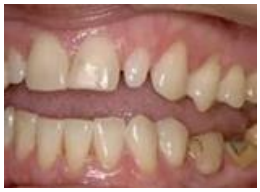
Mean tooth or teeth smaller than the normal, either localized or generalized.

In generalized it's either true or relative:

True: small teeth with normal size jaw bone & this occur in dwarfism.

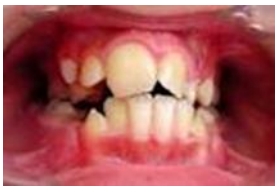
Relative: the jaw bone is larger than normal which lead to spacing between teeth giving picture of false microdontia.

*in localized microdontia, usually one tooth affected & mostly in lateral incisor (peg lateral) & max third molar.



Macrodontia

Mean tooth or teeth larger than the normal.



It may be generalized or localized

In generalized it's either true or relative

True: large teeth in normal jaw bone size, occur in Gigantism.

Relative: normal teeth in small size jaw, cause crowding of teeth & give false picture of macrodontia.

*in localized macrodontia, usually affect one side of jaw such in hemifacial hypertrophy. In the rare condition known as hemifacial hypertrophy, teeth on the affected side are abnormally large compared with the unaffected side.

2- Abnormalities in number of teeth

A- Anodontia

B- Hypodontia

C-Additional teeth (Hyperdontia)

Anodontia

Complete absence of teeth (deciduous & permanent)

It usually occurs in association with a generalized disorder such as hereditary ectodermal dysplasia. Therefore, all tissues derived from ectoderm are absent such as teeth, hair follicle, sweat gland, sebaceous gland.

The patient suffer from smooth, thin & dry skin, can't tolerate heat due to absence of sweat glands.

However, sometimes some teeth are present such as cuspids & molars

Hypodontia

Failure of development of one or two teeth is relatively common and often hereditary. The teeth most frequently missing are third molars, second premolars, or maxillary lateral incisors.

Other conditions associated with hypodontia:

There are many rare syndromes where hypodontia is a feature, but the only common one is Down's syndrome. One or more third molars are absent in over 90% of these patients. Absence of individual teeth scattered about the arch is also common.

Hyperdontia (Additional teeth)

Additional teeth are relatively common. They are usually of simple conical shape (supernumerary teeth) but less frequently resemble teeth of the normal series (supplemental teeth). These are the results of excessive but organized growth of the dental lamina of unknown cause.

Supernumerary teeth: Conical or malformed additional teeth, most frequently form in the incisor or molar region and very occasionally, in the midline (mesiodens).

Supplemental teeth: Occasionally an additional maxillary incisor, premolar or, rarely, a fourth molar develops.

Effects and treatment:

Additional teeth usually erupt in abnormal positions, labial or buccal to the arch, creating stagnation areas and increasing susceptibility to caries. A supernumerary tooth may prevent a normal tooth from erupting. These additional teeth should usually be extracted.

Syndromes associated with hyperdontia:

The best known is cleidocranial dysplasia where many additional teeth develop but fail to erupt.

Natal and neonatal teeth

Natal teeth: Erupted deciduous teeth present at birth.

Neonatal teeth: Deciduous teeth that erupt during the first 30 days of life. This is an artificial distinction, and it appears appropriate to call all of these teeth natal teeth, most are representing premature portions of deciduous dentition.

Treatment:

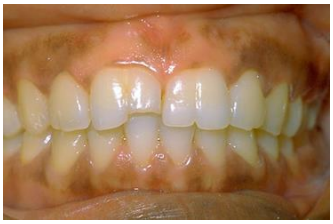
If the teeth are mobile and at risk for aspiration, then removal is indicated. If mobility is not a problem and the teeth are stable, then they should be retained.

3- Developmental alteration in the shape of teeth

Gemination

Is a developmental anomaly that affects anterior teeth, they result from partial division "twinning" of a single tooth germ, resulting in a tooth with two separated or partly separated crowns & a single root & root canal. The cause of gemination is unknown, but trauma has been suggested as a possible cause.

These teeth may be cosmetically unacceptable and may cause crowding.



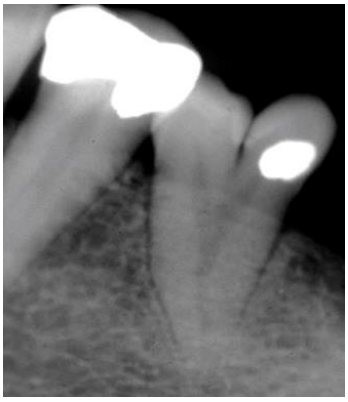
Fusion

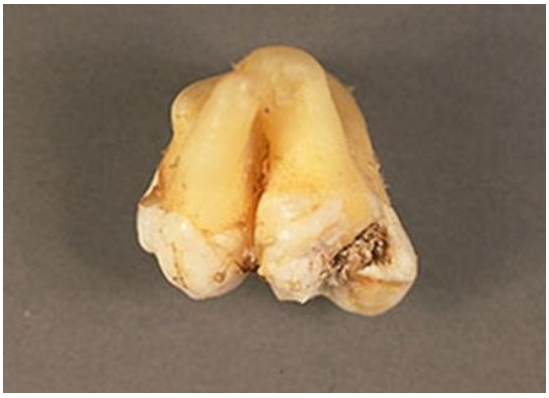
Result from the union of two normally separated tooth germs, it can be complete or incomplete.

* we can differentiate between gemination & fusion clinically by counting the teeth in each arch, if one tooth is missing mean fusion, but if with normal number mean gemination

Concrescence

Is a type of fusion of two teeth through cementum. The condition is thought to occur as a result of traumatic injury to the area or crowding where interseptal bone is lost, allowing close approximation of the tooth roots.

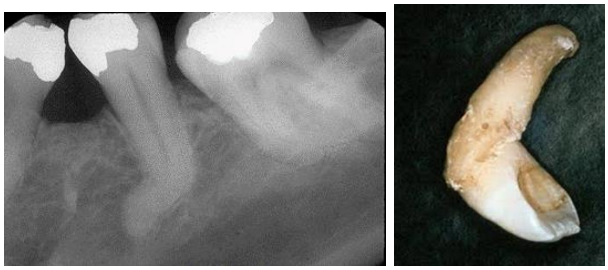




Dilaceration

It is an extraordinary curving or angulations of tooth roots. The cause of this condition has been related to trauma during root development. Hereditary factors are believed to be involved in

a small number of cases. Eruption generally continues without problems. However, extraction may be difficult, in addition, if root canal fillings are required in these teeth, the procedure is challenging.



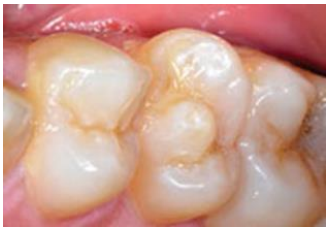
Dens invaginatus

Also known as Dens in dentin or tooth within a tooth. It is an uncommon tooth anomaly that represents an accentuation of the lingual pit. This defect ranges in severity from superficial, in which only the crown is affected, to deep, in which both the crown and the root are involved. The permanent maxillary lateral incisors are most commonly involved. Bilateral involvement is commonly seen. The cause of this developmental condition is unknown. Genetic factors are believed to be involved in only a small percentage of cases.

Because the defect cannot be kept free of plaque and bacteria, dens invaginatus predisposes the tooth to early decay and subsequent pulpitis. Prophylactic filling of the pit is recommended to avoid this complication.

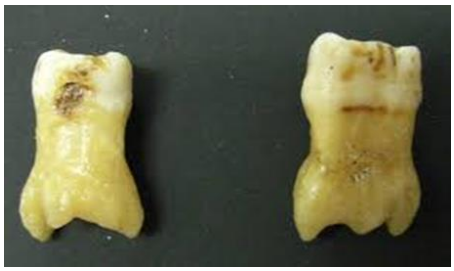
Dens evaginatus

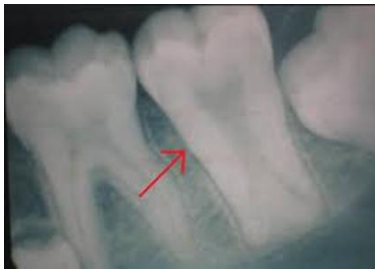
Is a developmental abnormality that primarily affects premolars. It's characterized by the development of an abnormal nodular or globe-shaped projection appearing as an extra cusp centrally located on the occlusal surface between the buccal & lingual cusps of premolars, although any tooth may be involved



Taurodontism

It is a variation in tooth form in which teeth have elongated crowns or apically displaced furcations, resulting in pulp chambers that have increased apical-occlusal height. Taurodontism may be seen as an isolated incident, in families, and in association with syndromes such as Down syndrome and Klinefelter's syndrome. Diagnosis is made from radiographic appearance. No treatment is required.



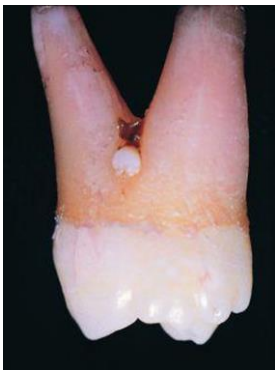


Supernumerary roots

Accessory roots are most commonly seen in mandibular canines, premolars, and molars (especially third molars). They are rarely found in upper anterior teeth and mandibular incisors, Radiographic recognition of an extraordinary number of roots becomes important when extractions or root canal fillings are necessary.

Enamel Pearls

Droplets of ectopic enamel, or so-called enamel pearls, may occasionally be found on the roots of teeth. They occur most commonly in the bifurcation or trifurcation of teeth but may appear on single rooted premolar teeth as well. Maxillary molars are more commonly affected than are mandibular molars.



This developmental disturbance of enamel formation may be detected on radiographic examination. It is generally of little significance except when located in an area of periodontal disease. In such cases it may contribute to the extension of a periodontal pocket because a periodontal ligament attachment would not be expected and hygiene would be more difficult.

4- Disorders of eruption

Eruption of deciduous teeth starts at about 6 months, usually with the appearance of the lower incisors, and is completed by about 2 years. Mass failure of eruption is very rare. More often eruption of a single tooth is prevented by local obstruction.

Local factors affecting eruption of deciduous teeth

Deciduous teeth usually erupt unobstructed. Occasionally an eruption cyst may overlie a tooth but is unlikely to block eruption.

Local factors affecting eruption of permanent teeth

A permanent tooth may be prevented from erupting or misplaced by various causes:

1- Loss of space (too early loss of a deciduous predecessor tends to cause irregularities because movement of adjacent teeth closes the available space)
2- Overcrowding
3- Supernumerary and supplemental teeth
4- Displacement in a dentigerous cyst
5- Retention of a deciduous predecessor

Delayed eruption associated with skeletal disorders

1- Cleidocranial dysplasia, in which there are typically many additional teeth but most of them fails to erupt.

2- Severe hereditary gingival fibromatosis, eruption may apparently fail merely because the teeth are buried in the excessive fibrous gingival tissue and only their tips show in the mouth (pseudoanodontia).

3-Cherubism: several teeth may be displaced by the proliferating connective tissue masses that containing giant cells and are prevented from erupting.

Treatment depends on the circumstances, but room may be made for the unerupted tooth by orthodontic means or extractions.

A retained deciduous tooth should be extracted if radiographs show a normal permanent successor. If a buried tooth partially erupts and becomes infected, it may have to be removed.

5- Defects of tooth structure

HYPOPLASIA AND HYPOCALCIFICATION

They are represented by minor structural defects of the teeth, such as pitting or discoloration. Hypoplasia of the teeth is not an important cause of dental caries; indeed, hypoplasia due to fluorosis is associated with enhanced caries resistance. The main clinical requirement is usually cosmetic improvement.

Defects of deciduous teeth:

Calcification of deciduous teeth begins about the fourth month of intrauterine life. Disturbances of metabolism or infections that affect the fetus at this early stage without causing abortion are rare. Defective structure of the deciduous teeth is therefore uncommon, but in a few places such as parts of India, where the fluoride content of the water is excessively high, the deciduous teeth may be mottled.

Defects of permanent teeth:

Single permanent teeth may be malformed as a result of local causes such as periapical infection of a predecessor (Turner teeth). Or multiple teeth by systemic diseases as:

Genetic:

1- Amelogenesis imperfecta

A- Hypoplastic (type l)
B- Hypomaturation (type 2)
C- Hypocalcified (type 3)

2- Dentinogenesis imperfecta

Shell teeth

3- Dentinal dysplasia

4- Regional odontodysplasia

5-Multisystem disorders with associated dental defects such as

Infective: Congenital syphilis

Metabolic: Childhood infections, rickets, hypoparathyroidism

Drugs: Tetracycline pigmentation, Cytotoxic chemotherapy, Fluorosis

1-Amelogenesis imperfecta

Etiology

Intrinsic enamel defect that affects all teeth of both dentitions. Results from defective amelogenin genes on X and Y chromosomes and also chromosome 4

At least 16 variants noted based upon inheritance pattern, enamel qualities, and radiographic features.

Clinical Presentation

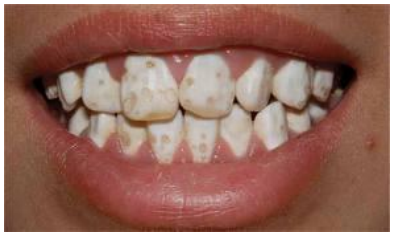
One of three basic alterations of enamel may be seen: hypoplasia, hypomaturation, or hypocalcification

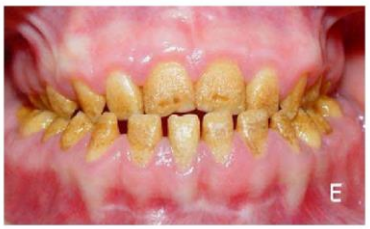
Enamel hardness varies depending upon type of defect:

normal hardness in hypoplastic form but deficient amounts of enamel; soft enamel in the hypocalcified variant but normal amounts of enamel.

Color ranges from normal (hypoplastic) to dark yellow-brown (hypocalcified)

Radiographic changes range from normal density (hypoplastic) to less dense (hypocalcified)





Diagnosis

1 -Clinical and radiographic features

2-Family history (autosomal, X-Iinked forms)

Treatment

1 -Full-crown restorations for esthetics

2-Genetic counseling

2-Dentinogenesis Imperfecta

Etiology

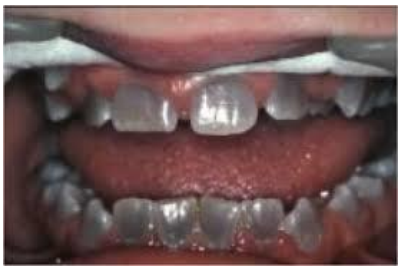
Hereditary disorder of dentin (autosomal dominant). It may be seen in association with osteogenesis imperfecta. Altered dentin matrix is related to the defective degradation of dentin phosphoprotein during dentinogenesis

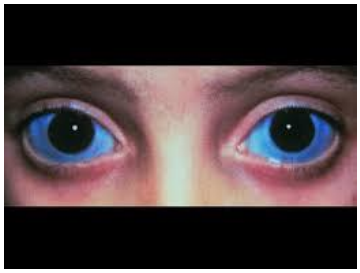
Clinical Presentation

Primary and permanent dentition exhibit gray to brownish opalescence.

Normal enamel fractures easily from defective underlying Dentin.

Severe tooth abrasion related to exposed dentin following enamel loss





Radiographically: roots are slender to spike with pronounced cervical constriction and obliterative pulpal calcification. Constricted tooth cervix gives molar crowns a "tulip" profile.

Diagnosis

I-Clinical and radiographic appearance

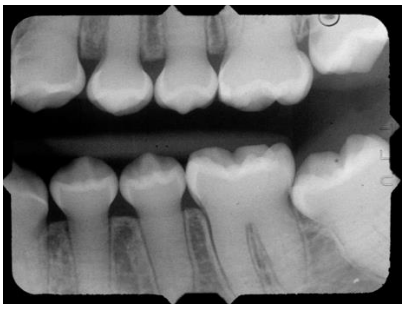
2-Family history

Treatment

Functional and esthetic restorations (full crowns) Genetic counseling

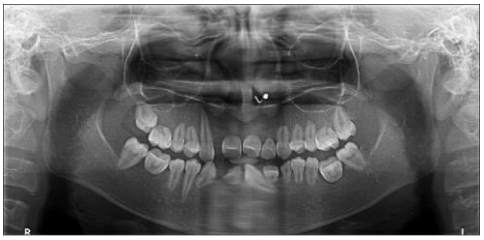
Shell teeth (dentinogenesis imperfecta type 3)

This rare anomaly is so called because only a thin shell of hard dental tissue surrounds overlarge pulp chambers. Like other types of dentinogenesis imperfecta there is normal, but thin, mantle dentine which covers irregular dentine. The pulp lacks a normal odontoblast layer and consists of coarse connective tissue which becomes incorporated into the deep surface of the dentine.



3-Dentinal dysplasia ('rootless' teeth)

In dentinal dysplasia, the roots are very short and conical. The pulp chambers are obliterated by multiple nodules of poorly organized dentine containing sheaves of tubules; these teeth tend to be lost early in life.

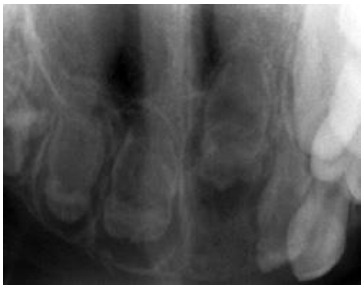


4-Regional odontodysplasia (ghost teeth)

This is a localized disorder of development affecting a group of teeth in which there are severe abnormalities of enamel, dentine, cementum and pulp. The disorder is not hereditary and the etiology is unknown. There is no sex or racial predilection.

Clinically, regional odontodysplasia may be recognizable at the time of eruption of the deciduous teeth (2 to 4 years) or of the permanent teeth (7 to 11 years). The maxillary teeth are most frequently affected; two quadrants may be affected. The abnormal teeth frequently fail to erupt, but if they erupt, show yellowish deformed crowns, often with a rough surface. In addition, they are susceptible to caries and fracture. Affected teeth have very thin enamel and dentine surrounding a greatly enlarged pulp chamber.

In radiographs, the teeth appear crumpled and abnormally radiolucent or hazy, due to the decrease in mineralization of dental hard tissues, hence they are called ghost teeth'.



Treatment

If affected teeth can be preserved and restored, crown and root dentine continue to form and the teeth may survive long enough to allow normal development of the alveolar ridge and occlusion. However, extraction is often required.

Disturbance affecting cementum structure

Cementum is continuously formed with life either with age or to compensate for occlussal wears. Sometimes we may have:

1-Hypercementosis (excess deposition of cementum in root area) lead to increase the thickness of the root and ankylosis and this will lead to difficult extraction , or we may have

2- Hypocementosis this will lead to loss of attachment to the surrounding bone, mobile teeth and then early loss of teeth.

Post developmental loss of tooth structure (enamel, dentin and cementum)

Enamel can be lost by attrition, abrasion and erosion

Attrition: It is the physiologic wearing of teeth as a result of mastication. It is an age-related process and varies from one individual to another. Factors such as diet, dentition, jaw musculature, and chewing habits can significantly influence the pattern and extent of attrition.

Abrasion: it is the pathologic wearing of teeth as a result of an abnormal habit or abnormal use of abrasive substances orally. Pipe smoking, tobacco chewing, aggressive tooth brushing, and use of abrasive dentifrices are among the more common causes. The location and pattern of abrasion are directly dependent on the cause; with the so-called tooth-brush abrasion is localized along the cemento-enamel junction is an easily recognized pattern.

Erosion: it is the loss of tooth structure from a nonbacterial chemical process. Most commonly, acids are involved in the dissolution process from either an external or an internal source. Externally, the acid may be found in the work environment (e.g., battery manufacturing) or in the diet (e.g., citrus fruits and acid-containing soft drinks).

The internal source of acid is most probably from regurgitation of gastric contents. This may be seen in any disorder in which chronic vomiting is a part. The pattern of erosion associated with vomiting is usually generalized tooth loss on the lingual surfaces of maxillary teeth.

In addition to these conditions

Dentin can be lost due to internal resorption

Cementum can be lost by external resorption

Environmental discoloration of teeth

A-Exogenous or extrinsic stains: These are the Stains on the surface of teeth that can be removed with abrasives. The color change may be caused by

1- Pigments in dietary substances (e.g., coffee, "betel" areca nut, tobacco).
2- By products of chromogenic bacteria in dental plaque. Chromogenic bacteria are believed to be responsible for brown, black, green, and orange stains observed predominantly in children.
3- Blood pigments
4- Restorative materials.
5- Medications (iron and iodine containing drugs). These are generally easily removed.

B-Endogenous or intrinsic staining

Discoloration of teeth resulting from deposits of systemically circulating substances during tooth development

1- Amelogenesis imperfecta(A.I.).

2-Dentinogenesis imperfecta(D.I.).

3- Dental flourosis.

4-Hyper bilirubhemia. Rh incompatibility (erythroblastosis fetalis) has been cited as a cause of endogenous staining in primary teeth. Because of red blood cell hemolysis resulting from maternal antibody destruction of fetal red blood cells, blood breakdown products (bilirubin) are

deposited in developing primary teeth. The teeth appear green to brown. No treatment is required, because only primary teeth are affected.

5- Drugs (Tetracycline). Tetracycline binds calcium and therefore is deposited in developing teeth and bones. The drug's bright yellow color is reflected in the subsequently erupted teeth. Because tetracycline can cross the placenta, it may stain primary teeth if taken during pregnancy. If it is administered after birth and between age 6 or 7 years, permanent teeth may be affected.