Pediatric Dentistry

5th Year

Lec. 19

ACQUIRED AND DEVELOPMENTAL DISTURBANCES OF THE TEETH AND ASSOCIATED ORAL STRUCTURES (1)



Assistant Professor Zainab Juma Jafar



ODONTOGENIC DISTURBANCES

Dental caries is the most common oral disease in both primary and permanent teeth among children worldwide. Caries-preventive programs have become more indicated.

Periodontal disease is also common; however, this is usually limited to the mild gingivitis. The severe forms of periodontal disease involving bone loss are rare in children and are found only in those with altered immune function. Both caries and periodontal disease are, for the most part, acquired and preventable disturbances.

ALVEOLAR ABSCESS

An alveolar abscess may be acute or chronic and is associated with pulpal necrosis. In permanent teeth this is usually a well-localized periapical lesion surrounded by a fibrous capsule. The primary tooth abscess is usually evident as a more diffused infection, and the surrounding tissue is less able to isolate or "wall off" the process.

During the acute infection phase, it is often difficult or impossible to establish effective anesthesia for tooth extraction. Block or general anesthesia may be required.

Drainage through the pulp chamber of a primary tooth is almost impossible if subperiosteal pus is present.

Drainage through the pulp chamber of a permanent tooth is established by creating a normal but complete, traditional access cavity and instrumenting the canals to permit drainage of the exudate. The endodontic instrument should not pass the root apex. After initial debridement and irrigation the opening to the chamber should be closed unless exudate continues to drain. If pain occurs during the excavation of tooth structure to establish drainage, the discomfort can be lessened if the tooth is stabilized by the dentist's fingers.

CELLULITIS

Cellulitis is a diffused infection of the soft tissues that is seen more frequently in younger children. It is similarly caused by primary or permanent pulpal necrosis and is characterized by considerable swelling of the face or neck due to collateral edema and



a spreading fascial infection; the tissue appears dark and brawny. Cellulitis may be very serious and life threatening.

If a maxillary tooth is involved, the swelling and redness may involve the eye and, if untreated, may spread posteriorly to involve the brain with an abscess or cavernous sinus thrombosis. Cellulitis resulting from an infected mandibular tooth will spread to the floor of the mouth along the fascial planes. An infection involving submandibular, sublingual, and submental spaces is termed **Ludwig's angina.**

These cases usually require extraction of the primary tooth or the establishment of drainage in permanent teeth, if possible, by opening the pulp chamber of the affected tooth. However, the child may have difficulty in opening the mouth to permit the procedure; also, incision of soft tissue to establish drainage is not indicated in the early stages of cellulitis because of the diffused, poorly localized nature of the infection. Antibiotics are usually indicated in these children.

ENAMEL HYPOPLASIA

Local or systemic factors that interfere with normal matrix formation cause enamel surface defects and irregularities termed **enamel hypoplasia**.

Enamel hypoplasia may be localized or generalized

HYPOPLASIA RESULTING FROM NUTRITIONAL DEFICIENCIES

Nutritional deficiency, particularly those related to deficiencies in vitamins A, C, and D, calcium, and phosphorus, can often be related to the occurrence of enamel hypoplasia.

In some children a mild deficiency state or systemic condition without clinical symptoms can apparently interfere with ameloblastic activity and can produce a permanent defect in the developing enamel.

HYPOPLASIA RELATED TO BRAIN INJURY AND NEUROLOGIC DEFECTS

There is a definite relationship between the time of occurrence of the possible factors that could have caused brain damage and the apparent time of origination of the enamel defect (based on its location in the enamel on the crown of the tooth).



Evidence of enamel hypoplasia is an aid to the clinician and the research worker in determining when brain injury occurred in patients in whom the cause is not clearly defined.

Enamel defects occur with greatest frequency in children with low intelligence quotients and a high incidence of neurologic defects.

HYPOPLASIA CAUSED BY LOCAL INFECTION

Enamel hypoplasia resulting from local infection is called **Turner tooth** as Turner was the first described this localized type of hypoplasia. The periapical inflammatory processes of primary teeth extend toward the buds of the pertinent permanent teeth and affect them during their pre-functional stage of eruption. The infection spreads diffusely through the bone around the buds of the successors and thereby affects the important protective layer of the young enamel, **the united enamel epithelium**, so the enamel will be exposed to inflammatory edema and to granulation tissue. The granulation tissue later eroded the enamel and deposited a well-calcified, metaplastic, cementum-like substance on the surface of the deep excavation. So the retention of infected primary teeth, even if they are asymptomatic, is unjustifiable, which may lead to the development of hypoplastic defects on the permanent tooth, its deflection from the normal path of eruption, and even death of the developing tooth.

HYPOPLASIA CAUSED BY TRAUMA

A traumatic blow to an anterior primary tooth that causes its apical displacement can interfere with matrix formation or calcification of the underlying permanent tooth. The trauma or subsequent periapical infection frequently produces defects on the labial surface of the permanent incisor.

HYPOPLASIA CAUSED BY FLUORIDE (DENTAL FLUOROSIS)

Excessive ingestion of fluoride can affect ameloblasts during the appositional, calcification, and maturation stages of tooth development, causing the clinical entity



called dental fluorosis or mottled enamel. The affected enamel is often limited superficially to the outer layer (100- to 200 μ m), with appearance ranging from fine white flecks to brown opaque lesions and/or pitting.

OTHER FACTORS

Hypoplasia may be also caused by nephrotic syndrome, allergies, lead poisoning (plumbism), cleft lip and palate, ionizing radiation and chemotherapy, and rubella embryopathy.

TREATMENT OF HYPOPLASTIC TEETH

Small carious and pre-carious areas may be restored with composite resin or a glass ionomer. The restoration is usually confined to the area of involvement.

Hypoplastic primary and permanent teeth with large areas of defective enamel and exposed dentin may be sensitive as soon as they erupt. Satisfactory restoration may not be practical at this time. The topical application of fluoride has been found to decrease tooth sensitivity.

The application should be repeated as often as necessary to reduce sensitivity to thermal change and acid foods till it reaches the occlusal surface which is a candidate for a stainless steel crown.

OTHER MODALITIES OF TREATMENT

- The application of 18% hydrochloric acid is an effective method for de-staining mottled enamel.
- A modified procedure called enamel microabrasion, in which a specially prepared abrasive compound (Prema) is applied to the discolored enamel areas, similarly to prophylaxis paste.
- A newer delivery system for the microabrasion procedure. A viscous, water soluble abrasion slurry containing hydrochloric acid and silicon carbide microparticles (Opalustre) is conveniently applied to the tooth surface using a syringe.



- Bleaching of vital teeth may be used in combination with enamel microabrasion to help remove deeper intrinsic discolorations.

ANOMALIES OF THE TEETH

ODONTOMA

Abnormal proliferation of cells of the enamel organ may result in an odontogenic hamartoma, commonly referred to as an *odontoma*. Odontomas may be compound, with multiple denticles, or complex, presenting as a single mass of calcified tissue. An odontoma should be surgically removed because it usually interferes with eruption of teeth in the area.

FUSION OF THE TEETH

Fusion represents the union of two independently developing primary or permanent teeth. Fusion of teeth involving only cementum is termed **concrescence**.

Fused teeth will have separate pulp chambers and separate pulp canals. Dental caries may develop in the line of fusion of the crowns, necessitating the placement of a restoration. A frequent finding in fusion of primary teeth is the developmental absence of one of the corresponding permanent teeth.

Care of such patients may include surgical sectioning and separation of fused teeth, and although dentin is exposed, such teeth are easily moved orthodontically without the risk of ankylosis.

GEMINATION

A geminated tooth must be distinguished from a fused tooth. It represents an attempted division of a single tooth germ by invagination occurring during the **proliferation stage** of the growth cycle of the tooth, in which case the geminated tooth appears clinically as a bifid crown on a single root.

The treatment of a geminated tooth may involve reduction of the mesiodistal width of the tooth to allow for normal development of the occlusion by periodic “disking” of the tooth when the crown is not excessively large, and restoration if dentin is exposed.



DENS INVAGINATUS (DENS IN DENTE)

This developmental anomaly is characterized by an invagination lined with enamel and the presence of a foramen cecum, with the probability of communication between the cavity of the invagination and the pulp chamber. Anterior teeth with dens invaginatus are usually of normal shape and size. In posterior teeth, however, it can have an anomalous appearance.

Application of sealant or a restoration in the opening of the invagination is the recommended treatment to prevent pulpal involvement. If the condition is detected before complete eruption of the tooth, gingival tissue must be removed to facilitate cavity preparation and restoration.

A common presentation may be tooth necrosis, and the child may have an acute abscess. The prognosis of such teeth depends on pulp morphology and restorability of the crown.

PRE-ERUPTIVE "CARIES"

Occasionally the defects on the crowns of developing permanent teeth are evident radiographically, even though no infection of the primary tooth or surrounding area is apparent. Such a lesion often does resemble caries when it is observed clinically, and the destructive lesion progresses if it is not restored. As soon as the lesion is reasonably accessible, the tooth should be uncovered by removal of the overlying primary tooth or by surgical exposure. The caries-like dentin is then excavated, and the tooth is restored with a durable temporary or permanent restorative material.

TAURODONTISM

This anomaly is characterized by a tendency for the body of the tooth to enlarge at the expense of the roots. The pulp chamber is elongated and extends deeply into the region of the roots. It should have a special consideration in endodontics.



AGENESIS OF TEETH

ANODONTIA

Anodontia (i.e., complete failure of the teeth to develop) is rare and may be a part of the ectodermal dysplasia also affecting the skin, hair, and nails. Most affected individuals do not have a family history of inbreeding.

Overlay denture, is often the treatment of choice.

HYPODONTIA and OLIGODONTIA

Agenesis of some (fewer than 6) teeth (not including the third molars) is referred to as hypodontia. Oligodontia is used to describe conditions when more than 6 permanent teeth do not develop.

Any of the 32 permanent teeth may be missing. However, there is a propensity for the last tooth in each series to be absent, namely, third molars, second premolars, and lateral incisors. The absence of teeth may be unilateral or bilateral.

Dental agenesis may be associated with other dental anomalies, such as small and short crowns and roots of the teeth that are present, conical crowns, enamel hypoplasia, taurodontism etc.

ECTODERMAL DYSPLASIAS

There are more than 170 types of ectodermal dysplasia with various anomalies of ectodermal derivatives, including both primary and permanent teeth, hair, nails, and skin. Children with missing primary and permanent teeth may have some or all of the signs of a type of ectodermal dysplasia and should undergo further evaluation.

Children with ectodermal dysplasia usually have normal mental capacity and a normal life expectancy. The primary teeth that are present may be normal or reduced in size. The anterior teeth are often conical. The primary molars without permanent successors have a tendency to become ankylosed.

Treatment: partial dentures can be constructed at an early age. Bonding techniques are useful to provide aesthetics.