

Radiology

Dental and Craniofacial Anomalies

There are many developmental and acquired anomalies that can affect the teeth and facial skeleton so they are classified into: Anomalies of the teeth **and** Craniofacial anomalies. The diagnosis of them is based on both the clinical and radiographic findings.

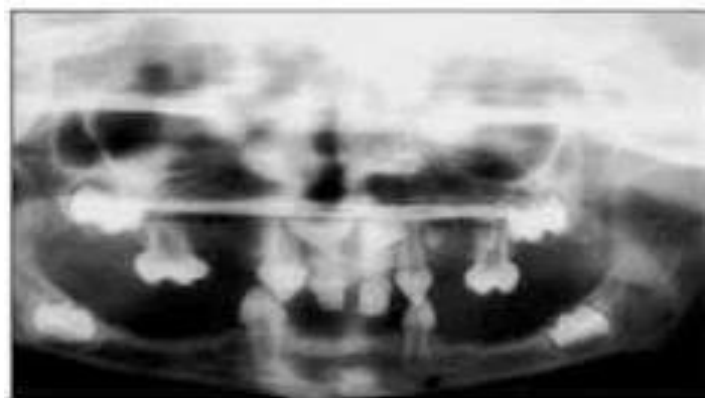
❖ Anomalies of the teeth

1- Developmental teeth anomalies: These include abnormalities of the teeth in: Number, Structure, Size, Shape (morphology), and Eruption.

Abnormalities in number:

- **Missing teeth** (Hypodontia)

It's a condition at which the patient has missing one or few teeth as a result of their failure to develop. When numerous teeth are absent the condition is called (oligodontia) and the failure of all teeth to develop is called (anodontia). It could happen in Ectodermal Dysplasia. Imaging features of missing teeth may be recognized by identifying and counting the teeth present.



- **Hyperdontia**

It's a condition of having supernumerary teeth, or teeth which appear in addition to the regular number of teeth. When a supernumerary tooth has a normal morphological feature it is called a supplemental tooth.

The most common supernumerary tooth is a mesiodens, which is a mal-formed, peg-like tooth that occurs between the maxillary central

incisors, Fourth and fifth molars (paramolar, or distomolar that form behind the third molars) are another kind of supernumerary teeth. It could be associated with **Cleidocranial Dysplasia**. The imaging features of supernumerary teeth are variable. They may appear entirely normal in both size and shape or they may be smaller and conical shape.



Panoramic radiograph showing multiple Supernumerary premolars



Mesiodens

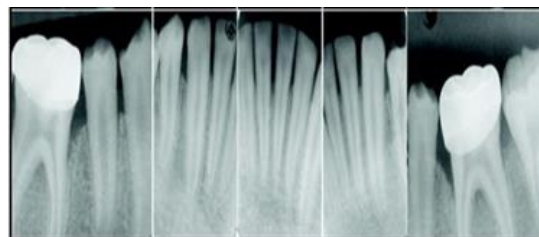
Abnormalities in structure:

The Abnormalities in teeth structures are subdivided into:

1- Genetic defect:

- **Amelogenesis imperfect**

Genetic disturbances in enamel formation leading to altered morphology of enamel. There is normal dentin and pulp formation. Imaging features shows square-shaped crown, thin enamel and low or absence of cusps,



- **Dentinogenesis imperfecta**

Is a genetic anomaly involving the dentin in both deciduous and permanent dentition. Imaging features show a marked constriction at cervical region of the tooth crown with pulp chamber obliteration and short blunt roots.

There is another genetically inherited abnormality that affects dentin called **Dentin dysplasia**



- **Regional Odontodysplasia (ghost teeth)**

Its a rare condition in which both enamel and dentin are hypoplastic and hypocalcified. Imaging feature described as “ghost-like” appearance. The pulp chambers are large and the root canals are wide with very thin enamel and dentin.

- **Turner hypoplasia**

It's a frequent pattern of enamel defects seen in permanent teeth secondary to periapical inflammatory disease of the overlying deciduous tooth. The altered tooth is called (Turner's tooth). Imaging features of the involved region of the crown shows enamel irregularities which alter the normal contour of the affected tooth. The involved region of the crown may appear as an ill-defined radiolucent region.



- **Congenital syphilis**

It's a dental hypoplasia that results from direct infection of the developing tooth by spirochete of syphilis, involves the permanent incisors that called (Hutchinson's teeth) and first molars that called (mulberry molars). The mesial and distal surfaces taper from the middle of the crown to the incisal edge so the edge may be no wider than the cervical area of the tooth. The incisal edge is frequently notched. Imaging features have a characteristic shapes of the affected incisor and molar crowns.



Hutchinson's teeth

Abnormalities in size:

- **Macrodonia (large teeth)**

It's a condition in which the teeth are abnormally large, rarely affects the entire dentition. Often a single tooth or a group of teeth may be involved. Imaging features reveal the increased size of the teeth. The shape of the tooth is usually normal, but some cases may be distorted. It associated with crowding, malocclusion, or impaction.



- **Microdontia (small teeth)**

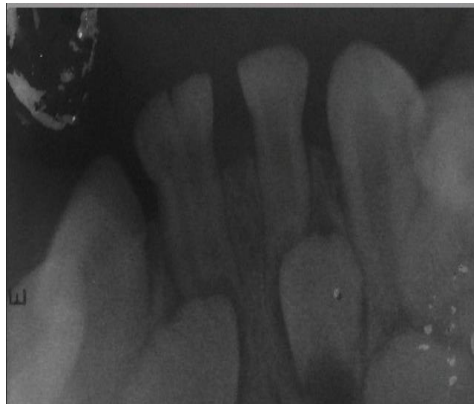
It's a condition in which teeth appear smaller than normal. In the generalized form, all teeth are involved. In the localized form, only single or few teeth are involved. The most common teeth affected are the upper lateral incisors and third molars. Imaging features of the affected teeth are frequently small and malformed.



Abnormalities in shape (morphology):

- **Fusion**

Two teeth joined together into a single anatomic crown (union of two separated tooth germ). Fusion is more common in anterior teeth of both the deciduous and permanent dentitions. Clinically the crowns of the fused teeth usually appear to be large and single, incisal cleft of varying depth or a bifid crown can sometimes occur. Imaging features of fused teeth show unusual shape, size of the fused teeth; also the teeth may show abnormal configuration of the pulp chamber or root canal



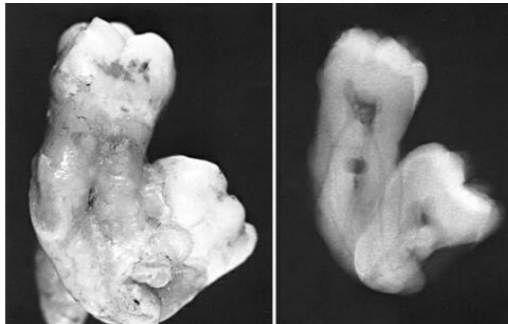
- **Gemination**

Single tooth germ divided into two teeth joined together (single root with two or enlarged crowns). Imaging features reveal the altered shape of the hard tissue and pulp chamber of the geminated tooth.



- **Concrescence**

Is union of two adjacent teeth by cementum only. Maxillary third molar frequently involved. An imaging examination may not always distinguish between concrescence and teeth that are in close contact or that are simply superimposed.



- **Dilaceration**

it is a sharp bend or curve in the tooth anywhere in the crown or the root. Radicular dilacerations are not recognized clinically and in severe condition the tooth doesn't erupt. X ray image provides the best means of detecting radicular dilacerations. If the root dilacerated mesially or distally; the condition is clearly apparent on periapical image.



Dens Invaginatus and Dens Evaginatus

Dens invaginatus (dens in dente) is infolding of the enamel surface into the interior of a tooth crown or the root . Imaging features show that the infolding of the enamel is more radiopaque than the surrounding tooth structure and can be identified as an inverted teardrop shaped radiolucency with radiopaque border. While **Dens evaginatus** appears as a tubercle of enamel on the occlusal surface. Imaging features shows an extension of a dentin tubercle on the occlusal surface covered with radiopaque enamel.



Dens Invaginatus



Dens Evaginatus

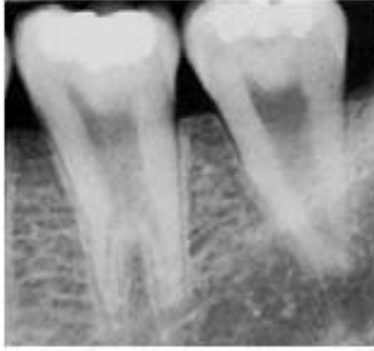
- **Enamel pearl**

It's small spherical enamel masses (enameloma) located at the root of the molars and are found in 3% of the population. Imaging features of the enamel pearl appears smooth, round radiopaque structure.



- **Taurodontism**

It's a condition found in the molar teeth whereby the body of the tooth and pulp chamber is enlarged vertically with short roots, the floor of the pulp and the furcation of the tooth is moved apically. Imaging features is the elongated pulp chamber and the more apically positioned furcation, shortened roots with long crown.



- **Talon cusp:**

It's an Accessory cusp like structure projecting from the cingulum area or cement-enamel junction of the maxillary or mandibular anterior teeth. Imaging features show a distinct radiopaque image of talon cusp on the crown of the involved tooth.



Abnormalities in Eruption of Teeth:

-**Transposition** is the condition in which two adjacent teeth have exchanged positions in the dental arch. Imaging features reveal transposition when the teeth are not in their usual sequence in the dental arch



-Premature Eruption (natal and neonatal teeth)

The teeth erupted in the oral cavity at the time of birth are called as 'natal teeth' and teeth erupting prematurely in first 30 days of life are called as 'neonatal teeth'. Imaging features the roots are not seen on the radiograph and the teeth are very small.



- Delayed Eruption (Impacted Teeth)

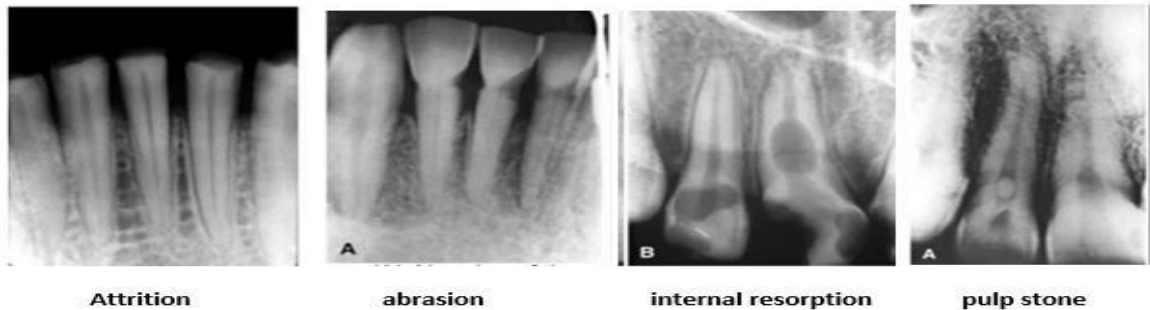
permanent teeth are observed to be delayed in eruption forming Partially or completely impacted teeth, is more commonly in mandibular third molar, followed by maxillary canine and maxillary third molar. Imaging features of impacted mandibular third molar show mesioangular , distoangular , vertical or horizontal impaction.



Acquired teeth Abnormalities

- **Attrition:** is physiologic wearing of teeth resulting from occlusal contacts between maxillary and mandibular teeth. The imaging appearance shows changes in the normal outline of the tooth with flat incisal or occlusal surface.
- **Abrasion** is the nonphysiologic wearing of teeth (friction with a foreign toothbrush and dental floss , pipe ,...). Imaging appearance is defects at the cervical level of teeth
- **Erosion** (chemical action). Imaging features appear as radiolucent defects on the crown.

- **Resorption** is the removal of tooth structure (internal or external). Imaging features for external root resorption are smooth loss in the apical and cervical regions with blunt root apex, while internal resorption appears as round, oval or elongated radiolucency within the root or crown
- **Secondary dentin** additional dentin deposited. Imaging features is a reduction in size of the normal pulp
- **Pulp stones** (foci of calcification in the dental pulp). The imaging appearance is radiopaque structures within pulp, **Pulpal sclerosis** is another form of pulp calcification, but it diffuse to larger area.
- **Hypercementosis** is excessive deposition of cementum on the tooth roots. Imaging is an excessive buildup of cementum around all or part of a root



❖ Craniofacial anomalies

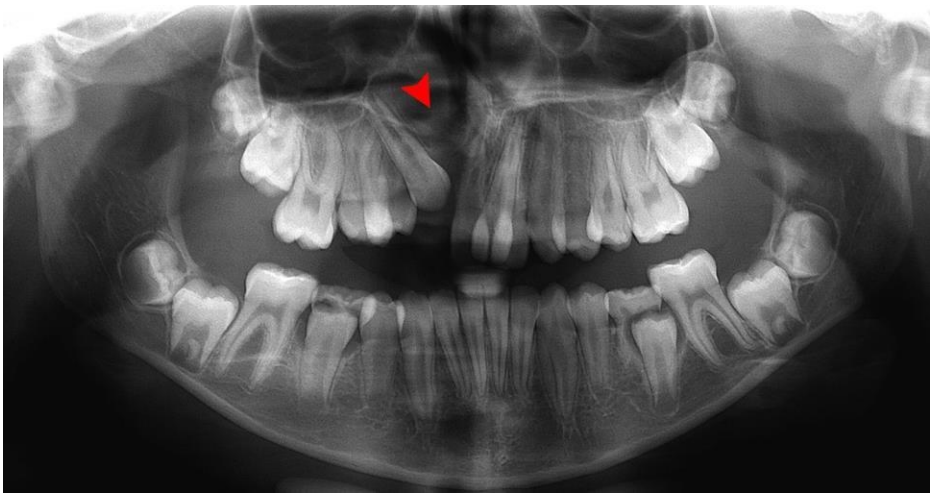
The craniofacial anomalies are usually first discovered in infancy or childhood. Some are caused by genetic mutations, others result from environmental factors, and a third group are multifactorial. Cleft lip and palate is one of these anomalies.

Cleft Lip and Palate

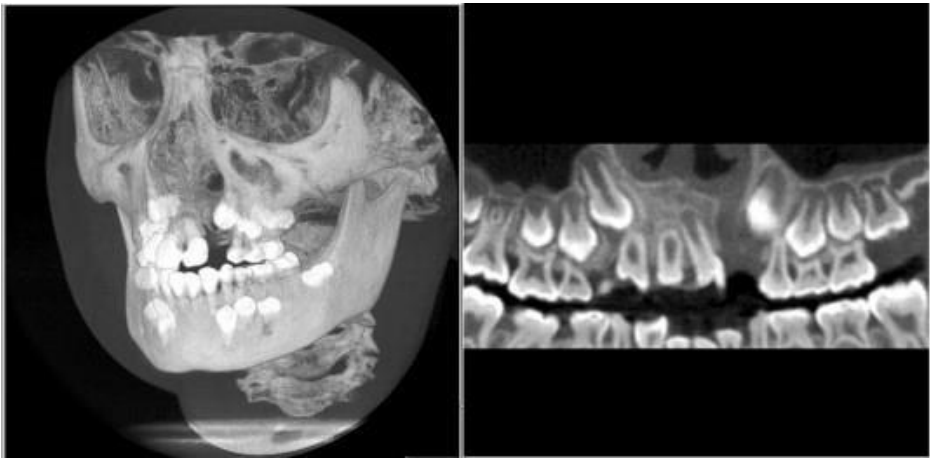
Cleft lip occurs due to failure of union of medial and lateral maxillary processes. While, cleft palate (CP) develops from a failure of fusion of the lateral palatal shelves. Cleft lip and palate together (CL/P) is either unilateral or bilateral. In both CL/P and CP, the palatal defects interfere with speech and swallowing.

Multiple radiographic procedures are performed on patients with CL/P throughout childhood and adolescence. These may include panoramic, periapical, occlusal, and cephalometric radiographs, as well as multidetector computed tomography and, more recently, cone-beam imaging. Imaging Features appear as well-defined vertical

radiolucent defect in the alveolar process with numerous dental anomalies (absence of the maxillary lateral incisor, presence of supernumerary teeth, enamel hypoplasia, malformed teeth, delay eruption with hypodontia in both arches).



panoramic image



CBCT image