



DEVELOPMENTAL DISTURBANCE OF TOOTH WITH RESPECT TO SHAPE

<b>Dr. Srivikasni. J</b>	CRRI, Karpaga Vinayaga Institute Of Dental Sciences
<b>Dr. Swetha. P</b>	CRRI, Karpaga Vinayaga Institute Of Dental Sciences
<b>Dr. Subatharani. A</b>	CRRI, Karpaga Vinayaga Institute Of Dental Sciences
<b>Dr. Pooja Sri. P</b>	PG, Department of Oral Pathology and Microbiology, Karpaga Vinayaga Institute Of Dental Sciences
<b>Dr. Sathish Kumar</b>	Professor and Head of the Department, Department of Oral Pathology and Microbiology, Karpaga Vinayaga Institute Of Dental Sciences
<b>Dr. Mary Tresa Jeyapriya</b>	Reader, Department of Oral Pathology and Microbiology, Karpaga Vinayaga Institute Of Dental Sciences

**ABSTRACT**

The process of tooth development is a highly complex process resulting from interactions between the oral ectoderm, which produces enamel-forming cells, and the neural crest ectoderm, which produces tooth structures other than enamel. Developmental dental anomalies of the primary and permanent dentition occur when a specific disturbance in one or more stages of odontogenesis occurs during human development. Such anomalies in respect to shape include Gemination, Fusion, Concrecence, Lobodontia, Globodontia, Dilaceration, Talon's cusp, Dens invaginatus, Dens evaginatus, Enamel pearl, Taurodontism, Supernumerary Roots.

**KEYWORDS :** Concrecence, Taurodontism, Lobodontia, Globodontia, gemination

**INTRODUCTION :**

The process of tooth development is a highly complex process resulting from interactions between the oral ectoderm, which produces enamel-forming cells, and the neural crest ectoderm, which produces tooth structures other than enamel. Early on, that is, within 6 weeks of intrauterine life, the dental embryo begins to grow and the cells that form the mineralized part begin to differentiate. After that, these cells deposit the dentin and enamel matrix and later begin to be mineralized. As the completed tooth erupts into the oral cavity, periodontal components such as the periodontal ligament, cementum, and alveolar bone begin to surround the tooth root. The development of a tooth involves four stages- Bud stage, Cap stage, Earlybell stage, and Advanced bell stage<sup>1</sup>. Developmental dental anomalies of the primary and permanent dentition occur when a specific disturbance in one or more stages of odontogenesis occurs during human development. Such anomalies are morphologically diverse and can be characterized as those affecting shape, size, number, position, and enamel or dentin structures<sup>2</sup>.

**Classification Of Dental Abnormalities:**

**According To The Size Of Teeth:**

- Microdontia
- Macrodontia

**According To The Shape Of Teeth:**

- Germination
- Fusion
- Concrecence
- Lobodontia
- Globodontia
- Dilaceration
- Talons cusp
- Dens in dente
- Dens evaginatus
- Enamel pearl
- Taurodontism
- Supernumerary roots

**According To Number Of Teeth:**

- Anodontia

- Supernumerary tooth
- Predeciduous dentition
- Postpermanent dentition.

**Developmental Disturbance Of Tooth With Respect To Shape :**

**1. Germination :**

Germination (Figure 1) is defined as a failure to attempt at the division of a single tooth germ by invagination with resultant incomplete formation of two teeth<sup>3</sup>. It refers to a single enlarged tooth or joined tooth wherein the tooth count is normal when the anomalous tooth is counted as one<sup>4</sup>. Also referred to as Twinning, double tooth, double formation, joined teeth, or fused teeth<sup>5</sup>. The etiology of germinated teeth is unknown. Germination is also caused complex interactions between genetic and environmental factors<sup>6</sup>. Other etiological factors are nutritional deficiency, infectious or inflammatory processes, excessive intake of medicines, hereditary or congenital disease, and ionizing radiations<sup>5</sup>. It is more commonly seen in deciduous teeth than in permanent teeth. In deciduous teeth, maxillary incisors and canines are commonly affected<sup>6</sup>. It has equal gender predilection<sup>2</sup>. The clinical features includes bifid crown appearance of the affected tooth. The size of the crown appears to be larger compared to normal crown and has a deep and shallow grooves which extends incisio-gingivally<sup>2</sup>. This condition also results in crowding, spacing and delayed or ectopic eruption for the underlying succedaneous teeth<sup>3</sup>. This condition also results in higher incidence of caries formation and has an esthetic appearance since it most often occurs in anterior region. The treatment options are considered according to the patient requirement, teeth affected and the degree of involvement<sup>7</sup>.



(Figure 1)

**2. Fusion :**

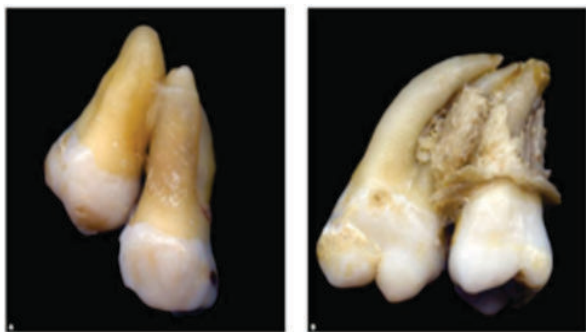
Fusion(Figure 2) is defined as the union between the enamel or both dentin and enamel of two or more separate developing tooth buds<sup>8</sup>.Also Known as Synodontism<sup>6</sup>.Fusion can be further subdivided into complete or incomplete fusion, according to the stage of development<sup>5</sup>.Most commonly occurs in primary dentition than permanent dentition. It is more frequent unilaterally<sup>5</sup>.Tooth are fused together by the dentin, pulp chamber and canals that may be linked or separated depending on the developmental stage when the fusion occurs<sup>5</sup>. Deep buccal and lingual grooves often present at the site of fusion which may lead to increased caries potential as these areas are difficult to clean and improper hygiene<sup>2</sup>.It also leads to aesthetic problems, occlusal disturbances due to crowding, irregular morphology<sup>5</sup>. Management of fused tooth involves restorative, endodontic, surgical and periodontal treatment<sup>6</sup>.Caries prevention can be done by applying fissure sealants. Composite resin restoration can be done when caries develop at these sites<sup>2</sup>.To manage this developmental anomaly an early diagnosis, a convenient choice of the treatment modality, and a regular 3-month follow-up program is required. It is also suggested to determine if there is any dental anomaly present in the permanent successors<sup>9</sup>.



(Figure 2)

**3. Concrescence :**

Concrescence(Figure 3) is defined as the union of the cementum of two adjacent tooth without confluence of the underlying dentin showing independent pulp chambers and root canals . It occurs after the root formation is completed. Concrescence is further divided into true /developmental concrescence If the union occurs during development and acquired/post inflammatory concrescence if the union occurs after root completion <sup>5</sup>.The etiology of concrescence is unknown. However development, local trauma, local infection after development, occlusal overload also play a major role in concrescence<sup>6</sup>.More frequently occurs in maxillary second and third molars and supernumerary teeth<sup>3</sup>.Concrescence leads to gingival architecture loss which may result in development of funnels and causes plaque formation leading to destruction of periodontal tissues<sup>3</sup>.Concrescence is difficult to identify clinically. When this defect is suspected clinically,radiograph is necessary to detect<sup>10</sup>.Additional radiographic projections at different angulations may require in case of superimposition of adjacent tooth<sup>5</sup>.The treatment method of concrescence depends upon the patients needs<sup>10</sup>.Selective shaping (coronoplasty)with or without placement of full crowns can also be done<sup>6</sup>.



(Figure 3)

**4. Lobodontia :**

Lobodontia(Figure 4)was defined by KEENE and DAHLBERG in 1973 as a multiple tooth anomaly resembling the dentition of carnivores (lobos - wolf)<sup>11</sup>.This anomaly affect a single tooth, groups of teeth, or an entire dentition . However, the entire dentition involvement is rare<sup>12</sup>.



(Figure 4)

**5. Globodontia:**

The term globodontia (Figure 5) refers to the enlarged bulbous, fused, malformed posterior teeth with few discernible cusps or grooves<sup>13</sup>.



(Figure 5)

**6. Dilaceration :**

The term dilaceration (Figure 6) was first used by Tomes in 1848 and is defined as a deviation or curvature in the linear relationship between the crown and root<sup>5</sup>. These deformities of permanent teeth are the result of trauma to the deciduous teeth during the development of permanent successor, which alters the position of the mineralized portion of the tooth and causes the rest of the tooth to form at an angulation<sup>6</sup>. Dilaceration usually in the apical one third of the root if the anterior tooth is involved, the middle third if first molar is involved and the coronal one third if third molar is involved<sup>5</sup>. Radiographically the root is dilacerates mesially or distally, which is evident on intraoral periapical radiograph. It gives Bull's eye like appearance when the root dilacerates buccally or lingually<sup>3</sup>.

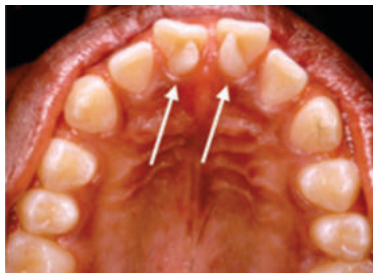


(Figure 6)

**7. Talon Cusp**

Ongle R and Praveen BN were the first to described talon cusp on the lingual surface of the upper central incisor<sup>3</sup>.Talon cusp(Figure 7) of anterior teeth, is a relatively rare developmental anomaly characterized by the presence of an accessory cusp like structure projecting from the cingulum area or cemento enamel junction of the maxillary or mandibular anterior teeth in both the deciduous and

permanent dentition. It resembles an eagle's talon but it may also appear as pyramidal or conical<sup>4</sup>. This condition is more prevalent in Rubinstein-Tyabi syndrome, Mohr syndrome, Bloch-Sulzberger syndrome, Ellis-van Creveld syndrome<sup>3</sup>.



(Figure 7)

**8. Dens Invaginatus :**

Hulsmann (1997) described dens invaginatus (Figure 8) as a developmental abnormality resulting in deepening or invagination of the enamel organ into the dental papilla prior to mineralization of the tooth tissues<sup>14</sup>. Also called as Dens in dente which means tooth within a tooth<sup>3</sup>. Maxillary lateral incisors are more commonly affected. Various treatments have been reported to exist depending on the degree of malformation which includes prophylactic treatment, conservative restorative treatment, non-surgical root canal treatment, endodontic surgery and extraction.



(Figure 8)

**9. Dens Evaginatus: (Figure 9)**

It's also known as leong's premolar. It's a developmental anomaly characterised by presence of an accessory cusp on occlusal surface between the cusps of premolar. This condition most commonly affects premolar followed by molar, canines and incisors. It can be either unilateral or bilateral. It commonly affects mongoloids<sup>3</sup>. Etiopathogenesis - Proliferation and evagination of area of inner epithelium and underlying dental papilla into the enamel organ during early stages of tooth development<sup>3</sup>. Differential diagnosis are Talon's cusp, Bolk's cusp, and cusp of<sup>16</sup>. Treatment involves for vital tooth - Grinding of accessory cusp along with indirect pulp capping and for nonvital tooth - endodontic treatment<sup>3</sup>.



(Figure 9)

**10. Enamel Pearl:**

Enamel pearl (Figure 10) is defined as an ectopic globule of enamel that is firmly attached to the root of the tooth. Other names are enameloma, enamel droplet, enamel nodule, enamel exostoses and enamel globule. It's commonly found on roots of maxillary molars especially on bifurcation and trifurcations of root<sup>5</sup>. During normal tooth development,

ameloblasts lose their activity after crown formation and become part of Hertwig's epithelial root sheath. Occasionally for unknown reasons, ameloblasts retain their enamel competence, resulting in prolonged (cervical enamel projections) or delayed (enamel pearls) ectopic enamel production<sup>5</sup>. In Radiographic it appears as a smooth, round and radiopaque. If it is located in cemento-enamel junction it has to be removed as it predisposes to periodontal diseases<sup>3</sup>.



(Figure 10)

**11. Taurodontism:**

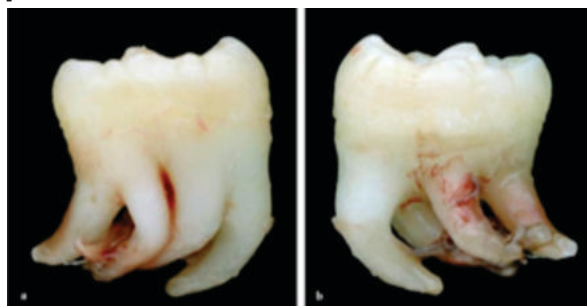
The Latin word "tauros," which means "bull," and the Greek word "odus," which means "tooth" or "bull tooth," are the sources of the term "taurodontism." Witkop defined taurodontism (Figure 11) as "teeth with large pulp chambers in which the bifurcation or trifurcation is displaced apically and hence that the chamber has higher apico-occlusal height than in typical teeth and lacks the constriction at the level of cemento-enamel junction (CEJ).<sup>5</sup> It caused by the failure of Hertwig's sheath to invaginate at the proper horizontal level<sup>5</sup>. Radiographic appearance of involved teeth have a rectangular shape relatively tapering towards the roots. The shift of the furcation to the apical third typically makes it difficult to extract a taurodont tooth.<sup>17</sup>



(Figure 11)

**12. Supernumerary Roots: (figure 12)**

It is characterized by increased number of roots, most commonly in third molars, mandibular canine and premolars. The condition affects both permanent and deciduous teeth<sup>3</sup>. Etiology of supernumerary roots is unknown; Hertwig's epithelial root sheath tissue ingrowth has been suggested as a possible cause<sup>6</sup>. There is no specific treatment for this but there might be complications during extraction and root canal treatment so care must be taken while doing treatment. On other hand tooth with supernumerary roots offers better Anchorage during orthodontic treatment and better periodontal support. They are excellent abutment for fixed partial dentures<sup>18</sup>.



(Figure 12)

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