# Development teeth in the affected dentitions, they

Developmentof dentition is a very complex process. Any aberrations in the different stagesof tooth development can result in unique manifestations, either in the primaryand permanent dentitions.

The terms ‘ double teeth’, double formations’, ‘ joinedteeth’1 or ‘ dental twinning’2 are often used todescribe gemination or fusion, both of which are primary developmentalabnormalities of the teeth.  Doubleteeth are developmental anomalies of dental hard tissues. Based upon themorphology of double teeth and the number of teeth in the affected dentitions, they are classified as of gemination, fusion and concrescence.

Gemination (shizodonthia)indicates that a double tooth originates from one dental follicle as the resultof an incomplete splitting into two teeth, starting at the incisal edge, butaborted before cleavage is complete. No matter what the changes are, there ismostly only a single root with only one root canal. Clinically these teethpresent as a bifid crown with a well-defined groove or an incisal notchdelineating the two crowns. In contrast, fusion implies a union of discretetooth germs during odontogenesis. The extent and localization of the uniondepends on the developmental stage of the teeth at the time of the fusion.

Inmost cases, the result is a broad tooth with two separate pulp chambers androot canals. When fusion occurs at the cementum level, concrescence is said tobe responsible 3. Milazzo and Alexander 4 suggestedthat the clinical teeth in the arch should be counted and that the anomalouscrown be counted as one; a full complement of crowns indicates gemination, whereas fewer than the expected number indicates fusion.

Gemination has beenobserved more frequently in the deciduous than in the permanent dentition, withprevalence of 1% and 0. 1%, respectively. There seems to be no gender differences in occurrence.

Gemination, however ismost often seen in the maxillary primary incisors and the canines 5. Taloncusp is a morphologically well-delineated accessory cusp-like structureprojecting from the cingulum area or cementoenamel junction towards the incisalridge of the maxillary or mandibular anterior teeth in both the primary andpermanent dentitions. This anomalous structure is composed of normal enamel, dentine and varying extensions of pulpal tissue 6. Theterm talon cusp was coined by Mellor and Ripa 7 due itsresemblance to an eagle’s talon. The diverse clinical manifestations of theanomaly, have led the talon cusp to be described in many different ways: exaggerated cingula, cusp-like hyperplasia, accessory cusp, supernumerary cusp, interstitial cusp 8.

The prevalence of talon cusps is low, with anincidence of less than 0. 06% 9 to approximately 8% 10of the population. Due toa wide variation in the size and shape of talon cusp and in order to havediagnostic criteria, Hattab et al 11 classified the anomaly intothree types: Type 1(Talon): a morphologicallywell-delineated additional cusp that prominently projects from the palatal orfacial surface of a primary or permanent anterior tooth and extends at leasthalf the distance from the cemento-enamel junction to the incisal edge. Type 2(Semi talon): an additional cusp of a millimeter or more but extending lessthan half the distance from the cemento-enamel junction to the incisal edge. Itmay blend with the palatal or facial surface or stand away from the rest of thecrown.

Type 3(Trace talon): an enlarged or prominent cingula and their variations, i. e. conical, bifid or tubercle-like. Associationof talon cusp with tooth gemination is very rare, and few such cases have beenreported involving maxillary central incisors 12-19. This articledescribes a unique case of a palatal talon cusp on a geminated permanentmaxillary lateral incisor. CASE REPORTA fifteenyear-old male visited dental clinic for routine dental checkup. The medical anddental histories were noncontributory. On extra oral examination, the patient had asymmetrical straight facial profile.

Intraorally, a permanent dentition wasobserved with fair oral hygiene and mild dental fluorosis. The upper arch wasU-shaped, whereas the lower arch was parabolic, with anterior crowding. Themolar relationship was Angle’s class I on either side. Clinically, maxillaryleft lateral incisor was seen with increased mesiodistal crown width withdistinct developmental occlusogingival grooves on the labial and lingualsurfaces (Figure 1). On the palatal surface, it exhibited a pronounced, well-defined, pyramidal shaped accessory cusp extending from the cementoenameljunction, with the tip of the cusp attached to thecrown.

A deep palatal developmentalgroove distal to the talon cusp was also observed (Figure 2). Although, thetalon cusp neither irritated the tongue during mastication or speech norinterfered with occlusion, the patient complained of the bulkiness in the area. Neitherthe parent nor the patient could recall any similar anomalies in the primarydentition.

No other family members were known to have the same trait. A periapical radiographshowed a V-shaped radio-opaque structure superimposed on the image of theaffected crown, with the point of the “ V” toward the incisal edge (Figure 3). The talon cusp was outlined by two distinct white lines converging toward theincisal edge. The geminated-taloned tooth had a single enlarged pulp chamber, one root and bifid crown appearance. Outline of palatal developmental grooveand its extension over the root was evident radiographically. Based on the clinical and radiographic findings, palatal talon cusp type2 described by Hattab et al.

11 on geminated maxillary left lateralincisor has been diagnosed. Oral hygiene instructions and prophylaxis was performed to improve thepatient’s oral hygiene. With parental consent, a periodic reduction of thetalon cusp was carried out at 6-8 week intervals, using a diamond bur in ahigh-speed water-cooled handpiece.

Following each grinding procedure, theexposed surface was treated with fluoride varnish as a desensitizing agent. Inaddition, the notch in the crown was restored with composite resin. The patient was scheduled for periodic dental examination. DISCUSSIONAbnormalities in tooth size, shape, and structure are caused bydisturbances during the morpho-differentiation stage of tooth development20. Geminated teeth appear as a single enlarged tooth or joined(double) tooth in which the tooth count is normal when the anomalous tooth iscounted as one.

Fused teeth present as a single enlarged tooth or joined(double) tooth in which the tooth count reveals a missing tooth when theanomalous tooth is

counted as one. It is not always possible to differentiatewhether there has been fusion between a normal tooth and a supernumerary toothor gemination with hypodontia 21. Brook and Winter1 elucidated the difficulty of decidingwhether a tooth is fused or geminated and proposed that these anomalies bereferred to in a neutral term, such as “ double teeth”. Theetiology of tooth gemination is still unknown, suggested to result from traumaticinjuries occurring during development of the tooth bud. Evidence obtained fromcase studies suggests that this anomaly has a hereditary tendency, similar tothat affecting the dental lamina and resulting in a supernumerary tooth. Theheredity probably has recessive autosomal inheritance or dominant autosomalinheritance with little penetration. Thus, it seems that gemination caused bycomplex interactions of a variety of genetic and environmental factors 14. Similar to gemination, talon cusps are also believed to originate duringthe morpho-differentiation stage of tooth development, as a result of anoutward folding of the inner enamel epithelial cells and a transient focalhyperplasia of the mesenchymal dental papilla 11.

The exactetiology of talon cusps is yet to be known. However, there is strong supportfor a multifactorial etiology, involving both genetic and environmentalfactors. They have also been reported in patients with Mohr syndrome, Sturge-Weber syndrome, Rubinstein-Taybi syndrome, cleft lip and palate, incontinentia pigmenti achromians, hypomelanosis of Ito, Ellisvan Creveldsyndrome and Alagille’s syndrome etc 22. Talon cusp on a geminated tooth is a very rare clinicalsituation. A review of the literature revealed only seven previous casesreported in the literature, with all the cases confining to permanent maxillarycentral incisors.

(Table-1) To best of our knowledge, this is the first reportof a geminated tooth, with a talon cusp affecting a lateral incisor. Ekambaramet al. 23 also reported an unusual case of facial and palataltalon cusps, but called the affected teeth as ‘ double teeth’. Geminatedtooth, although often asymptomatic, are potentially problematic because of thecompromised esthetics, with wider tooth or may be a crooked angle bent. Inaddition to poor esthetics, crowding in the arch may result from the increaseddimension of the affected tooth. The line of demarcation in the crown is apotential plaque trap and may thus predispose the tooth to dentalcaries and periodontal disease. 23 Talon cusp may pose a challenge to maintenance of oral hygiene becauseof the plaque accumulation around the base of projection.

The stagnation offood around the grooves predisposing dental caries, irritation to the tongueduring mastication and speech, occlusal discrepancies, breast-feeding problems, temporomandibular joint pain, compromised esthetics, and periodontal problemsdue to excessive forces etc are the other complications caused by talon cusp 14, 23. Yumikura and Yoshida 24 reported that 42% of talon cusp has pulptissue within them. For this reason, fracture or attrition of the tubercle mayexpose the pulp horn resulting in pulpal complications. The presence of these accessory cusps mayprevent proper bonding of brackets for orthodontic treatment and complicate thewearing of a mouthguard for sporting activities 23. Asymptomatic anterior geminated tooth should be left alone unlesscomplications arise with esthetics, crowding or spacing, and dental caries.

Simple composite restorations can be used to camouflage the geminated tooth andprevent caries developing in the fissures. More invasive treatment such asselective grinding and surgical hemisection, may compromise the pulpal statusand should be deferred until the root apex is mature 25. The management objectives of talon cusp should aim at preserving pulpalvitality, meeting esthetic and occlusal requirements, establishing cariesprevention, and elimination of irritation of the tongue and other soft tissues. Lavitan 26 suggested flowable resin composites could be placedincrementally onto the tubercles and surrounding tooth surfaces to support thetubercle and to prevent the development of dental caries. In the case of mild occlusal interference, periodic minor reduction of the talon cusp can be effectively carried out, followed by application of fluoride varnish as a desensitizing agent. This canbe achieved over several consecutive appointments 6 to 8 weeks apart to allowthe deposition of reparative dentin to preserve pulpal vitality 27.

Various procedures of intentional assault of the normal pulp including directpulp capping, shallow pulpotomy and modified Cvek’s pulpotomy using MTA andother medicaments have been described to avoid future pulpal complications 28. Nevertheless, such radical measures are not often prophylactic and are ofdebatable value. In the case presented here, only gradual reduction of the talon cusp bygrinding has been done, as the patient complained of bulkiness the palatal area, along with resorting the notch in the crown. No other active treatment wascarried, because the geminated tooth with talon cup had not posed anysignificant problems and the patient

was not bothered by the appearance.  It is important for dentalprofessionals to be familiar with these dental anomalies.

Patient and parentscan be properly informed of the potential risk factors and problems associatedwith these anomalies. Early diagnosis of these anomalies in the tooth by the dentalprofessional can improve the prognosis of treatment and reduce futurecomplications.