Management of two unusual cases of dens invaginatus and talon cusp associated with other dental anomalies.

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ABSTRACT

The management of two unusual cases of dens invaginatus and talon cusp is presented. The first concerns talon cusp in maxillary primary and permanent lateral incisors, a supplemental tooth with dens invaginatus hampering eruption of the permanent incisors. The other presents bizarre crown morphology of a lateral incisor with talon cusp, dens invaginatus and a palatal accessory cusp-like structure. Early diagnosis and management are important to avoid complications.

INTRODUCTION

Developmental anomalies of the permanent dentition are most frequently encountered in the maxillary lateral incisor. This tooth occupies an unfavourable position during its formative stages and is the last of the anterior teeth to calcify; hence it is the most likely to be affected by various developmental disturbances. Two such disturbances are dens invaginatus and talon cusp. Dens invaginatus also known as dens in dente is a developmental anomaly resulting from an invagination in the surface of the crown before calcification has occurred. The invaginatus may vary from a slightly accentuated cingulum to deep foldings reaching to the apical foram. Pulp involvement of teeth with coronal invaginations may occur at a short time after tooth eruption; hence early diagnosis is mandatory to instigate preventive treatment.

Talon cusp is a relatively rare dental anomaly that occurs as an accessory cusp-like structure projecting from the cingulum area or CEJ of a maxillary or mandibular tooth in either the primary or permanent dentition in both the sexes. Although talon cusp has been reported most frequently on the lingual surface, occurrence of labial talon cusp has been documented. The presence of talon cusp is in itself not an indication for any treatment procedure; however, as it can pose problems in aesthetics, speech, occlusion and caries control, treatment may be necessary.

Both talon cusp and dens invaginatus have been associated with other odontogenic anomalies, such as peg shaped lateral incisors, dens evaginatus of posterior teeth, supernumerary teeth, congenitally missing teeth etc. These developmental disturbances are also frequently encountered in the lateral incisor; however, their simultaneous occurrence along with other dental anomalies in uncommon. The following case report presents management of two unusual clinical cases of dens invaginatus and talon cusp. The first case concerns talon cusp in both a primary lateral incisor as well as the permanent lateral incisor and dens invaginatus in a supplemental lateral incisor, which had hampered the eruption of the permanent maxillary left central and lateral incisors. The second case exhibited bizarre crown morphology of a lateral incisor with a talon cusp, dens invaginatus and an accessory cusp-like structure on the palatal surface.

Case Report

A 9.6 year-old boy reported to the Department of Pediatric Dentistry with complaint of irregular and unerupted front teeth. Intra-oral examination revealed a mixed dentition with Angle's Class I molar relationship. Clinical examination of the anterior region revealed multiple anomalous teeth viz. A vertical depression was also observed on the labial surface, which corresponded to the palatal talon cusp.

i) Talon cusp in the deciduous maxillary left incisor, which had atrited, and had a T-shaped appearance. A vertical depression was also observed on the labial surface, which corresponded to the palatal talon cusp.

ii) A talon cusp in the permanent maxillary right lateral incisor that interfered with occlusion in the lower right incisor region. Non-canous developmental grooves were present at the junction of the talon cusp with the palatal surface of this tooth.

iii) A lateral incisor like tooth erupted at the left lateral incisor region.

iv) Unerupted maxillary left central incisor.

All the involved teeth responded normally to vitality tests (Electric Pulp Tester: Parkell, Model Pt-20, USA, thermal tests) except for the primary left lateral incisor, which was not tested. The remaining dentition appeared normal and did not show any obvious abnormality. Medical and dental history was noncontributory and no other member of the family had such similar problems.

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family was affected by similar dental abnormalities. The periapical radiographs of the right maxillary lateral incisor region revealed a V-shaped radiopaque structure superimposed on the image of the affected tooth crown. Pulp extension could be traced to the middle of the cusp, confirming the diagnosis of talon cusp.

Intra oral periapical radiographs of the maxillary left central and lateral incisor region showed a T-shaped primary lateral incisor and unerupted permanent maxillary left central and lateral incisors. The tooth, which had erupted in the maxillary left lateral incisor region, was confirmed radiographically to be supplemental lateral incisor due to its altered crown-root morphology. This tooth had hampered the eruption of the central and lateral incisors. It was in also in anterior cross bite relationship with the mandibular left permanent central and primary lateral incisors causing gingival recession in that region. Radiographically, a deep pit was also confirmed in the supplemental tooth, however dens invaginatus which was suspected, was not ruled out at this stage due to severe overlapping of the teeth (Fig.3). Hence, it was decided to radiograph and section the tooth after extraction of the same. Panoramic radiographic examination revealed no other abnormalities (Fig.4). After diagnosis, the following treatment was carried out.

The primary lateral incisor and the supplemental lateral incisor were extracted under local anesthesia (2% Lignocaine with 1:80,000 Adrenaline). After extraction, the supplemental tooth was radiographed and a ground section was performed, confirming the diagnosis of a dens invaginatus (Fig.5, 6). Three weeks recall check—up showed erupting maxillary left central and lateral incisors. Routine treatment for the other teeth was carried out. The central incisor was seen to be erupting mesially and was kept under observation for the same. Simultaneously, the talon cusp on the right lateral incisor was ground periodically (approximately 1mm per visit) to relieve it from occlusion. This was followed by topical fluoride application (Fluoritop —SR Varnish, ICPA Health Products) and the developmental groove between the talon cusp and the palatal surface of the maxillary right lateral incisor were sealed with glass ionomer cement (Fuji II LC) to prevent food lodgment.

A two monthly follow up showed obvious space discrepancy in the region causing anterior crowding (Fig.7). Orthodontic treatment for the same is currently underway.

**Case Report 2**

An 8.5 year-old girl reported to the Department of Pediatric Dentistry with the complaint of decayed posterior teeth. On clinical examination, multiple carious maxillary and mandibular molars and a bizarre crown form of permanent maxillary left lateral incisor was seen. The patient appeared healthy and of normal physical development for her age. She had no history of any severe illness or any record of orofacial trauma. Her dental history revealed that the primary teeth had erupted at normal dental age, with no obvious abnormalities in size and shape.

Detailed intraoral examination showed a mixed dentition with all incisors and first permanent molars erupted in a Class I molar relationship. The crown of the maxillary left lateral incisor, was large and exhibited two, pronounced well-demarcated accessory cusp like structures on the palatal surfaces (Fig.8). One of these extended from the cingulum/CEJ halfway up to the incisal edge of the tooth and was suggestive of a talon cusp, while the other was a lobe like structure present on the mesial aspect of the palatal surface. There was a vertical groove on the mesial and distal aspects of both the cusps extending from the base of the cusp to its tip giving the appearance of a trifid tooth. A deep developmental groove with debris accumulated within it was present where the cusp joined the palatal surface of the tooth.

An intra oral periapical radiograph revealed two radiopaque ‘V shaped structures extending from the cingulum to the incisal edge of the tooth (Fig.9). Dens invaginatus extending to the middle third of the root was also observed. In addition, it was obvious that the mesial accessory cusp appeared as a separate entity clinically, and radiographically no separate root canal could be traced. The clinical and radiographic findings were suggestive of the following:

i) Talon cusp of lateral incisor with dens invaginatus and a mesially placed palatal accessory cusp.

ii) Talon cusp of lateral incisor with dens invaginatus and incomplete fusion with a supernumerary tooth.

iii) Gemination of lateral incisors with talon cusp and dens invaginatus. However, the authors are of the opinion that the diagnosis of talon cusp and dens invaginatus of the lateral incisor with an accessory cusp seems most probable. Treatment of the tooth consisted of prophylactic sealing of the grooves with glass ionomer cement. It was also decided to keep the tooth under observation till complete eruption had occurred. The talon cusp was ground at this stage, as it

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did not interfere with occlusion (Fig. 10). The patient underwent routine treatment for other teeth and was however lost to further follow up.

DISCUSSION

Developmental disturbances of the permanent dentition are most frequently encountered in the lateral incisor. Moyer's states that this is because the most distal tooth within each group displays the greatest variability in size, is the most frequent abnormal in shape and aberrant in calcification timing. Dens invaginatus is a rare malformation of teeth, showing a broad spectrum of morphological variations. Hallet and Oehlers have classified dens invaginatus depending upon the extent of invagination. In both the cases, the dens invaginatus belonged to Hal iets type 4 and Oehlers type 2 respectively. In most cases dens invaginatus is detected by chance on the radiograph. As maxillary lateral incisors are the teeth most susceptible to coronal invaginations these teeth should be investigated thoroughly. In some cases the enamel lining is incomplete channels may also exist between the invagination and the pulp. Therefore, pulp necrosis often occurs rather early, within a few years of eruption, sometimes even before root end closure. Other reported sequelae of undiagnosed and untreated coronal invaginations are abscess formation, retention of neighboring teeth, displacement of teeth, cysts, and internal resorption. Such teeth should be treated with fissure sealing before carious destruction can occur. A composite restoration and strict periodic review is recommended.

Review of literature shows that extraction of teeth with

Fig. 1: Pre-operative photograph of case 1.

Fig. 2: Pre-operative occlusal view of case 1 showing talon cusps on primary left and permanent right maxillary lateral incisors and incisor-like tooth erupted in the maxillary left incisor region.

Fig. 3: Intra oral periapical radiograph showing supplemental teeth.

Fig. 4: Panoramic radiograph of case 1.
Fig. 5: Extracted supplemental lateral and primary lateral incisor.

Fig. 6: Ground section of supplemental tooth confirming den's invaginatus.

Fig. 7: At two month follow up erupting teeth with space discrepancy.

Fig. 8: Maxillary left lateral incisor with two accessory cusp like structures palatally.

Fig. 9: Intra oral periapical radiograph revealing two radio opaque V shaped structure.

Fig. 10: Post operative photographs of case 2.

Invaginations was a preferred therapy until the 1970's, until Grossman and Creaven were the first to describe root canal treatment of invagination only. Hovland and Block were among first to present cases treated with conventional root canal therapy, which however may present several problems because of the irregular shape of the root canal systems.

When pulp necrosis occurs before root-end closure, apexification procedures with calcium hydroxide may be necessary. Surgical treatment has to be considered in cases of endodontic failure and in teeth, which cannot be treated non-surgically.

Talon cusp is a relatively rare odontogenic anomaly arising
during the morphodifferentiation phase of tooth development. Talon cusp may represent the extreme of a continuous variation progressing from a normal cingulum through an enlarged cingulum (trace talon) and a small accessory cusp (semi talon), to a talon cusp. The prevalence of talon cusp varies considerably between ethnic groups, ranging from 0.06% in Mexican children to 7.7% in north Indian children. The anomaly occurs with higher incidence in mongoloid populations than Caucasians and Negroes. However, the lack of precise criteria to classify an accessory cusp as a talon may contribute to the variations between different populations.

Our review of literature revealed approximately 31 articles on talon cusp in English language. Almost 92% of taloned teeth were found in maxilla of which 55% were in lateral incisors, 36% in central incisors and 91% in canines. In our cases we found talon cusp were found on lateral incisors. Males are affected more frequently than females by talon cusp, but the ratio was found to be considerably higher in primary teeth (3.5:1) than in permanent teeth (1.8:1). Only two cases of talon cusp on supernumerary teeth, and one case on gennatated tooth have been reported.

Talon cusp has not been reported as an integral part of any specific syndrome, though it appears to be more prevalent in patients with Rubenstein-Taybi syndrome, incontinentia pigmenti achromians and Ellis-Verte syndrome. Clinical complications encountered with talon cusps include compromised aesthetics, occlusal interference, displacement of the affected tooth, carious lesions in the development grooves which delineate the cusp, pulpal necrosis and periapical pathosis, advanced attrition, periodontal problems, irritation of the tongue and interference with tongue space and TMJ pain. Several forms of treatment have been advocated for the management of talon cusp such as gradual periodic reduction of cusp, with fluoride as a desensitizing agent, or total removal, and restoration, resultant defect. Orthodontic correction can then be undertaken when required.

The present cases were unique in their clinical presentations and complications. In case 1, there were multiple anomalies in the anterior teeth and coincidentally all were in lateral incisors. The talon cusp was found in both the deciduous as well as the permanent lateral incisors (Fig.2). We have not come across any report where talon has been reported in both the deciduous as well as permanent teeth in the same patient. However, Chen stated that an individual who has primary talon cusp does not bear increased risk of developing permanent talon cusp. Presence of dens invaginatus in a supplemental left lateral incisor, occurrence of multiple talon cusps, dens invaginatus, and supplemental tooth all occurring in a single patient is not a usual occurrence, unless associated with a obvious syndrome.

Presence of dens invaginatus in supernumerary teeth has earlier been reported. Rotstein et al. have advocated extraction of teeth when abnormal crown morphology presents aesthetic and functional problems. Al Oman et al also stress on the importance of early diagnosis and treatment; but in their case extraction of supernumerary teeth did not result in eruption of impacted central incisors. However in the present case, extraction of the supplemental tooth resulted in eruption of the obstructed maxillary central and lateral incisors within a period of 21 days. It was observed that the erupting central incisor was rotated mesially (Fig.6). The deciduous lateral incisor with the talon cusp was extracted. The talon cusp was ground periodically in accordance with Al Oman et al without pulpal exposure, and was sealed. The patient is currently under routine orthodontic therapy for the rotated incisors.

In case 2, there was presence of talon cusp, dens invaginatus and an accessory lobe like structure in a bizarre maxillary left lateral incisor. In our literature review we have not come across any such lateral incisor reporting such unusual morphology. In this case patient had an accessory and talon cusp on the palatal surface of maxillary left lateral incisor. Schulze has mentioned a similar condition as “doubling of the cingulum”. As the talon and accessory cusp did not interfere with the occlusion, neither were ground, but the deep developmental groove was sealed. It was decided to wait for the complete eruption of the mandibular incisors and canine and then grind the talon cusp if necessary. Another reason for not grinding the tooth was that since the tooth had a dens invaginatus and root development was incomplete any pulp exposure at this stage would have necessitated complicated endodontic treatment.

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