MULTIPLE TALON CUSPS AND DENS INVAGINATUS ASSOCIATED WITH OTHER DENTAL ANOMALIES — AN UNUSUAL REPORT

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ABSTRACT

Talon cusp is a dental anomaly that occurs as an accessory cusp like structure from the cingulum of maxillary or mandibular anterior teeth. Dens invaginatus is a developmental variation which arises as a result of an invagination on the surface of a tooth crown before calcification has occurred. An unusual case of multiple talon cusps affecting the maxillary central incisors and the canines bilaterally together with other dental abnormalities viz dens invaginatus affecting the maxillary lateral incisors, microdontia, short roots, reduced alveolar bone height, dilaceration of the described posterior teeth, anterior open bite and bilateral posterior cross bite in a 35 year old male. The presence of these dental anomalies in a single patient is very rare and this is perhaps the first case report of this nature.

None of these anomalies alone are particularly uncommon but they have not previously been reported together. The occurrence of these anomalies is probably incidental as the conditions are aetiologically unrelated and no developmental syndrome was identified.

Key words: *Talon cusps, Dens invaginatus, Short roots, Microdontia, Dilacerations, Cross bite*

INTRODUCTION

Talon cusp is an uncommon dental anomaly that occurs as an accessory cusp like structure from the cingulum or cemento-enamel junction of maxillary or mandibular anterior teeth in either primary or permanent dentition.[1] The first recorded case of talon cusp was in 1892, when Mitchell described an accessory cusp on the lingual surface of an upper central incisor as a process of horn like shape curving from the base downward to the cutting edge in a female patient.[2] This anomaly has also been reported to be associated with the Rubinstein-Taybi syndrome, Mohr syndrome, Sturge-Weber syndrome and with anomalies such as odontome, dens invaginatus, double tooth, supernumerary tooth and impaction.[3]

The presence of an enamel lined cavity with in a tooth is termed as dens invaginatus. A dens invaginatus may occur in coronal part of tooth or rarely within the root. The coronal form may range in extent from an incipient pit, to significant invagination of the enamel with disruption of the coronal morphology, resulting in direct access for micro-organisms between the pulp chamber and oral cavity.[4]

The short root anomaly was described by Lind. It affects maxillary central incisors almost symmetrically, other teeth are more rarely involved and it is usually premolars and canines which are affected. The male: female ratio is reported to be 1:3.[4] Dilaceration is a deviation or bend in the linear relationship of a tooth crown to its root; it is an angulation or sharp curve in

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the root or the crown of a developed tooth of 90^0 or more.[5]

Morphological anomalies of dental crowns or roots are common whereas multiple anomalies in a single patient are unusually rare. This is a case report of an unusual concurrent combination of dental anomalies affecting both the crowns and roots of several teeth.

CASE REPORT

A 35 year old male presented with the chief complaint of mobility of lower front teeth since last 3 months. His medical history was unremarkable with no history of serious childhood illness or systemic abnormality. The family history did not reveal consanguineous marriage of his parents. The extra-oral examination showed no abnormalities. On intra-oral examination his general dental status was found good with no caries experience however, mandibular incisors exhibited grade I mobility. Multiple talon cusps were evident on the palatal surfaces of six maxillary anterior teeth from canine to canine region. Microdontia was present in relation to all maxillary and mandibular posterior teeth. Other dental variations included an anterior open bite and bilateral posterior cross bite in relation to mandibular first molars. Spacing was present in relation to mandibular right central and lateral incisors (Fig 1a,b).

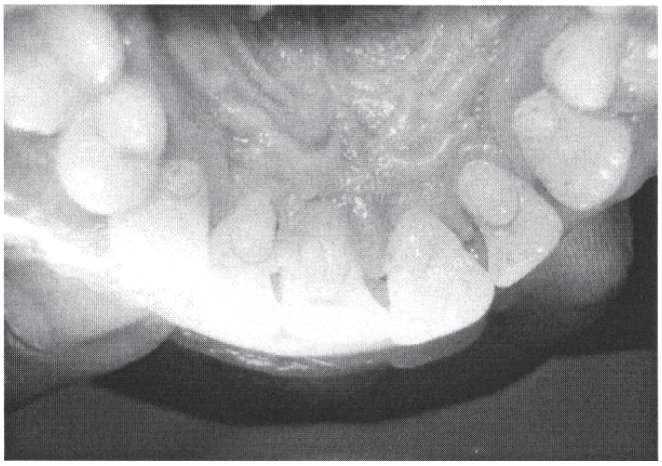

Fig 1A: Talon cusps in the maxillary anterior region, as viewed palatally

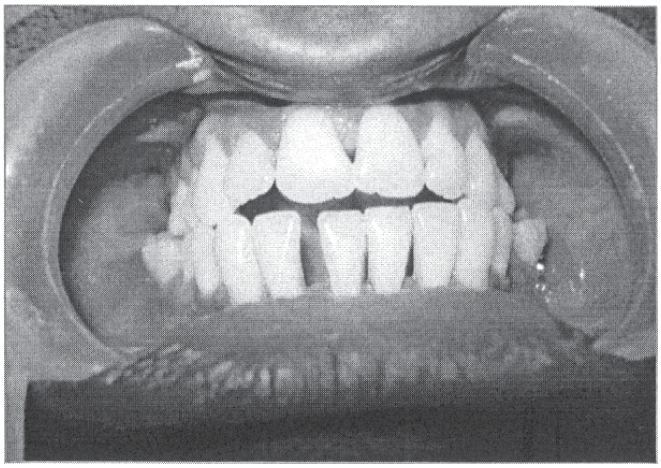

Fig 1B: An anterior open bite with bilateral posterior cross bites in relation to 36 and 46. Spacing is present between 41 and 42

An intraoral periapical radiograph and occlusal radiograph were taken which revealed V-shaped radiopaque structure superimposed over the image of maxillary right and left central incisors and canines suggestive of talon cusps. An inverted teardrop-shaped radiolucency with a radiopaque border due to infolding of the enamel lining which appear more radiopaque was seen in the maxillary lateral incisors suggestive of dens invaginatus. There was an apical radiolucency associated with maxillary right lateral incisor and tooth was non-vital on electric pulp testing suggestive of a peri-apical-pathosis (Fig 2a,b and 3). An orthopantomograph disclosed short roots with crown to tooth ratio of more than I:1 in maxillary and mandibular anterior teeth and low levels of alveolar bone inter-proximally. Dilaceration was present with respect to maxillary and mandibular posterior teeth (Fig 4). In view of the low alveolar bone levels, the patient was referred for a comprehensive periodontal and general medical investigation. Blood investigations were performed and all levels were found to be within the normal range thus suggesting of no association with any systemic disease,

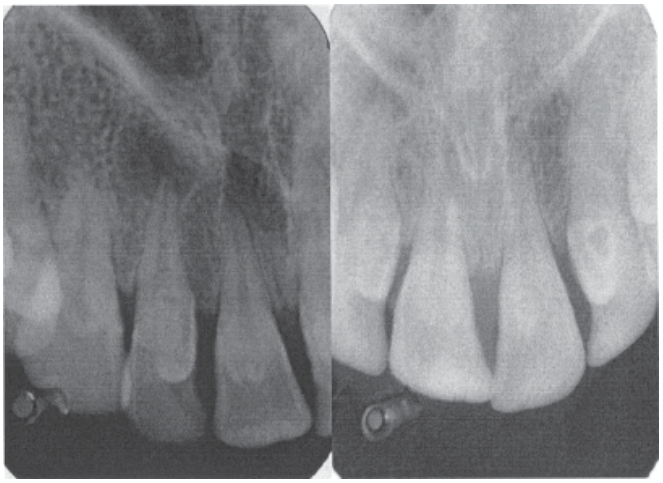

Fig. 2A: An IOPA of maxillary anterior region showing a peri-apical radiolucency of right lateral incisor

Fig. 2B: An IOPA illustrating the presence of talon cusps on maxillary central incisors and dens invagination maxillary lateral incisors

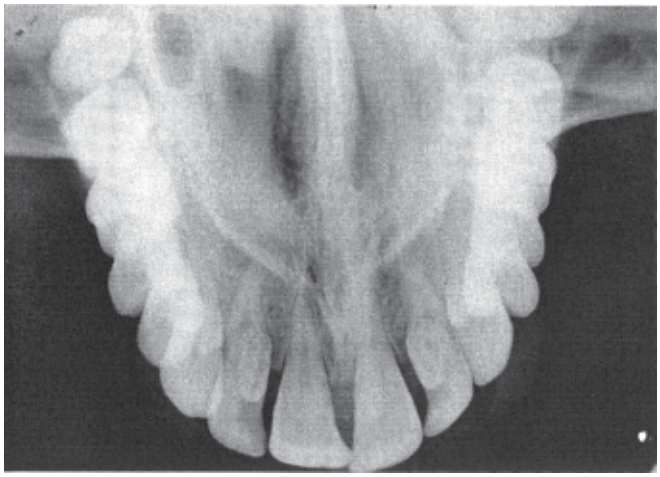

Fig 3: An anterior cross sectional occlusal radiograph illustrating the presence of talon cusps on maxillary central incisors and canines bilaterally and dens invaginati on lateral incisors bilaterally

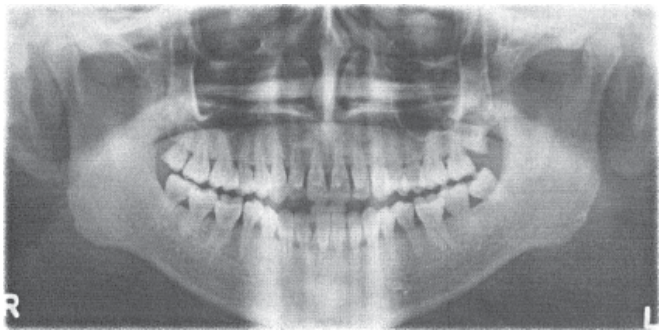

Fig 4: An OPGs illustrating the presence of short root anomaly of maxillary and mandibular anteriors, dilacerations of maxillary and mandibular posteriors, reduced alveolar bone levels and an impacted maxillary left third molar

since no developmental syndrome was identified the occurrence of the anomalies was considered incidental.

DISCUSSION

Talon cusp is an anomalous structure composed of normal enamel or dentin containing varying extension of pulp tissue. Mellor and Ripa[2] named the accessory cusp as talon cusp because of its resemblance in shape to an eagle's talon. Shulze referred to talon cusp as an accessory cusp which may connect with incisal edge to **p**roduce a T form or if more cervical, a Y shaped crown contour.[1] Clinically, talon cusps may cause problems due to caries developing in the groove where the cusp blends with the sloping lingual surface. Talon cusps may interfere with occlusion, or be unaesthetic.[4] The prevalence of talon cusp is low with estimates ranging from less than 1% to approximately 8% of population. A review of literature suggests that 75% of talon cusps are in the permanent dentition, showing a higher frequency in males than females. Anomaly shows a greater predilection for maxilla. With regard to tooth affinity, only central incisors are involved in primary dentition and maxillary lateral incisor is most often affected in permanent dentition (67%) followed by central incisor (24%) and canine (9%). The anomaly is commonly unilateral but 1/5th of cases are bilateral in occurrence.[2] In the present case also there was a bilateral involvement.

The exact etiology of condition is still unresolved, but is believed to be a combination of genetic and environmental factors. Sicher and Bhaskar suggested that disturbances during morpho-differentiation might affect the shape and size of tooth without impairing the function of ameloblasts or odontoblasts, whereas Hattab et al suggested that the anomaly might occur as a result of outfolding of enamel organ or hyper productivity of dental lamina. He classified these anomalous cusps in to three types i.e. (i) Talon (ii) Semi talon (iii) Trace talon based on degree of cusp formation and extension. Talon is a morphologically well delineated additional cusp that prominently projects from palatal surface of a primary or permanent anterior tooth and extends at least half the distance from cemento-enamel junction to incisal edge. Semi talon is an additional cusp of lmm or more but extending less than half the distance from cemento-enamel junction to incisal edge. Trace talon is enlarged or prominent cingula in any of its variants originating from cervical third of root.

Dens in dente results from an infolding of the outer surface into the interior of a tooth. This can occur in either the crown or the root during tooth development. A dens invaginatus may occur in a deciduous, permanent or supernumerary tooth. The prevalence is estimated to range from 0.25% to 6.9%. Males are affected more than females with a ratio of 3: 1. Maxillary permanent lateral incisors are the most frequently affected teeth, followed in decreasing frequency by the permanent central incisors, premolars, canines and molars. It is rarely seen in mandibular teeth. Bilateral occurrence of this condition is frequently observed and it has been reported in association with taurodontism, microdontia, gemination and dentinogenesis imperfecta. In this patient also dens invaginatus was present bilaterally on maxillary lateral incisors associated with microdontia and dilaceration. Loss of vitality of teeth with dens invaginatus is a well recognized

dental complication.[4] Early recognition and timely preventive measures of the dens invaginatus can avoid the unwanted complication. As the vitality of maxillary right lateral incisor had already been lost in this patient, preventative sealants were applied to the remaining vital incisors.

The term, microdontia is used when teeth are smaller than normal. According to Shafer, three types of microdontia are recognised (i) true generalized microdontia, (ii) relative generalized and (iii) microdontia involving a single tooth. Microdontia involving a single tooth is a rather common condition. It affects most often the maxillary lateral incisor and the third molar.[7] It is of interest to note that other teeth, seldom exhibit microdontia, however in the present case maxillary and mandibular posterior teeth were unusually affected with microdontia.

The short root anomaly has been described by Lind, which affects both maxillary central incisors almost symmetrically. Other teeth are rarely involved but in this case mandibular incisors were also affected along with maxillary incisors. Short roots may also be observed in disorders like dentin dysplasia, scleroderma, Stevens-Johnson syndrome, thalassemia and in some short stature syndrome.[6] The short roots are not due to resorption or to any developmental disturbance of exogenous origin. The aetiology of this dental anomaly is not well understood. Many are isolated cases of unknown origin, but a racial variation exists with the greatest prevalence reported in Mongolian populations.[4] In addition to all these anomalies an anterior open bite and bilateral posterior cross bite was also present in this case.

The concurrent existence of multiple dental anomalies has been reported previously; particularly in patients with chromosomal abnormalities who may present with multisystem abnormalities.[4] multiple dental anomalies have also been reported in patients without generalized abnormality or disease such as is evident in this case. An extensive review of the literature has revealed only a single case with a pattern of abnormalities nearly similar to seen in this patient.

C.M. McNamara[4] et al reported a case in a Caucasian female who presented with unusual combination of dental anomalies, short roots on maxillary central incisors, talon cusps, and dens invaginati and reduced alveolar bone heights with pyramidal root morphology. In this case in addition to all these anomalies, microdontia of all the posteriors, cross bite, open bite and dilacerations of maxillary and mandibular posteriors were also present, whereas JK Dash[2] et al reported a case of talon cusp affecting the mandibular central incisor and the maxillary right lateral incisor in association with other dental abnormalities like inverted impacted migrating mandibular right second premolar, complete agenesis of the maxillary and the mandibular third molars, severe crowding, deep bite, hypoplastic teeth, bilateral reverse cross bite in the premolar region and retrognathic mandible, however in the present case there was an unusual involvement of multiple talon cusps affecting the maxillary central incisors and the canines bilaterally in association with dens invaginatus affecting the maxillary lateral incisors, microdontia, short roots, reduced alveolar bone height, dilacerations of the posterior teeth, anterior open bite and bilateral posterior cross bite. The presence of so many anomalies in a single patient is rare.

CONCLUSION

Dental abnormalities and the presence of talon cusps and dens invaginatus need to be diagnosed early to prevent severe malocclusion and periapical-pathosis. Multidisciplinary consultation is important, as the early diagnosis and management of these basic abnormalities can prevent the unwanted complications.

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