CASE SERIES

Developmental Variations in Maxillary Lateral Incisor – A Case Series

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Abstract

Developmental anomalies of tooth are not uncommon to find in clinical practice these days. Thorough knowledge of these anomalies is a prerequisite for their correct diagnosis, understanding clinical complications and management. Maxillary lateral incisor is one which is frequently associated with such developmental malformations, commonly affected by microdontia, hypodontia, dens invaginatus and dens evaginatus (talon cusp). These anomalies may present with or without esthetic and functional complications, requiring if not definitive at least preventive care. This paper will discuss the case series of developmental malformations of maxillary lateral incisors.


Key words: Maxillary lateral incisor; Developmental anomaly; Peg lateral; Hypodontia; Dens invaginatus; Dens evaginatus; and Talon cusp.

Introduction

Maxillary lateral incisors vary in form more than any other tooth in the mouth except the third molars. If the variation is too great, it is considered a developmental anomaly.¹ Developmental alterations which are most commonly associated with maxillary lateral incisors either unilaterally or bilaterally are microdontia, hypodontia, dens invaginatus and dens evaginatus (talon cusp).²⁻⁷

Microdontia is a condition where the teeth are smaller than the normal size, which may involve all the teeth or be limited to a single tooth or a group of teeth.⁸ However, involvement of single tooth is a rather common condition, especially involving maxillary lateral incisor. Microdontia of maxillary lateral incisor is called as “peg lateral”, that exhibit converging mesial and distal surfaces of crown forming a cone like shape. The root on such a tooth is usually shorter than usual.²⁻⁹

Hypodontia refers to the developmentally missing one or more teeth. It is more frequently found in permanent dentition of Asians and Native Americans. Congenitally missing maxillary lateral incisors are the second most common dental
agenesis, exceeded only by third molars. The absence may be either unilateral or bilateral.\textsuperscript{8,10}

Dens invaginatus is a developmental anomaly resulting in a deepening or invagination of the enamel organ into the dental papilla prior to calcification of the dental tissues.\textsuperscript{11} Permanent maxillary lateral incisors are most commonly involved; however isolated cases have been reported in the mandibular region and in the deciduous dentition.\textsuperscript{12}

Dens evaginatus or evaginated odontoma is a developmental anomaly that occurs more frequently in mandibular premolars. In canines and incisors, dens evaginatus originates in the palatal cingulus, often being bilateral and is known as “talon cusp”. So, the talon cusp is described as an anomalous hyperplasia of the cingulum of maxillary and mandibular incisors resulting in the formation of a supernumerary cusp resembling an eagle’s talon.\textsuperscript{13,14}

Diagnosis and management of these developmental malformations of maxillary lateral incisors becomes important in clinical practice, as they are often associated with esthetic and functional clinical complications. So, this paper aims to discuss about the cases of microdontia, hypodontia, dens invaginatus and dens evaginatus (talon cusp) involving maxillary lateral incisors along with their clinical complications, diagnosis and management.

Case Series

Here we report 4 cases of developmental alterations involving maxillary lateral incisors, each of microdontia, hypodontia, dens invaginatus and dens evaginatus (talon cusp). All these patients reported to the Outpatient Department of Purvanchal Institute of Dental Sciences, Gorakhpur (U.P), India, however their reason to visit was not associated with above mentioned anomalies, and so these were just an accidental findings.

Case 1: A 32 years old male patient was having morphologically anomalous maxillary lateral incisor present unilaterally on right side. The tooth was having narrow mesiodistal width incisally as compared to mesiodistal width cervically, i.e., they were having mesial and distal surfaces of crown converging from cervical to incisal region. Due to this the size of tooth was smaller as compared to its normal counterpart. Diagnosis of microdontia (peg-shaped) was made. Also there was mild spacing present in anterior maxillary arch (Fig. 1).

Case 2: An 18 years old young female patient was having clinically missing maxillary lateral incisors bilaterally since birth. However, there was no spacing present in the maxillary arch. So, it appears like that, due to lack of sufficient maxillary arch perimeter the maxillary lateral incisors were congenitally missing, i.e., congenital hypodontia (Fig. 2).

Case 3: A 20 years old male patient was undergoing for restoration in relation to 16 and 26. Accidentally, it was found that the lingual aspect of right and left maxillary lateral incisors were having deep pit present just incisal to the
cingulum area. Mild stains were present, however there was no caries. This seems to be the presence of dens invaginatus, as this is the usual presentation of the same anomaly (Fig. 3).

**Case 4:** 22 years old female patient visited for orthodontic treatment of crowded maxillary anteriors. Her clinical examination revealed that on the lingual aspect of maxillary central and lateral incisors bilaterally, there was presence of prominent cusp like elevations projecting from the cingulum and merging smoothly with the lingual surfaces. This gave an impression of talon cusp present in relation to all maxillary incisors. There was no occlusal interference in relation to the same (Fig. 4).

Since, in all the cases described there was no clinical complaint associated hence, no further radiographic investigations and treatment was planned.

**Discussion:**

Developmental dental anomalies are an important category of dental morphologic variations. They can result from many factors including both genetic and environment. Although defects in certain genes are the most influential etiological events in the prenatal period, post natal periods have also been blamed for anomalies in tooth dimensions, position, and number. Absence of one or few teeth arises from a disturbance early in the tooth formation process during initiation or proliferation of tooth bud. Abnormalities in tooth size, shape, and structure result from disturbances during the morpho-differentiation stage of development, and ectopic eruption, rotation and impaction of teeth result from developmental disturbances in the eruption pattern of the permanent dentition.\(^1\), \(^10\), \(^15\)

Peg shaped lateral incisors occur in approximately 2% to 5% of the general population, and women show a slightly higher frequency than men. Usually they are found equally on the right and left, uni or bilaterally, however some studies have shown their bilateral occurrence slightly higher than the unilateral occurrence. Peg lateral is usually associated with other dental anomalies like tooth agenesis, maxillary canine first premolar transposition, palatal displacement of one or both maxillary canine teeth, buccally displaced canine, and mandibular lateral incisor-canine transposition.\(^1\), \(^15\)

When peg-shaped laterals erupt in the mouth, esthetically it can be a disappointment to the patient that their teeth are not perfect or too small in comparison to the rest of the anterior teeth. Diagnosis is usually made clinically when peg lateral erupts. Treatment could be the combination of orthodontic treatment first to align the teeth in the arch, direct composite bonding onto peg laterals, indirect composite placement, bonded crowns, porcelain bonded to metal crowns, crown lengthening surgery to get better gingival heights then direct bonding, extractions and implant placement.\(^16\)
Throughout human evolution, reductions in the number of teeth and size of the jaws have occurred, along with a decrease in the surface area needed for mastication. It is believed that evolution with regard to reduction in tooth numbers will continue. The types of teeth reported missing vary in different ethnic groups. In Turkish and American population, the maxillary lateral incisors are most frequently missing. Similarly, Gupta SK et al observed a significant number of missing maxillary lateral incisors (1.69%) in Indian population. The absence may be either unilateral or bilateral. Although the aetiology of single missing teeth is unknown, a familial tendency for this defect is present in many instances. Graber, while reviewing the congenital absence of teeth, reported the accumulating evidence, that it is actually the result of one or more point mutations in a closely linked polygenic system. It is most often transmitted in an autosomal dominant pattern with incomplete penetrance and variable expressivity.8 Associated complications of missing maxillary lateral incisors are compromised aesthetics and occlusal imbalance in the maxillary and mandibular dental arch, leading to psychological distress in some patients. For definitive diagnosis of congenitally missing maxillary laterals, clinical examination followed by diagnostic radiograph is mandatory. In treatment planning a number of factors need to be considered when deciding whether to close the space left by a missing maxillary lateral incisor or to open space in preparation for a prosthetic tooth. The ideal treatment is the most conservative approach that minimizes the need for tooth reduction and is the least invasive method of satisfying the patient's aesthetic and functional requirements. In contemporary dentistry, there are three treatment options for replacing missing lateral incisors: a canine substitution, a tooth supported prosthesis or a single tooth implant.10

It is not uncommon to find dens invaginatus in clinical practice and the reported incidence is in a range of 0.04% and 10%.12 The anomaly usually present as a deep pit on the lingual surface of anterior teeth that may present with or without clinical symptoms, thus can be overlooked easily at times. But, early diagnosis is important because of increased risk of developing caries, pulpal and periodontal inflammation in affected tooth. In most cases a dens invaginatus is detected by chance. Clinically, an unusual crown morphology (dilated, peg-shaped, barrel-shaped) or a deep foramen coecum may be important hints, but affected teeth also may show no clinical signs of the malformation.12 17 Several treatment modalities have been described for dens invaginatus, including nonsurgical endodontic treatment, endodontic surgery, intentional replantation, and finally extraction.12

Talon cusp consists of enamel, dentin with varying extensions of pulp. Three fourths of all reported cases of talon cusp are located in the permanent dentition, predominantly occurring on permanent maxillary lateral incisors. Early diagnosis and management is necessary to avoid complications like caries, periapical lesions, irritation of tongue during speech and mastication and occlusal interference which may lead to accidental cusp fracture, displacement of the affected tooth, temporomandibular joint pain and periodontal problems because of excessive occlusal force.5, 18 It is clinically difficult to establish an accurate diagnosis of talon cusp without radiographic examination. Periodic and gradual reduction of the cusp, with application of a desensitizing agent or, reduction of cusp with or without endodontic therapy, sealant application on the grooves, and aesthetic restorations are options of treatment. Extraction being the last treatment option.14, 19

In the present case series, although patients were not having any aesthetic and functional complaints associated with the anomalies present, however definitive diagnostic and preventive measures were needed to be performed. But, due to lack of cooperation of patients this didn't happen.

References