



Transmigration of permanent maxillary central incisor

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Abstract

The aim of this paper is to report the rarest and first report on the unusual dental variation which is ever documented in the dental literature. An intra-osseous, transmigration of the permanent maxillary central incisor crossing the mid-palatal suture in a normal 13 year old Indian male patient is shown in this article. In addition, emphasis on reporting of such rare dental phenomenon by clinicians, authors and researchers is stressed to draw out proper diagnostic, preventive, therapeutic, prognostic guidelines and also to frame particular classification system for transmigration of permanent teeth including both permanent maxillary incisors and canines.

Keywords: Maxillary central incisor, Surgical exposure, Orthodontic traction, Mixed dentition period, Transmigration.

INTRODUCTION

Permanent maxillary incisors are important teeth in the mouth not only for establishing smile, facial esthetics but also for speech, pronunciation (especially for “S” sound), chewing and for establishing self-esteem in an individual. Therefore, the normal eruption position and morphology of these teeth are important for normal phonetics and esthetics. The eruption failure of maxillary incisor usually encountered itself during the mixed dentition period between the ages of 7 – 9 years. Eruption of the maxillary incisor is considered to be delayed, if the eruption of the adjacent contralateral incisor occurred 6 months earlier, and the lower incisors have erupted >1 year earlier or there is a deviation from the normal sequence of eruption [1].

In the dental literature, the term “transmigration” refers to intrabony migration of an impacted, unerupted tooth crossing the dental midline without the influence of any pathological entity. This occurs only in the permanent dentition most frequently involving the mandibular canines with reported prevalence of 0.34% [2]. From the author’s archive quiet number of unusual transmigrations of permanent mandibular canines including different types have been published representing from Indian ethnicity [3-5]. Transmigration of permanent maxillary incisors by crossing the mid-palatal suture is a rarest dental phenomenon and there is paucity of dental evidence on this unusual variation. Therefore, the intention of this article is to present a rarest, an uncommon developmental dental entity, where the permanent maxillary right central incisor was impacted and half of its crown part was transmigrated by crossing the mid-palatal suture to the contralateral side of the midline.

Cases report

A 13 year old male patient reported to a private dental clinic complaining of spacing and absence of one tooth in the upper front region. Patient was moderately build and well-nourished and did not show any signs and symptoms of syndromic, systemic or metabolic disorders. There was no previous history of trauma. On intraoral examination, mixed dentition was apparent and patient mother explained that all milk teeth exfoliated at proper age followed by eruption of permanent teeth too at the correct age. Further examination revealed missing of permanent left central incisor in the

oral cavity. Spacing observed between right central and left lateral incisor teeth. Suspecting the impaction or agenesis of central incisor a radiograph was advised. Radiographic examination revealed that half of the crown part of maxillary right central incisor was transmigrated by crossing the mid-palatal suture with half of crown part located in the contralateral side of the midline (Figure 1). The root development appeared complete. The central incisor was positioned, approximately 40 degree angulation to the mid-palatal suture with the crown facing lingually and root towards palatal aspect. The roots of left central incisor and right lateral incisor were displaced distally due to the transmigration pressure from the central incisor (Figure 1). No other developmental anomalies were observed. Finally, based on clinical, radiographic findings and from literature search, the case was diagnosed as non-syndromic, congenital, idiopathic transmigration of solitary maxillary central incisor. Complete treatment plan was explained to the patient and referred to an orthodontist for further treatment.

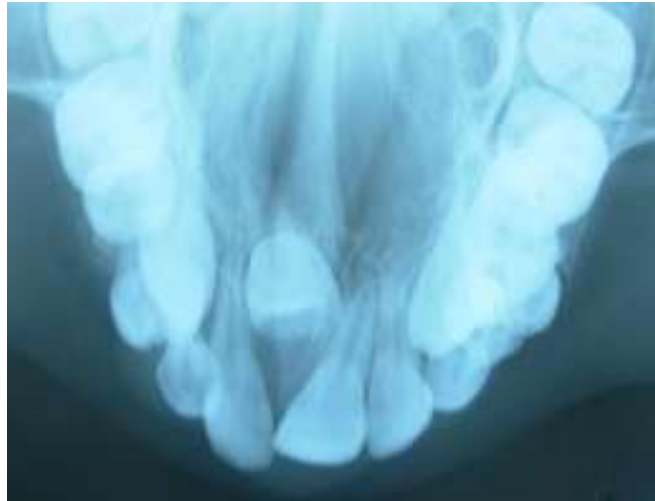


Figure 1: Occlusal radiograph showing transmigrated maxillary permanent right central incisor. Half of the crown part has crossed the mid-palatal suture and migrated to the opposite side. The transmigrated incisor is associated with cystic lesion.

DISCUSSION

In the normal eruption scenario, the tooth usually erupts in to the oral cavity when its $\frac{1}{2}$ to $\frac{3}{4}$ of its final root length is formed. When the tooth fails to erupt, then the condition is termed as an impaction and can be defined as a tooth that cannot or will not erupt into its normal functional position within the oral cavity in time [1,6]. The most frequently encountered impacted teeth are mandibular third molars, followed by the maxillary canines and mandibular second premolars. Impaction of maxillary central incisor is an uncommon, rarely seen pathologic condition compared to third molars or canines. The prevalence in the general population varies from 0.2 to 1% in children, age ranging from 5-12 years [1,6]. This condition more frequently encountered in males compared to females and also reported more on the left side than the right [1,6]. In addition to the impaction, transmigration of central incisor into-osseously to the contralateral side by crossing the dental midline is a wonder in the normal developmental dental scenario. In the present case, transmigration of permanent right central incisor was evident. To the best of author's current knowledge and following the extensive review of literature, maxillary central incisor crossing the mid-palatal suture has never been reported in the literature. Therefore, this case represents the first case of permanent maxillary central incisor transmigration from India to the web of knowledge.

The reported cases of transmigrated permanent incisors are listed in Table 1 [7,8]. Kumar et al reported the first case of transmigration of permanent maxillary right lateral incisor along with transmigration of permanent maxillary right canine in 2012 which were diagnosed on Computed Tomographic scan [7]. In their case, the maxillary right lateral incisor was impacted and inclined horizontally and positioned on the palatal side. Its crown was migrated across the mid-palatine suture with its cusp tip against the middle third of the root of the upper left central incisor. No other associated pathology was found in relation to this transmigrated incisor except for canine which was associated with dentigerous cyst. As both lateral incisor and canine were located in the unfavorable position and found with dentigerous cyst, surgical removal of both teeth were performed under general anesthesia. In previous report documented in 2007, Camilleri reported the first case of permanent lower lateral incisor transmigration in association with lower canine transmigration [8]. Apart from these two reports there are no other documented reports found in the literature, pertaining to transmigration of central incisors except for canines [1,9,10].

In the literature, various definitions have been given by different authors pertaining to transmigration. According to Tarsitano et al, transmigration can be defined as a phenomenon in which an unerupted mandibular canine migrates, crossing the mandibular midline [11]. Later in 1985, this definition was modified by Javid to consider those cases in

which more than half of the tooth had passed through the midline [12]. Again Auluck expanded the old definitions and stated that the tendency of a canine to cross the midline suture is a more important factor than the actual distance of tooth migration after crossing the midline [13]. In addition to the above facts, definition or explanation will also depend on the stage of transmigration when the clinician first diagnoses or observes the condition. Moreover, even the original studies and case series documented in the literature like Mupparapu et al [14] are in agreement with the last fact [2, 7-12]. Therefore, in the light of these above opinions and statements the present case was diagnosed as a “true transmigration” as the half of the crown was crossed the mid-palatine suture and found in the contralateral side of the midline.

In the maxilla, transmigration of teeth might be prevented due to the shorter distance between the roots of maxillary incisors and the floor of the nasal fossa and restriction of the path of tooth movement by the roots of adjacent teeth, the maxillary sinus and the mid-palatal suture which acts as a barrier. In contrast to this, the higher frequency of tooth transmigration in the mandible is due to the larger cross-sectional area of the anterior mandible compared with the anterior part of maxilla [7-14].

Mupparapu et al [14] have given classification system for transmigration of mandibular canines. However, transmigrated maxillary canines are not classified as the incidence of transmigration occurrence in maxilla is scarce and hence there is no classification system proposed by authors till now in the literature. Therefore it is essential that, many numbers of clinicians, researchers and authors must be encouraged to report and publish more and more number of cases of transmigrated maxillary canines or incisors for better understanding of mechanism behind transmigration of tooth in the maxilla, which will help in the meticulous diagnosis, prevention of complications and treatment of this rare uncommon condition.

There is no exact etiologic factor behind the occurrence of transmigration of maxillary canines. However Auluck and Mupparapu have suggested this is due to the local factor like angulation of the migrating tooth in relation to the mid-palatal suture [13,14]. Impacted maxillary teeth require a huge amount of force to exceed the strong physical barrier like mid-palatal suture along their eruptive path. If the maxillary canines are positioned perpendicular to the mid-palatal suture, they might get storing horizontal component of eruptive force to migrate to the opposite side. However, suppose if they are positioned at an axio-coronal angulation of 45 to 90 degree, the eruptive force will have both vertical and horizontal i.e., angular components. The horizontal component of the eruptive force of an impacted maxillary canine might not be sufficient to overcome the resistance of the mid-palatal suture, and therefore these teeth abruptly stop their movement at the midline [13,14].

In addition to the above hypothesis, other local pathologic factors reported as causative factors for transmigration of a tooth are trauma, tumors, odontomas and cysts. These physical obstacles are sufficient to divert a tooth from its normal path of eruption. Even in the present case the transmigrated incisor was associated with large cystic lesion. Hence the pressure produced from the large cyst might have pushed the tooth towards the midline. A case published by Kumar et al also shows that the transmigrated canine was associated with a dentigerous cyst [7]. The author of this paper published a case of ameloblastic fibro-dentinoma in an Indian male patient where the permanent maxillary left central incisor was impacted in a 13-year-old male Indian patient [15]. In this challenging case due to the pressure exerted by the expanding tumor (Ameloblastic fibro-dentinoma) the left maxillary central incisor was impacted almost horizontally and pushed towards the left maxillary sinus. The complete root portion was found within the maxillary sinus space. This tooth along with tumor was surgically resected under general anesthesia. This case presentation signifies that impaction and transmigration of maxillary incisors is of paramount importance in dentistry, posing surgical, interceptive and orthodontic problems. It is essential to diagnose such cases in their initial stages of abnormal eruption pattern, impaction or migration to prevent more complicated sequel in the future life of children [15,16].

There is no definite treatment for the transmigration of maxillary incisors or canines stated in the literature. Because of unfavorable position of transmigrated teeth it is difficult to reposition them back to their original place in the oral cavity using orthodontic treatment [1,17]. Therefore most of the transmigrated teeth have been surgically removed to avoid occurrence of pathological conditions like cysts or tumors. In the present case as the transmigrated incisor was associated with a cyst, both tooth and cystic lesion was surgically enucleated under general anesthesia.

Table 1: List of case reports published on transmigration of permanent incisors

Sl. No.	Author/Year	Maxilla/Mandible	Transmigrated Permanent Incisor	Associated other Dental Anomalies
1.	Kumar et al, 2012 [7]	Maxilla	Right lateral incisor	Transmigration of right canine
2.	Camilleri 2007 [8]	Mandible	Lower lateral incisor	Transmigration of canine, Hyperdontia
3.	Present case (First case in the dental literature)	Maxilla	Right central incisor	None

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