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Prevalence of Bilateral Agenesis of Maxillary Lateral Incisors and Clinical Management Options

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Abstract

Background/Purpose: Agenesis is an anomaly where the tooth germ fails to differentiate completely into dental tissues resulting in congenitally missing teeth. This is one of the commonest dental anomalies. The aim of this study was to determine the prevalence of bilateral agenesis of maxillary lateral incisors. This study also reflects upon the treatment options available when there is agenesis of maxillary lateral incisors. **Materials and Methods:** Bilateral agenesis was considered and included in the study as agenesis and unilateral agenesis was excluded from the study. Orthopantamograms (OPGs) of 945 dental patients aged 6-30 years were examined for the agenesis of teeth. Frequencies were calculated using chi square test and the level of significance was considered if p value was <0.05. **Results:** The prevalence of bilateral agenesis or congenitally missing maxillary lateral incisors was at 8.2%. **Conclusions:** The prevalence rate of bilateral agenesis of maxillary lateral incisors is more common in females than males. An evidence based decision should be taken for the clinical management of this kind of agenesis.

Keywords: Maxillary lateral incisors, Orthopantamograms, Bilateral agenesis.

Introduction

Agenesis or congenitally missing tooth occurs when the tooth germs fail to differentiate appropriately into dental tissues [1,2]. Agenesis has shown a high prevalence amongst the population at around 25% [3,4]. Agenesis when seen in less than six teeth (excluding third molars) is defined as Hypodontia [4]. Anodontia refers to condition when there is complete agenesis of teeth and Oligodontia is defined as the condition when there is agenesis of six or more teeth and the term [5,6].

Agenesis is commonly seen in third molars and after the third molars agenesis is seen more commonly with mandibular second premolars and then the maxillary lateral incisors [7,8]. There can be arch length discrepancies, malocclusion and unaesthetic appearance as a result of agenesis [9,10].

Several etiological factors have been suggested for the development failure of the permanent tooth germ, thus leading to its absence, such as: physical obstruction, dental lamina rupture, limitation of space or functional anomalies [11]. In spite of recent progress, the etiopathogenesis of hypodontia remains largely unknown. There is evidence that congenital tooth absence can be the result of environmental or hereditary causes, or even of their interaction.

Factors like genetics and dietary factors have been suggested as responsible for the etiology of agenesis of teeth [11,12]. When the primary and permanent dentitions have been compared it is seen that the permanent dentition has increased prevalence of agenesis when compared with primary dentition [13]. Orthodontic treatments can be affected when there is agenesis of maxillary lateral incisors.

When the agenesis or congenitally missing teeth is in the functional, esthetic or more anterior region it can have an imminent psychological and functional ill effect on the patient [12]. It has been emphasized that early diagnosis of hypodontia can result in minimal functional, psychological and esthetic complications which may have to be dealt with later in life of the patient [12,14]. Orthodontic space re-distribution, fixed partial denture and implants are considered as standard treatment options for these patients which can help the patient lead a normal functional life [14-16].

The current study was designed to understand the prevalence of bilateral agenesis of maxillary lateral incisors. The authors also have tried to suggest possible clinical management options of congenitally missing maxillary lateral incisors.

Materials and Methodology

This was a retrospective, observational study conducted after approval from the Research and Ethics Committee at RAK College of Dental Sciences (RAKCODS), RAK Medical and Health Sciences University (RAKMHSU), RAK, UAE. The objective of this study was to understand the prevalence of bilateral agenesis of maxillary lateral incisors. The study also intended to evaluate the gender and arch predilection for the bilateral agenesis of maxillary lateral incisors. The

age group of the patients of whom the OPGs were selected was between 6 years to 30 years of age. OPGs which showed bilateral agenesis of maxillary lateral incisors were included. Since a clinical examination of these patients was not possible only those OPGs which showed bilateral absence were considered to be true agenesis and were included in the present study.

945 Orthopantamograms (OPGs) were first included out of the total 18500 OPGs available. The electronic health files of patients were evaluated to exclude patients with syndromes. Within these 945 OPGs bilateral agenesis was sought for. The sampling followed in this study was convenience sampling as the team selected the OPGs which fit into the selection criteria.

Statistical Analysis

Data observed in this study was described using descriptive statistical analysis. To evaluate the frequency of agenesis between the sexes (males/females), chi-square statistical test was applied, the level of significance was set at $P<0.05$.

Results

Bilateral agenesis was found in 85 OPGs out of the 945 OPGs. 8.2% showed bilateral agenesis or congenitally missing maxillary lateral incisors (The remaining of these 85 OPGs showed bilateral agenesis of mandibular second premolars and third molars) (**Figure 1**).

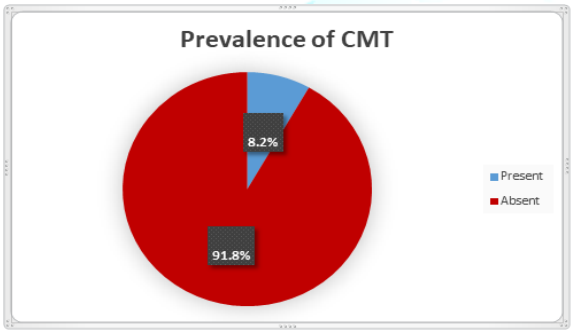

Figure 1: Prevalence percentage of bilateral agenesis of maxillary lateral incisors.

The prevalence of bilateral agenesis or congenitally missing teeth was seen more in females (57.14%) than in males (42.85%) **(Table 1)**, the results were however not statistically significant ($X^2=0.98$, $P=0.26$).

Teeth	Total	Male	Female	X^2 (Chi Square)	Sig p Value
Maxillary lateral incisors	100%	42.85%	57.14%	0.98	0.26

Table 1: Prevalence of bilateral agenesis of maxillary lateral incisors between males and females.

Discussion

Studies have suggested agenesis to have a prevalence rate of 25% amongst the general population making it one of the commonest dental anomalies in humans [9]. This anomaly is associated with other conditions like crowding and delayed eruption [10]. The permanent dentition is more affected with agenesis when compared to the primary dentition [11]. In the present study the prevalence rate of bilateral agenesis of maxillary lateral incisors has been evaluated.

In this retrospective study a total of 945 OPGs were initially included of which 85 OPGs showed evidence of bilateral agenesis or congenitally absent teeth including third molars. Out of these 85 OPGs 8.2% reflected agenesis of maxillary lateral incisors.

Gender predilection

The prevalence for bilateral agenesis of maxillary lateral incisors was seen more in females (57.14%) than males (42.85%) (Table 1). There are studies which have shown results similar to the present study where there is an increased rate of prevalence of agenesis in females when compared to males [13,17]. It has been shown in studies that the prevalence of hypodontia is usually higher in females [10]. Other studies have showed higher incidence rates in males when compared to females [12,18,19]. However when the literature is explored there is no much evidence or reasoning as to why the prevalence is higher or lower in either gender though genetics and hereditary factors have been attributed as a strong reasoning factor [20].

Clinical Management of Agenesis Related to Maxillary Lateral Incisors

The management of bilateral agenesis or congenitally missing lateral incisors can be divided into the following scenarios

- When there is space between the maxillary central incisors and canines
- When there is no space between the maxillary central incisors and canines

When there is space between the maxillary central incisors and canines

Whenever the case presents with adequate space (Appropriate mesiodistal width) between the maxillary central and canine depicting the actual space available for a lateral incisor, then the best treatment will be a single tooth implant restoration. However factors like orthodontic redistribution of space may need to be considered dependent upon the case. Earlier on options like resin bonded bridge or a fixed partial denture was also used successfully. However these treatment options had their own drawbacks like the possibility of endodontic treatment needed for the abutment teeth later on or the possibility of pulpal injury if no intentional endodontic treatment was done before the bridge placement. However now single tooth implant restoration looks to be the choice of treatment [20,21].

When there is no space between the maxillary central incisors and canines

Whenever the case presents with no adequate space between the maxillary central incisor and canine, the canine is more or less in the space of the lateral incisor. In these scenarios the main concern is regarding the appearance of the canines. The options available include reshaping the canines to the shape of laterals. If the reshaping is not esthetic enough then the option of laminates or veneers can be explored upon. However the thickness of canines reduction need to be considered for a replacement with veneers or laminates as the tooth will require more reduction considering the bulk of the canine. In these cases the possibility of intentional endodontic treatment of the canines is a definite possibility to look into before the placement of laminates or veneers [20,21].

The authors of the present study believe that there should be increased number of samples included to give formidable results with regards to the prevalence of bilateral agenesis of maxillary lateral incisors and also to understand the gender predilection clearly regarding the prevalence rates. Studies should also be done on a larger scale to understand the genetics behind agenesis. However the management options of agenesis of maxillary lateral incisors can get challenging at times and any treatment planned should be well thought as the patient will have to live with it for a lifetime. It has to be understood that there are no straightforward methods in the management of agenesis of the

maxillary lateral incisors but the dentist has to be more flexible, accommodative and actually innovative in understanding the situation comprehensively and deal accordingly.

Conclusions

In the present study we found that

- The prevalence rate of bilateral agenesis or congenitally missing maxillary lateral incisors is at 8.2%.
- Clinical management options of congenitally missing maxillary lateral incisors need to be based on evidence based dental practice.

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