

## Prevalence of Bilateral Agenesis of Mandibular Second Premolars and Maxillary Lateral Incisors- A Retrospective Study

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**Received:** August 12, 2020; **Published:** August 27, 2020

### Abstract

**Background/Purpose:** Agenesis is an anomaly where the tooth germ fails to differentiate completely into dental tissues resulting in congenitally missing teeth. It is found to be the most common dental anomaly affecting at least 25% of the population. The aim of this study was to determine the prevalence of bilateral agenesis of mandibular second premolars and maxillary lateral incisors in patients visiting a dental college in United Arab Emirates.

**Materials and Methods:** Orthopantomograms (OPGs) of 945 dental patients aged 6 years - 30 years were examined for the agenesis of teeth. Bilateral agenesis was considered as agenesis and unilateral agenesis was excluded from the study. Descriptive statistics were used to describe the percentages and 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 mandibular second premolars was at 10.5% and maxillary lateral incisors was at 8.2%.

**Conclusion:** The most common bilateral agenesis or congenitally missing teeth were mandibular second premolars followed by maxillary lateral incisors. The bilateral agenesis of mandibular second premolars was more common in males when compared to females. The agenesis of maxillary lateral incisors was more common in females when compared to males.

**Keywords:** OPG; Bilateral Agenesis; Mandibular Second Premolars; Maxillary Lateral Incisors

### Introduction

Agenesis of teeth or congenitally missing teeth are defined as teeth whose dental germs do not develop sufficiently enough to ensure differentiation into dental tissues [1,2]. Agenesis of teeth is considered to be one of the most common dental anomalies reported in dentistry [3,4]. Literature has used different terms to define agenesis. Hypodontia is referred to as the agenesis or congenital absence of less than six teeth (excluding third molars) [4]. Oligodontia is a term used to define the condition when there is agenesis or congenital absence of six or more teeth and anodontia which is used to define a rare condition when there is complete agenesis or all teeth are missing congenitally [5,6].

Agenesis when present in the anterior or the premolar region, it can result in arch length discrepancies and also malocclusion which is unaesthetic and easily visible [7,8]. Agenesis is commonly seen in the mandibular second premolars followed by the maxillary lateral

incisors as suggested in different studies [9,10]. Several factors like human evolution, dietary factors, masticatory apparatus changes and genetics have been associated with agenesis of teeth [11,12].

Racial comparisons of agenesis have suggested that the white race and Asians show an increased prevalence when compared to the black race and non-Asians [13]. Agenesis is usually seen in the permanent dentition when compared to the primary dentition. Prevalence of congenitally missing teeth or agenesis are more commonly reported in the female population when compared to the males [13].

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]. 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 [12].

Agenesis of premolars usually are seen to affect orthodontic treatments to a large extent. The diagnosis of agenesis of premolars is impeded by calcification of these teeth which is delayed. The inability to determine agenesis at an early stage can result in a space loss or also collapse of the dental arch [12]. Maxillary lateral incisors is the second most common congenitally missing tooth after the mandibular second premolars (excluding the third molars) [15]. The agenesis of maxillary lateral incisors at times is also associated with developmental anomalies and syndromes such as congenital absence or agenesis of permanent teeth and peg laterals or microdontia of lateral incisors [15].

The current study was designed to understand the prevalence of bilateral agenesis or bilateral congenitally missing mandibular second premolars and maxillary lateral incisors in the population visiting the university.

### Materials and Methodology

This was a retrospective, observational study conducted after approval from the Research and Ethics Committee. This study evaluated the prevalence of bilateral agenesis of the mandibular second premolars and the maxillary lateral incisors. The study also assessed the gender predilection for the bilateral agenesis of these teeth. The age group of the patients of whom the OPGs were selected was between 6 years to 30 years of age. 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 this study.

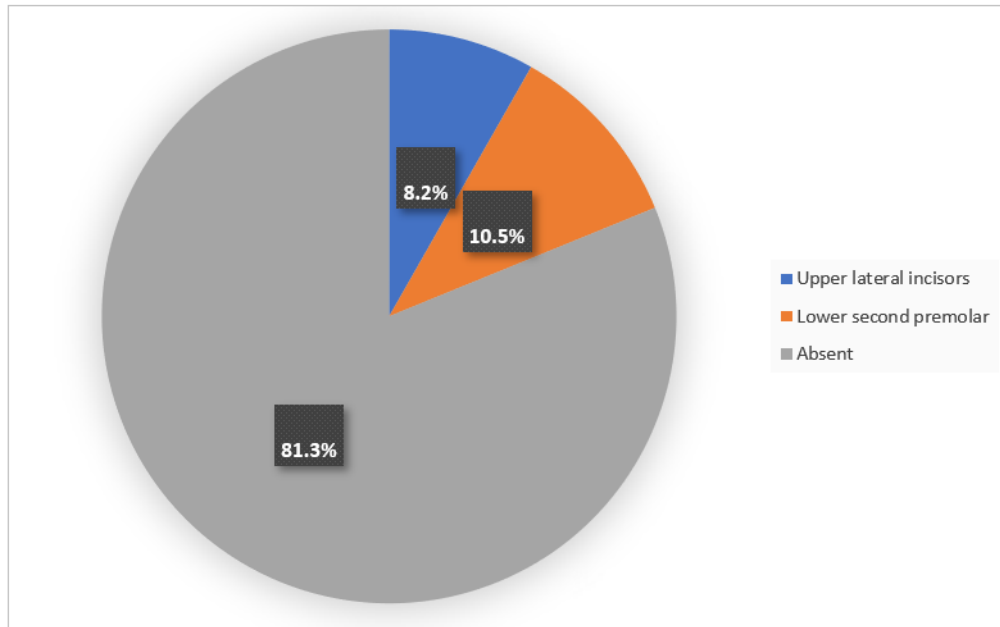
Initially 945 Orthopantomograms (OPGs) were included out of the total 18500 OPGs available. These OPGs were selected based upon the age group and clear details like clarity of OPG, date of OPG taken, gender of patient. The E-file records were checked to ensure that these patients did not go for extractions of these teeth and also it was confirmed on these E-files if the patient had any syndrome or special condition, such patients OPGs were excluded from the study. After selecting these 945 OPGs the second level of selection was done based upon the number of OPGs which showed bilateral agenesis or congenital absence of the mandibular second premolars and maxillary lateral incisors. Bilateral agenesis was considered as an inclusion criteria to ensure that we had true agenesis cases being included as a clinical examination of the patients was not in the scope of the present study.

### Statistical analysis

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

**Results**

85 OPGs out of the 945 OPGs revealed bilateral agnesis of teeth, out of the 85 OPGs which revealed bilateral agnesis, 10.5% showed bilateral agnesis or congenitally missing mandibular second premolars and 8.2% showed bilateral agnesis or congenitally missing maxillary lateral incisors (Figure 1).



**Figure 1:** Prevalence percentage of bilateral agnesis of mandibular second premolar and maxillary lateral incisors.

The mandibular second premolar agnesis gender wise comprised of 55.55% males and 44.44% females. The prevalence of bilateral agnesis or congenitally missing teeth was seen more in males (55.55%) than females (44.44%) (Table 1), the results were however not statistically significant ( $X^2 = 0.84, P = 0.30$ ).

Teeth	Total	Male	Female	X <sup>2</sup> (Chi Square)	Sig p Value
Mandibular Second Premolars	100%	55.55%	44.44%	0.84	0.30
Maxillary Lateral Incisors	100%	42.85%	57.14%	0.92	0.28

**Table 1:** Prevalence of bilateral agnesis or congenitally missing teeth between males and females.

The maxillary lateral incisor agnesis gender wise comprised of 42.85% males and 57.14% females. The prevalence of bilateral agnesis or congenitally missing teeth was seen more in females (57.14%) than males (42.85%) (Table 1), the results were however not statistically significant ( $X^2 = 0.92, P = 0.28$ ).

## Discussion

It has been suggested that the prevalence of tooth agenesis amongst the human population is at approximately 25% which makes agenesis of teeth one of the commonest dental anomalies [9]. Agenesis of teeth or congenitally missing teeth are at times associated with abnormalities like delayed eruption, crowding and juxtaposition [10]. Agenesis affects both the primary and permanent dentition, however the permanent dentition seem to be more prone to agenesis [11].

In this study the authors have tried evaluating the prevalence of bilateral agenesis or congenitally missing mandibular second premolars and maxillary lateral incisors among all non-syndromic patients who had visited RAKCODS clinics. The authors of this study have diagnosed a tooth to be as agenesis or congenitally missing if no signs of mineralization of the crown of the particular tooth is seen on the OPG and when there is no evidence of extraction on both the OPG and also on the patients E-file on HIMS (Hospital Information Management System).

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 10.5% reflected agenesis of mandibular second premolars and 8.2% showed bilateral congenitally missing maxillary lateral incisors. For both these teeth the males showed a higher predilection of agenesis than the females. However, these results were not statistically significant.

### Gender predilection

The prevalence for bilateral agenesis or congenitally missing mandibular second premolar teeth was seen more in males (55.55%) than females (44.44%) (Table 1). The prevalence of bilateral agenesis of maxillary lateral incisor was more in females (57.14%) than males (42.85%) (Table 1). There are studies which have commonly shown an increased rate of prevalence of agenesis in females when compared to males [13,17]. Other studies have shown higher incidence rates in males when compared to females, these studies were reported from Iran, Australia and Finland [12,18,19]. It has been shown in studies that the prevalence of hypodontia is usually higher in females [10]. 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].

The agenesis of either of these teeth, the mandibular second premolars or maxillary lateral incisors poses significant diagnostic and clinical management challenges to the clinicians. These teeth being located in the anterior region makes it of even more significance. The space created by the agenesis of these teeth should be ideally treated by either space redistribution, implants, orthodontic space closure. The management of edentulous spaces involving these teeth must be done appropriately by the orthodontist. If it is decided to leave the space open as such for provision of restoration later on in life, it should be ensured that there is enough space for restoration, this space if needed can be created by the use of orthodontic treatment and also it should be ensured that there is adequate alveolar ridge health [14]. If it is decided upon by the orthodontist to close the space then the orthodontist should ensure that the management will not interfere with normal occlusion or should not create an unfavorable adjustment which can harm the facial profile. It is to be understood whatever decisions are made should be in the best interest of the patient as the patient has to survive this for lifetime. Therefore, appropriate decision making by the orthodontist as early as possible is recommended [14].

It has been reported that in cases of congenitally missing second premolars the management principles include as suggested by Kennedy, a) Establish the correct amount of space b) Preserve the occlusal table c) Preserve the alveolar ridge set up treatment in such a way that the incisors will be in the correct positions at the end of treatment. Again, the emphasis is placed upon an early diagnosis and appropriate clinical management of these edentulous spaces as a result of agenesis of either the mandibular second premolars or maxillary lateral incisors [16].

In the present study we found there is a higher prevalence rate of bilateral agenesis of mandibular second premolars followed by the maxillary lateral incisors. The authors of the present study believe that there should be increased number of samples included to give formidable results and also to understand the gender predilection clearly. Studies should also be done on a larger scale to understand the genetics behind agenesis. However, the management options become more important which need to be dealt with appropriately once the edentulous spaces are present as a result of agenesis of these teeth.

### Conclusion

In the present study we found that

1. The prevalence rate of bilateral agenesis or congenitally missing mandibular second premolars is more than the maxillary lateral incisors.
2. The prevalence rate of bilateral agenesis or congenitally missing mandibular second premolars was found to be higher in males when compared to females.
3. The prevalence rate of bilateral agenesis or congenitally missing maxillary lateral incisors was found to be higher in females when compared to males.

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**Volume 19 Issue 9 September 2020**

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