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

Vivek Padmanabhan1*, Omar Khaled AR Abo Mostafa1 and Lama M Kamel Rahhal1

Affiliation
1RAK College of Dental Sciences, RAK Medical and Health Sciences University, United Arab Emirates

*Corresponding author: Vivek Padmanabhan, Assistant Professor, Pediatric and Preventive Dentistry Department, RAK College of Dental Sciences, RAK Medical and Health Sciences University, United Arab Emirates. E-mail: vivek.padmanabhan@rakmhsu.ac.ae

Citation: Padmanabhan V, Omar Khaled AM and Rahhal LMK. Prevalence of bilateral agenesis of maxillary lateral incisors and clinical management options (2020) Dental Res Manag 4: 31-33.

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 redistribution, 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 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 predislection 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). 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

Citation: Padmanabhan V, Omar Khaled AM and Rahhal LMK. Prevalence of bilateral agenesis of maxillary lateral incisors and clinical management options (2020) Dental Res Manag 4: 31-33.
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.

**References**

1. Moyers RE and Riolo ML. Handbook of orthodontics, Moyers RE (Ed) (1988) Year Book Medical Publishers, USA, pg-348-53.
2. Silva MR. Radiographic assessment of congenitally missing teeth in orthodontic patients (2003) Int J Paediatr Dent 13: 112-116. [https://doi.org/10.1046/j.1365-263x.2003.00436.x](https://doi.org/10.1046/j.1365-263x.2003.00436.x)
3. Rakshavan V. Meta-analysis and systemic review of factors biasing the observed prevalence of congenitally missing teeth in permanent dentition excluding third molars (2013) Prog Orthod14: 33. [https://doi.org/10.1186/2196-1042-14-33](https://doi.org/10.1186/2196-1042-14-33)
4. Bural C, Oztas E, Ozturk S and Bayraktar G. Multidisciplinary treatment of nonsyndromic oligodontia (2012) Eur J Dent 6: 218-216. [https://doi.org/10.1016/j.ejod.2012.05.025](https://doi.org/10.1016/j.ejod.2012.05.025)
5. Class LQ, Weissbluth MF, Nakamura E and Hermann FP. Esthetic and functional rehabilitation for oligodontia in the mixed dentition: case report (2012) J Dent Child 79: 193-196.
6. Parkin N, Elcock C, Smith RN, Griffin RC and Brook AH. The aetiology of hypodontia: the prevalence, severity and location of hypodontia within families (2009) Arch Oral Biol 54: 52-56. [https://doi.org/10.1016/j.archoralbio.2008.11.002](https://doi.org/10.1016/j.archoralbio.2008.11.002)
7. Lo Muzio L, Mignoana MD, Bucci P and Sorrentino F. Statistical survey on the incidence of agenesis in a sample of 1529 subjects (1989) Minerva Stomatol 28: 1045-1051.
8. Lagana G, Venza N, Borzabadi-Farahani A, Fabi F, Danesi C, et al. Dental anomalies: prevalence and associations between them in a large sample of non-orthodontic subjects, a cross-sectional study (2017) BMC Oral Health 17: 62. [https://doi.org/10.1186/s12903-017-0532-y](https://doi.org/10.1186/s12903-017-0532-y)
9. Kokich VO Jr and Kinzer GA. Managing congenitally missing lateral incisors Part II: Tooth-supported restorations (2005) J Esthet Restor Dent 17: 76-84. [https://doi.org/10.1111/j.1708-8240.2005.tb00089.x](https://doi.org/10.1111/j.1708-8240.2005.tb00089.x)
10. Abu-Hussein M, Watted N, Azzaldeen A, Yehia M and Awadi O. Prevalence of Missing Lateral Incisor Agenesis in an Orthodontic Arabs Population in Israel (Arab48) (2015) Int J Pub Heal Res 3: 101-107.
11. Larmour C, Mossey PA, Thind BS, Forgih AH and Stirrup DR. Hypodontia-A retrospective review of prevalence and etiology, Part I (2005) Quintessenze Int 36: 263-270.
12. Vahid-Dastjerdi E, Borzabadi-Farahani A, Mahdian M and Amini N. Non-syndromic hypodontia in an Iranian orthodontic population (2010) J of Oral Sci 52: 455-461. [https://doi.org/10.2334/josmvd.52.455](https://doi.org/10.2334/josmvd.52.455)
13. Polder BJ, Van’t Hof MA, Van der Linden FP and Kuijpers-Jagtman AM. A meta-analysis of the prevalence of dental agenesis of permanent teeth (2004) Comm Dent Oral Epidemiol 32: 217-226. [https://doi.org/10.1111/j.1600-0528.2004.00158.x](https://doi.org/10.1111/j.1600-0528.2004.00158.x)
14. Kokich VG and Kokich VO. Congenitally missing mandibular second premolars: Clinical options (2006) Am J Orthod Dentofacial Orthop 130: 437-444. [https://doi.org/10.1016/j.ajodo.2006.05.025](https://doi.org/10.1016/j.ajodo.2006.05.025)
15. Kokich VO Jr and Kinzer GA. Managing congenitally missing lateral incisors Part II: Tooth-supported restorations (2005) J Esthet Restor Dent 17: 76-84. [https://doi.org/10.1111/j.1708-8240.2005.tb00089.x](https://doi.org/10.1111/j.1708-8240.2005.tb00089.x)
16. Kennedy D. Missing second premolars: can early treatment make a difference? (2010) Spring Vancouver Canada: PCSO Bulletin pg 29-33.
17. Spear F, Mathews D and Kokich V. Interdisciplinary management of single-tooth implants (1997) Semin Orthod 3: 45-72.
18. Gracco ALT, Zanatta S, Valvecchi FF, Bignotti D, Perri A, et al. Prevalence of dental agenesis in a sample of Italian orthodontic patients: an epidemiological study progress in Orthodontics (2017) Prog Orthod 18; 33. [https://dx.doi.org/10.1186%2Fs40510-017-0186-9](https://dx.doi.org/10.1186%2Fs40510-017-0186-9)
19. Ali S, Al Hur AA, Alyessaya AA and Ali G. Prevalence of congenital missing permanent teeth in a sample of Iraqi patients attending dental clinics of Krbala University: A Retrospective Study (2019) Biochem Cell Arch 19: 3265-3272.
20. Millar BJ and Taylor NG. Lateral thinking: the management of missing upper lateral incisors (1995) Brit Dent J 179: 99-106.
21. Miller TE. Implications of congenitally missing teeth: orthodontic and restorative procedures in the adult patient (1995) J Pros Dent 73: 115-122. [https://doi.org/10.1016/0022-3913(05)80148-9](https://doi.org/10.1016/0022-3913(05)80148-9)