Original Article

Prevalence of Congenitally Missing Mandibular Incisors in A Sample of Kurdish Patients Seeking Orthodontic Treatment

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Abstract

Objectives: This study's objective was to evaluate the prevalence of congenitally missing mandibular incisors (central and lateral incisors) in Kurdish patients seeking orthodontic treatment.

Methods: The data were captured from 4056 patients (2596 females and 1460 males) seeking orthodontic treatment and included orthopantomograms, intraoral photographs, study models, while anamnestic data were retrieved and examined to evaluate the prevalence of congenitally missing lower incisors. A Chi-square test was used to determine significant differences.

Results: The prevalence of missing lower incisors was 1.28%, with no statistically significant difference between males and females. A total of 73 permanent lower incisors were missing, with an average of 1.42 teeth per patient. Missing unilateral (59%) was more frequent than missing bilateral (41%). Within the unilateral cases, the left side tooth was more frequently missing than the right side, and the central incisor was the most frequently missing tooth. In addition, missing unilateral was more frequent in females, and missing bilateral was more frequent in males. In most subjects (76%), where mandibular incisors were missing, there were no other missing teeth.

Conclusions: The prevalence of hypodontia can vary in different ethnic groups. In the Kurdish population, the prevalence was comparable with other ethnic groups, and the most frequently missing lower incisor was the left central incisor, followed by the right central incisor. Furthermore, missing unilateral was more frequent than missing bilateral.

Keywords: *Prevalence, Congenitally missing, Mandibular incisors, Orthodontic patients.*

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Introduction

The congenital absence of one or more teeth, either primary or permanent, is referred to as hypodontia [1]. Researchers have used various terminology to describe this condition, such as reducing teeth number, teeth aplasia, congenitally missing teeth, absence of teeth, agenesis of teeth, and lack of teeth[2]. Polder et al.[3] preferred the term dental agenesis. Anomalies of teeth numbers are the most frequently observed developmental dental condition in the permanent dentition[4]. Agenesis of other permanent teeth, excluding third molars, ranges from 1.6 to 9.6%, depending on the population studied[5]. Most studies reported a higher prevalence of dental agenesis in females than males[6], and the ratio was reported to be 3:2[7]. Agenesis is considered a complex problem by dentists worldwide[2]. It might be associated with other clinical features of a syndrome, or it may occur as non-syndromic. The non-syndromic type could be either familial or sporadic. Significant phenotypic variability exists in the familial type, which can present as autosomal-dominant, autosomal-recessive, or X-linked traits[1]. It is reported that the prevalence of agenesis is highly influenced by ethnic background[8]. On the other hand, other factors such as infection, trauma, metabolic disorders, radiation, environmental, genetic, and idiopathic factors are possible etiological factors of congenital agenesis[9]. However, evolution in general and heredity, in particular, are considered to be the major etiological factors[10].

Apart from third molars, the next most frequently missing teeth, ranked from highest to lowest, are mandibular second premolar teeth (2.8%), maxillary lateral incisors (1.6%), maxillary second premolars, and mandibular incisors (0.23%–0.08%)[11].

Missing mandibular incisors is common in certain populations, such as the Japanese, Korean, and Chinese[12]. Agenesis of mandibular incisors can compromise dental and facial esthetics [13] and create diagnostic and treatment problems[14].

This condition can result in severe psychological stress and esthetic and masticatory problems for the patient and affect mandibular symphysis growth and morphology[13]. Therefore, this study aimed to evaluate the prevalence of missing mandibular incisors (central and lateral incisors) in the Kurdish population.

Patients and methods

Ethical approval for this study was obtained from the scientific committee of the College of Dentistry-University of Sulaimani (Ethical approval number: 432). The sample of this retrospective cross-sectional study was selected from the data captured from patients who visited a private orthodontic center, Suli orthodontic center in Sulaimani city, Kurdistan region-Iraq, for orthodontic consultation from 2008 to 2020. The orthodontic files, which included orthopantomograms, intraoral photographs, study models, and anamnestic data, were used to diagnose congenitally missing mandibular incisors (Figure 1 and 2).

Congenitally missing tooth was recorded when any tooth from the mandibular incisor region was absent on the panoramic radiograph, excluding a history of loss due to trauma, caries, and periodontal disease. Patients with developmental anomalies such as ectodermal dysplasia or Down's syndrome and those with incomplete dental records were also excluded from the study. The diagnosis of congenitally missing teeth from orthopantomograms has been used to verify the absence of examined teeth[6,15].

The researcher analyzed the orthopantomograms of each patient. Ten percent of orthopantomograms of patients with and without congenitally missing mandibular incisors were re-examined by another investigator one month after the initial survey, and there were no statistical differences between the findings[6].

Statistical Analysis

The prevalence of missing mandibular incisors was determined, and the Chi-square test was used to find the significant difference between males and females and the right side and left side. $P \leq 0.05$ was regarded as statistically significant. Data analysis was conducted using the statistical software package IBM SPSS (Statistical Package for the Social Sciences version 21.0, Chicago IL, USA).

Results

Orthodontic files of 4056 patients were examined. Among these 4056 patients, 2596 were females (64%), and 1460 were males (36%).

A total of 51 patients were found to have missing mandibular incisors. Thus, the prevalence of missing mandibular incisors was 1.28%. The 51 patients comprised 25 (49%) males and 26 (51%) females, with no statistically significant difference in prevalence between the sexes (P value= 0.0513) (Table 1).

A total of 73 permanent mandibular incisors were missing, with an average of 1.42 teeth per patient. The

Figure1 a: Orthopantomogram of a patient with bilateral missing mandibular incisor.

Figure 1 b: Orthopantomogram of a patient with unilateral missing mandibular incisor.

Figure 2 a: Intraoral photograph of a patient with bilateral missing mandibular incisor.

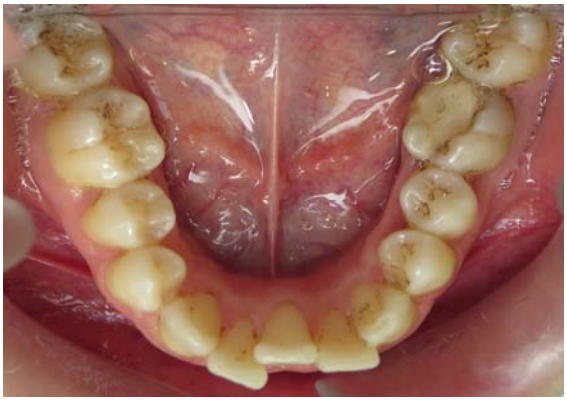

Figure 2 b: Intraoral photograph of a patient with unilateral missing mandibular incisor.

an average of 1.3 teeth per patient. The difference between males and females regarding the number of missing teeth per patient was not statistically significant (P value= 0.079486) (Table 2). The result showed that the most frequently missing mandibular incisor was the left central (51%), followed by right central (38%), and the least frequently missing incisor was the right lateral (4%) (Table 2).

In general, unilateral was more frequently missing than bilateral. At the same time, the left side tooth was more frequently missing than the right side, and central incisors were more frequently missing than lateral incisors. However, the differences were not statistically significant (Table 2 and 3).

In the case of unilaterally missing incisors, this was more frequent on the right side than on the left side, but the difference was not statistically significant (Table 3). In addition, unilateral missing was more frequent in females, and bilateral missing was more frequent in males, again without statistically significant difference (Table 3).

In most of the examined subjects (76%), missing mandibular incisors were observed without other missing teeth, and only 24% were associated with other missing teeth (Table 4).

Table 1: Distribution of missing mandibular incisors according to gender.

Study sample	Female n (%)	Male n (%)	Total n (%)	p-value
Total sample	2596 (64)	1460 (36)	4056	0.0513*
Patient with missing lower incisors	26 (0.641)	25 (0.616)	51 (1.27)	

Table 2: Prevalence of missing mandibular incisors according to gender.

	Right lateral n (%)	Right central n (%)	Left central n (%)	Left lateral n (%)	Total n (%)	p-value
Male	2 (2.7)	16 (21.9)	20 (27.4)	1 (1.4)	39 (53.4)	0.5421*
Female	1 (1.4)	12 (16.4)	17 (23.3)	4 (5.5)	34 (46.6)	
Total	3 (4.1)	28 (38.3)	37 (50.7)	5 (6.9)	73 (100)	

* Chi square test

Table 3: Prevalence of missing mandibular incisor with respect to jaw side.

	Unilateral n (%)	Bilateral n (%)	Right n (%)	Left n (%)
Male	**12 (24)**	**13 (25)**	**8 (27)**	**4 (13)**
Female	**18 (35)**	**8 (16)**	**13 (43)**	**5 (17)**
P-value	**0.2088***		**0.2964***	
Total	**30 (59)**	**21 (41)**	**21 (70)**	**9 (30)**

* Chi square test

Table 4: Prevalence of missing mandibular incisor in association with other missing teeth.

	Alone n (%)	Associated with other missing teeth n (%)	Total n (%)
Male	**19 (37)**	**6 (12)**	**25 (49)**
Female	**20 (39)**	**6 (12)**	**26 (51)**
Total	**39 (76)**	**12 (24)**	**51 (100)**

Discussion

This study's sample comprised patients from Sulaimani and the surrounding cities who attended the selected orthodontic center seeking orthodontic consultation or treatment. Therefore, the sample was deemed to be representative of Kurdish orthodontic patients. Over a twelve-year interval, 4,056 patients (64% females, 36% males) who had received orthodontic consultation were investigated in this study. The number of patients diagnosed with missing mandibular incisors and included in the study was 51 patients (49% males and 51% females).

Due to the scarcity of studies on missing mandibular incisors alone, we could not compare our results with those observed in other studies. However, this study can provide a baseline for this condition, and future studies can compare their data. Nonetheless, the studied sample was mainly composed of females (64%) within the broad range reported in previous studies[15-17].

The prevalence of missing mandibular incisors was calculated as 1.28% in the present study. This percentage is less than reported by Davis[12], Endo et al.[6], Amini et al.[19], and Al-Ajwadi[20], and the differences could be due to the type and size of the sample, methodology, or ethnic variation.

Our results highlighted that the frequency of missing mandibular incisors was greater in females than males, but the difference was not significant. This finding is in line with the studies of Karimi et al.[21] and Hedayati and Dashlibrun[17], while Al-Ajwadi found that missing mandibular incisors were more frequent in males than in females[20].

Although a higher percentage of female patients than males had missing mandibular incisors, males were found to have more missing teeth per person (1.56 in males and 1.3 in females).

In this study, unilateral missing was more frequent than bilateral, which is similar to the finding of Al-Abdallah[16] and Al-Ajwadi[20]. Kazanci et al. found that missing mandibular central incisors were more frequent bilaterally than unilaterally[22]. Moreover, several studies revealed the predominance of bilateral congenitally missing teeth to the extent that they outnumbered unilateral missing by two or even three times[23]. This can be explained by the variation in the ethnic background between studies. When unilateral missing lower incisors were investigated, our study revealed a higher prevalence on the right side than the left side, although the difference was not statistically significant (p=0.2964). Kazanci et al. also found that missing mandibular central incisors were more frequent on the right side than on the left side[22]. This is in contrast with the result of the study carried out by Al-Abdallah, which showed that the left side was more significantly affected than the right side[15].

On the other hand, this study revealed that missing incisors were more frequent on the left side than on the right side. This finding is consistent with the findings of Al-Abdallah[16] and in contrast to the studies of Trakinienė et al.[17] and Dermaut et al.[24], which found that missing incisor was most common on the right side, and this could be associated with differences between the examined ethnic groups.

Consistent with several studies' findings[3,16, 21,24-28], this study found that the central incisors were more frequently missing than lateral incisors. However, Niswander and Sujaku[29] and Gupta and Rauniyar[30] found that lateral incisors were more frequently missing than central incisors. Regarding missing lower incisors, the left central was found to be the most frequently missing mandibular incisor 51% (n =37), and this is in agreement with the findings of Trakinienė et al.[17], Al-Abdallah et al.[25], and Muller et al.[28].

Finally, it is essential to acknowledge that missing mandibular incisor affects both the dentofacial system's esthetics and function and should, therefore, be treated using a multidisciplinary team approach. This study's findings provide important information for orthodontists regarding the pattern and gender distribution of missing mandibular incisors among orthodontic patients. Further studies are necessary to relate missing mandibular incisors to other dental anomalies and malocclusions and provide the necessary information to establish comprehensive interdisciplinary treatment planning and management for patients.

Conclusions

1. The prevalence of missing lower incisors was 1.28%. The most frequently missing lower incisor was the left central incisor, followed by the right central incisor, with no significant difference based on gender.
2. Missing unilateral was more frequent than missing bilateral.

3. Missing bilateral was more frequent in males than in females.

4. There was more prevalence of missing teeth on the right side than on the left side (70%).

5. In most cases (76%), the missing lower incisor was present alone without other missing teeth.

6. Finally, multidisciplinary treatment planning should be adopted to reduce missing lower incisors' complications and improve patient management.

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