

PREVALENCE OF HYPODONTIA AND OLIGODONTIA IN A SAMPLE OF ORTHODONTIC AND PEDIATRIC DENTISTRY PATIENTS AT PRINCE HASHEM BIN AL-HUSSEIN MILITARY HOSPITAL

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ABSTRACT

Objective: To determine the prevalence and degree of severity of hypodontia and oligodontia in a sample of orthodontic and pediatric dentistry patients at Prince Hashem Ben Al-Hussein Military Hospital.

Methods: A total of 1524 patients (847 females and 677 males) were studied with regard to the prevalence of congenitally missing teeth. Diagnostic records and panoramic radiographs were examined for any missing permanent teeth excluding third molars.

Results: Hypodontia occurred in 67 subjects (4.4%). The missing teeth were observed in 28 males and 39 females. There were no statistically significant differences between both sexes. The most frequently missing teeth were maxillary lateral incisors (61.2%), mandibular second premolars (28.4%), mandibular central incisors (26.9%) and upper second premolars (10.4%) respectively. Of the patients with hypodontia, 52 subjects (77.6%) lacked one or two teeth. Fifteen subjects (22.4%) lacked three or more teeth. Fifty four subjects (80.6%) had hypodontia involving anterior teeth, while 22 subjects (32.8%) lacked posterior teeth and 11 subjects (16.4%) had two or more teeth missing in the same quadrant. Oligodontia was found in four patients (0.3%).

Conclusion: The result of this study revealed that the prevalence of hypodontia was 4.4% and of oligodontia was 0.3%. The findings implicate the need for a thorough clinical and radiographic assessment of all patients prior to extraction of either deciduous or permanent teeth, and reiterate for early diagnosis and orthodontic treatment if needed.

Key words: Congenitally missing teeth, Hypodontia, Oligodontia.

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Introduction

Hypodontia or dental agenesis is a common dental developmental anomaly that involves alterations in the number of teeth.⁽¹⁾ It usually results from disturbances during the initial stages of tooth formation. There are several terms used to describe this dental anomaly. The term anodontia is used to

describe the extreme form where there is total absence of teeth. When six or more teeth, excluding the third molars, are congenitally missing, the term used is oligodontia.⁽²⁾ Hypodontia is a condition in which only one to five teeth are developmentally absent.

Hypodontia has been reported in many racial

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groups and the usual examination findings include: Missing teeth, delayed eruption of permanent teeth, reduced alveolar development, an increased freeway space, and infraoccluded or retained deciduous teeth beyond the anticipated age.⁽³⁾ Also findings include variations in size and shape as microdontia and conical or tapered teeth. Hypodontia is more common in the permanent dentition. However, when a primary tooth is congenitally missing, its permanent successor is often missing too, though not necessarily.⁽⁴⁾ It is also possible for the primary teeth to be present and for some permanent teeth to be absent.

Generally if only one or few teeth are missing the absent tooth will be the most distal tooth of any given type. If a molar is missing it is almost always the third molar. If an incisor is missing it is nearly always the lateral. If a premolar is missing it is almost always the second rather than the first.⁽⁵⁾

The exact etiology of isolated hypodontia in most cases is obscure. Hereditary factors are often involved in the congenital absence of teeth. Teeth can also be missing as a result of disturbances such as trauma, infection, and chemical irritation during initial development.⁽⁶⁾ An increased frequency has been reported in association with multiple births, low birth weight, and increased maternal age. Hypodontia is also often seen in syndromes, particularly in those, which present with other ectodermal anomalies,⁽⁷⁾ and in non-syndromic patients with cleft lip/alveolus with or without cleft palate. Treatment aspects for hypodontia cases need combined orthodontic and restorative opinions. Space closure is the preferred option if esthetic will be good.⁽⁸⁾ Space maintaining and redistribution of space to accept prosthesis is also an option,⁽⁹⁾ and this include removable partial dentures; conventional fixed bridges, resin-bonded bridges, autotransplantation, and tooth implant.⁽¹⁰⁾

This study was carried out to determine the prevalence and degree of severity of hypodontia, as well as oligodontia, in a sample of patients attending pediatric dentistry and orthodontic clinics at Prince Hashem Bin Al-Hussein Military Hospital (Zarka).

Methods

A total of 1547 subjects who attended the Paediatric and orthodontic clinics at Prince Hashem Bin Al-Hussein Military Hospital over five months period were included in this investigation. The subjects were screened with regard to the prevalence of congenitally missing teeth except the third molars.

For each patient the following clinical details were recorded: Age, sex, medical, dental and family histories, in addition to the teeth present. Subjects were examined clinically using a mirror and an explorer and radiographically using the orthopantomograms, which were carefully analysed.

Patients with congenital diseases and/or reported syndromes such as ectodermal dysplasia were excluded, since this study was designed to assess the prevalence of hypodontia and oligodontia in healthy subjects. Patients with any previous history of dental extraction or tooth loss due to trauma were also excluded from this study. The hospital patients' records were used to make sure that teeth were actually missing and not extracted or lost due to trauma. The prevalence of hypodontia was calculated using the Excel sheet (Microsoft Excel XP®). Statistical analysis with the Chi-square was carried out to compare the prevalence of hypodontia in both sexes. The level of statistical significance was established at $p < 0.05$. The most frequently missing teeth and severity of hypodontia were assessed. The prevalence of oligodontia was measured as well.

Results

Among the 1547 patients examined, 23 patients were excluded from the study; ectodermal dysplasia (1), diabetes mellitus (1), hypothyroidism (2), epilepsy (1), extraction (5), avulsed tooth (1), missing teeth due to trauma (12). The study comprised 1524 subjects aged eight to twenty years, including 847 girls (55.6%) and 677 boys (44.4%).

Hypodontia occurred in 67 subjects with a prevalence of 4.4%. The missing teeth were observed in 28 males (4.1%), and 39 females (4.6%). However, there were no statistically significant differences between both sexes as detected from the Chi square test ($p > 0.05$), which is shown in Table I.

Table I. Prevalence of hypodontia according to sex

Sex	Hypodontia	Normal	Total
Male	28	649	677
Female	39	808	847
Total	67	1457	1524
Male	29.8	647.2	
Female	37.2	809.8	
Chi squared		df=1	P=0.66

df: degrees of freedom

p: significance value

Table II. The most frequently missing teeth

Tooth type	No of subjects with missing teeth	Percentage of subjects with missing teeth
Upper laterals incisors	41	61.2
Lower second premolars	19	28.4
Lower central incisors	18	26.9
Upper second premolars	7	10.4
Lower lateral incisors	6	9
Upper first premolars	2	3
Lower first premolars	2	3
Upper second molars	1	1.5
Lower second molars	1	1.5
Upper canines	1	1.5
Lower canines	1	1.5

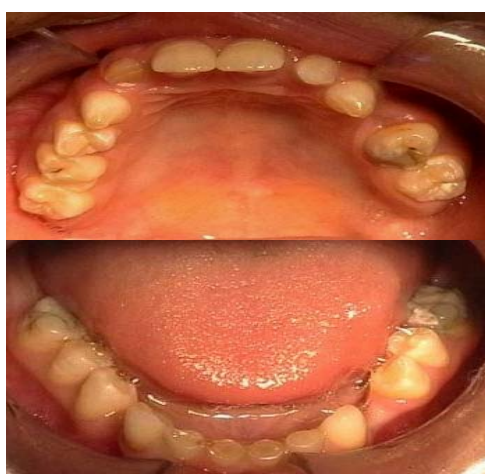


Fig. 1. A case of oligodontia with sixteen missing teeth

Maxillary lateral incisors were the most frequently missing teeth found missing in 41 subjects and accounted for 61.2% of the total missing teeth. The upper and lower canines, first premolars, second molars seemed to be the most stable teeth, lacking in only one patient. The results are shown in Table II.

Fifty-two subjects (77.6%) lacked one or two teeth. Fifteen subjects (22.4%) lacked three or more teeth. Fifty four subjects (80.6%) had hypodontia involving anterior teeth, while 22 subjects (32.8%) lacked posterior teeth and 11 subjects (16.4%) had two or more teeth missing in the same quadrant.

Oligodontia was found in four patients, with a prevalence of 0.3%. This condition was found in two males and two females, and two of them were of the same family. The highest recorded number of missing teeth in only one individual was sixteen, and

as shown in Fig. 1, the missing teeth were: The lower central and lateral incisors, canines and second molars. The upper left lateral incisor, canine, second premolar and second molar in addition to upper right canine, first and second premolars, and second molars. In another case of oligodontia, thirteen teeth were missing including the upper lateral incisors, first and second premolars; and lower central incisors, left lateral, first and second premolars. In the remaining two cases, nine and six teeth were missing.

Discussion

The population prevalence for hypodontia and the type of permanent teeth missing vary with the racial group and sample studied. Excluding the third molar,

Table III. Comparing our study with some other studies

Author	Year	Subjects	Prevalence of hypodontia	Most frequently missing teeth	Female: Male
Our study	2003	1524	4.4%	Upper lateral incisors 61.2%	No difference
Nordgarden ⁽¹⁴⁾	2002	9532	4.5%	Lower second premolars 47%	5.1%: 4%
Backman ⁽¹¹⁾	2001	739	7.4%	Lower second premolars	No difference
Salama ⁽¹⁵⁾	1994	1300	2.6%	Lower second premolars 45%	Not recorded
Dechkunak-orn ⁽¹²⁾	1990	1160	8.6%	Upper lateral incisors 22.4%	No difference

population prevalence across the world varies between 3.5 and 6.5%, with a female to male ratio of 3:2.⁽³⁾ For Europeans, the mandibular second premolar is the tooth most frequently absent after the third molar, followed by the maxillary lateral incisor and second premolar.

The prevalence of hypodontia in this study was 4.4%, which was within the range reported in the literature. However, no statistical differences between both sexes were found, but this was in agreement with some other studies.^(11,12) It might also be expected that the majority of hypodontia cases would be identified in the mixed dentition stage, since the recognition of the younger patient with hypodontia usually discovered either by chance or family history.

The most frequently missing teeth, in our study were maxillary lateral incisors. Some studies have also reported the upper laterals to be the most frequently missing teeth.^(12,13) However, the most commonly missing teeth in other studies were the lower second premolars.^(11,14,15) Comparison between our study and some other studies is shown in Table III.

The lower prevalence of missing lower second premolars in our study suggests either poor recognition of the problem and referral by dental practitioners or low levels of demand on the part of the patients. Most of the subjects involved in this study were orthodontic patients with a greater tendency to dental anomalies related to the upper anterior rather than lower posterior teeth. Implications of delayed mineralization and slow development of second premolars should also be considered.⁽²¹⁾

Analyses of this sample demonstrated a large number of patients with hypodontia involving the anterior teeth. Treatment is increasingly being sought as social awareness of dental disease increases. This was of great concern to children and their parents and for that reason they actually attended our clinics. It was also found that 16.4% had hypodontia of two or more teeth in the same quadrant, which needed

careful planning with particular references to the orthodontic consideration.

As for the prevalence of oligodontia, few studies have been performed since this is a rare condition, but it has been reported to range between 0.0%-0.5%.⁽¹⁶⁾ It usually occurs in children with no apparent systemic problem or congenital syndrome and there is usually a random pattern to missing teeth. The prevalence of oligodontia surveyed in this study (0.3%) was also within the range reported in the literature.

The number of missing teeth, in other studies, very rarely exceeded eight. However, Tsai *et al* (1998) described a case of 6-year-old girl with congenital absence of 16 permanent teeth.⁽¹⁷⁾

Finding this anomaly in two members of the same family implicates that genetic factors play an important role in oligodontia. However, exclusive aplasia of permanent canines is extremely rare. There are only a few cases of this condition reported in the literature.⁽¹⁸⁾

Conclusion

The prevalence of hypodontia and oligodontia surveyed in this study were within the wide range reported in the literature. The findings of this study implicate the need for a thorough radiographic evaluation of all patients prior to extraction of either deciduous or permanent teeth, and also reiterate the need for early diagnosis and orthodontic treatment if needed.

Recommendation

A further randomized study should be conducted to assess the prevalence of hypodontia in both sexes with different age groups at a national scale. Another study can also be conducted to assess the prevalence of ectodermal dysplasia and oligodontia in addition to hypodontia. Furthermore, a research to find any association in the oligodontia cases with other anomalies and small size of the existing teeth can be carried out as well.

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