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Angle's classification and hypodontia, is there an association?

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ABSTRACT

Aims: To find the association between different Angle's classes of malocclusion and to estimate the distribution of hypodontia according to gender, number of missing teeth and the site of the missing teeth. In addition, the heredity role in hypodontia was investigated. **Materials and Methods:** About 3415 subjects, 1750 females and 1665 males aging between 18–30 years were examined clinically in addition periapical radiographs were taken for each patient to exclude a possibility of impaction. A family history of hypodontia for each patient was taken (for father, mother, brothers and sisters). Then the sample was divided into 3 groups depending on Angle's classification of malocclusion. **Results:** No clear association was found between Angle's classes and hypodontia, females showed higher prevalence of hypodontia than males. Family history was obvious in patients with hypodontia. The upper lateral incisor was the most frequent absent tooth. **Conclusions:** No association was found between Angle's classification and hypodontia. The upper lateral incisor was the most frequent missing tooth. Maxilla was affected by hypodontia more than mandible. Females were affected more than males with very obvious effect of family history on hypodontia.

Key Words: Hypodontia, Angle's classification, malocclusion.

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INTRODUCTION

Hypodontia is a congenital absence of one or few teeth, while oligodontia defined as agenesis of numerous teeth commonly associated with specific syndromes or severe systemic abnormalities, like a genetic disorder as Witkop syndrome (the tooth–and–nail syndrome) which is a rare autosomal dominant ectodermal dysplasia that manifested by defects of the nail plates of the fingers, toes, hypodontia with normal hair, and sweat gland function.[1]

Hypodontia in the permanent dentition is relatively common varies from 1.4% to 14.2%.[2, 3] It has been claimed that agenesis of permanent teeth has increased over years.[4] However, hypodontia is uncommon in primary dentition ranges between 0.1–0.9%.[5]

Epidemiological studies demonstrated that a high probability of the corresponding permanent successors would be congenitally missing when the primary teeth are missing.[6] Some studies showed that the lower second premolar was the most frequently absent tooth followed by the upper lateral incisor, which occurred almost equally as agenesis of the upper second premolars.[5–7] While others revealed that the lateral incisor was the most frequently absent tooth followed by the second premolar.[8]

Hereditary or familial history has been suggested as the primary cause of hypodontia.[9–13] Recently, a specific gene was mapped that has been associated with permanent tooth agenesis (He–Zhao deficiency).[14]

In addition, evolution and environment has been considered as a contributing factor of hypodontia.[15–17] As examples for the environmental factors associated with hypodontia are birth trauma, radiation, tumor, rubella, virus and scarlet fever.[18, 19]

The aims of this study were carried out to estimate the distribution of hypodontia according to gender, number of teeth and position of missing teeth, to find the effect of different Angle's classes of malocclusion on hypodontia, and to demonstrate the effect of heredity on it.

MATERIALS AND METHODS

The sample of this study was consisted of 42 subjects (13 males and 29 females) whom were selected from the examination of 3415 subjects, (1750 females and 1665 males), their ages varied between 18 to 30 years with an average of 24 years and 4 months. These subjects admitted to the College of Dentistry in Mosul University and to the private clinics of the authors. The sample fulfilled the following criteria:

1. Congenital missing of one or more teeth excluding wisdom tooth.
2. No history of trauma.
3. No congenital facial deformity.
4. No history of orthodontic treatment, orthopedic or orthognathic surgery.
5. No history of permanent teeth extraction.
6. Iraqi subjects living in Mosul City.

The sample was examined on a dental chair using plane mouth mirror and probe, starting from the upper right second molar to the upper left second molar and then to the lower left second molar ending at the lower right second molar. Periapical radiographs were taken for each patient to exclude the possibility of impaction. A family history of hypodontia for each patient was taken (for father, mother, brothers and sisters).

The samples then divided into 3 groups depending on Angle's classification[20]:

1. Class I Molar Relation: The lower first molar is mesial to the upper first molar of ½ cusp width = 2800.
2. Class II Molar Relation: The lower first molar is distally positioned relative to the upper first molar = 479.
3. Class III Molar Relation: Lower molar is mesially positioned relative to the upper molar more than ½ cusp width = 136.

Statistical analyses were done including percentages and chi–square test to acept or reject the statistical hypothesis.

RESULTS

Distribution of hypodontia according to Angle's classification is shown in Table (1). Class I showed a higher prevalence followed by Class II and then by Class III. The number of missing teeth/case was higher in females at ratio (1.76) than males (1.54) (Table 2).

Table (1): Distribution of hypodontia according to Classes in the affected sample.

Gender	Number of examined sample	Number of affected sample	Affected sample	Class I	Class II	Class III
Males	1665	13	**No.**	10	2	1
			%	76.92	15.38	7.69
Females	1750	29	**No.**	19	7	3
			%	65.51	24.13	10.34
Total	3415	42	**No.**	29	9	4
			%	69.04	21.42	9.52

No: number of samplrs

Table (2): Distribution of hypodontia according to the number of missing teeth in both sexes

Gender	Number of examined sample	Number of affected sample	Number of missing teeth	Ratio of missing teeth/cases
Males	1665	13	20	1.54
Females	1750	29	51	1.76
Total	3415	42	71	1.69

The left laterals (upper and lower) were the most frequently missing teeth followed by the right ones (Table 3).

Table (3): Percentages of hypodontia according to site of different teeth

Site	Gender	Lateral Incisor		Canine		First Premolar		Second Premolar		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%
Right	Males	27	40%	4	5%	4	5%	4	5%	39	55%
	Females	23	33%	5	7.8%	1	1.9%	3	3.9%	32	47.1%
Left	Males	21	30%	4	5%	0	0%	7	10%	32	45%
	Females	28	39%	4	5.8%	3	3.9%	2	3%	38	52.9%

The distribution of hypodontia according to its presence unilaterally and/or bilaterally is shown in (Table 4), also this Table demonstrated that bilateral hypodontia is more frequent than unilateral for all teeth except for lower first premolars.

Table (4): Distribution of hypodontia according to its presence unilaterally and/or bilaterally

Tooth	Males		Females		Total	
	U	B	U	B	U	B
Upper Lateral Incisors	4	4	9	11	13	15
Lower Lateral Incisors	0	1	2	2	2	3
Upper Canines	1	1	1	3	2	4
Lower First Premolars	1	0	1	1	2	1
Lower Second Premolars	1	1	0	2	1	3

U: Unilateral; B: Bilateral

Family history effect on hypodontia is shown in Table (5). About 59.52% of the total sample (58.62% females and 61.54% males) had family history of hypodontia.

Table (5): Prevalence of hypodontia in relation to family history (in parents, brothers or sisters)

Gender	No. of examined sample	No. of affected sample	Yes		No	
			No.	%	No.	%
Males	1665	13	8	61.54%	5	38.46%
Females	1750	29	17	58.62%	12	41.38%
Total	3415	42	25	59.52%	17	40.48%

The results also showed that hypodontia was more prevalent in maxilla (73.24%) than mandible (26.76%), and the right side revealed slightly higher prevalence (50.70%) than the left side (49.3%) (Table 6).

Table (6): Distribution of hypodontia in affected total sample.

Maxilla versus Mandible	Number	%
Maxilla	52	73.24%
Mandible	19	26.76%
Right versus Left	**number**	**%**
Right	36	50.70%
Left	35	49.30%

Table (7) showed that the missing of 2 teeth is higher (52.38%) than one tooth (42.85%) and lastly 3 or more teeth (4.76%).

Table (7): The percentage of congenitally missing teeth.

One Tooth	Two Teeth	Three or More
42.85%	52.38%	4.76%

Table (8) showed that the most frequently missed tooth is the upper lateral followed by the upper canine and then the lower lateral.

Table (8): Comparison of frequency of hypodontia according to tooth number.

Jaw	Lateral Incisors		Canines		First Premolars		Second Premolars	
	Number	%	Number	%	Number	%	Number	%
Maxilla	37	51.59%	15	21.67%	0	0%	0	0%
Mandible	8	11.26%	0	0%	4	5.63%	7	9.85%

DISCUSSION

Class I showed a higher prevalence of hypodontia followed by Class II and then Class III malocclusions (Table 1). Chi square test showed no significant differences between Angle's classes, although a larger number of hypodontia cases were seen in Class I (since this Class had the higher number of the sample so the differre-nce was not significant).

Distribution of hypodontia according to the number of missing teeth/case revealed a higher value in females than males (Table 2). This disagreed with the findings of Al–Jourane,[21] who found a higher ratio in males which suggest that a genetic background is involved.

Occurrence of hypodontia according to site revealed that left and right laterals are most frequent teeth to be missed, followed by canine, second and first premolars (Table 3).

Bilateral missing of teeth was more frequent than unilateral missing (Table 4). This disagreed with the findings of Al–Jourane.[21]. However, hypodontia is a polygenetic inheritance influenced by environmental factors which may contribute to this result [15–17].

The effect of family history was very obvious in patients affected with hypodontia in males, females and total sample (Table 5), which supported the suggestion that heredity is the primary cause of hypodontia.[15]

The distribution of hypodontia was higher in maxilla than mandible (Table 6), which disagreed with the findings of Al–Jourane,[21] who found no difference between maxilla and mandible.

The right side showed a slightly higher prevalence of hypodontia than the left side (Table 6). This disagreed with the findings of Al–Jourane.[21]

The missing of two teeth was the most frequent in the cases of hypodontia, followed by one tooth missing and then three or more teeth (Table 7). This disagreed with the findings of Al–Judö [22], who found that one missing tooth is most frequent in hypodontia.

The upper lateral incisor was the most frequently congenitally missing tooth (Table 8), and this agreed with Augard and Gayard,[23] but disagreed with Al–Mulla *et al*.,[24] who found that the lower second premolar to be the most frequently missed tooth.

Hypodontia was more prevalence in females than males, although no significant difference was seen between the two sexes (Table 1). This came in agreement with the findings of Mattheeuws *et al*.,[4] who found a higher prevalence of hypodontia in females than males.

CONCLUSION

No association was found between Angle's classification and hypodontia. The upper lateral incisor was the most fre-

quent missing tooth. Maxilla was affected by hypodontia more than mandible. Females were affected more than males with very obvious effect of family history on hypodontia.

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