

# HYPODONTIA IN ORTHODONTIC PATIENTS IN SOUTHERN JORDAN

<sup>1</sup>FUAD HAMED AL-MOHERAT, BDS, MSC

<sup>1</sup>HASSAN MAL-EBRAHIM BDS, MSC

<sup>2</sup>IBRAHIM S ALSHURMAN, BDS

<sup>2</sup>NABIL A SHUDEFAT, BDS

<sup>1</sup>YASIN MAL-TAWAREH, PhD Biostatistics

## ABSTRACT

*The aim of this study was to investigate the prevalence of hypodontia among patients who were treated in three main hospitals namely Prince Ali Hospital, Zaid Hospital and Princess Haya Hospital located in southern Jordan.*

*A total of 1726 orthodontic patients were included in the study with an age range between 12 and 25 years. Patients with cleft lip and palate, ectodermal dysplasia, or having tooth loss due to caries, trauma, periodontal disease or congenitally missing third molars were excluded from the study. Dental history and panoramic radiographs were used in the diagnosis of congenitally missing teeth.*

*The prevalence of hypodontia was 7.1% excluding third molars; 2.10% were males and 5.01% were females. The total number of missing teeth was 197. The most commonly missing teeth were maxillary lateral incisors, followed by maxillary and mandibular second premolars. The number of missing teeth were greater in the maxilla than in the mandible. Hypodontia was almost equally distributed between both sides of jaws. There was significant difference between the type of malocclusion and the number of missing teeth. The majority of patients had one or two missing teeth.*

**Key words:** Hypodontia, congenitally missing teeth, prevalence, Jordan

## INTRODUCTION

Hypodontia is one of the most common dental developmental anomaly in human being. In literature many terms have been used to describe the reduction in number of teeth: hypodontia, oligodontia, congenitally missing teeth; namely, aplasia of teeth, anodontia, and agenesis of teeth.

The term hypodontia was most frequently used. Some authors prefer to use the term agenesis of teeth as it describes more accurately the developmental disorder involved.<sup>1</sup>

The cause of tooth agenesis may be due to environmental factors such as radiation, chemotherapy<sup>2</sup> or hereditary. Congenitally missing teeth may be transmitted as autosomal dominant, autosomal recessive or X-linked genetic condition.<sup>3-6</sup> Its occurrence may be isolated or non-syndromic hypodontia and hypodontia associated with syndromes.<sup>7</sup> Two mutated genes in human, MSX1 and PAX are known to cause agenesis of permanent teeth.<sup>8,9</sup>

The absence of one or two teeth is relatively common, but severe hypodontia is rare and may be

associated with a syndrome such as ectodermal dysplasia.<sup>10</sup>

Dhanrajani<sup>11</sup> classified hypodontia according to the severity of the condition. The term mild to moderate hypodontia is used to denote agenesis of two to five teeth while absence of six or more teeth excluding third molar, indicate severe hypodontia, oligodontia is the absence of multiple teeth, usually associated with systemic problem.

The prevalence of hypodontia varies according to population studied. Hypodontia in permanent dentition occur in 3.5% to 6.5% in majority of population.<sup>11,12</sup> The multifactorial nature of dental agenesis may explain the variability in reported prevalence.

## METHODOLOGY

A total of 1726 of dental records of patients who attended orthodontic clinics at three main hospital located in the southern of Jordan (Prince Ali hospital, Prince Zaid hospital and Princess Haya hospital) from January 2004 to January 2007 were included in the study. The mean age of patients was 15.9, SD± 2.26, with range of 12-25 years. All patients were Jordani-

<sup>1</sup>Royal Medical Services of Jordan Armed Forces

<sup>2</sup>Jordan Board in Orthodontics, Royal Medical Services of Jordan Armed Forces

**Correspondence:** Fuad Hamed Almoherat, Wadi Elseer PO Box 53, Amman, Jordan, Email: fuadalmoherat@yahoo.com

ans. Cleft lip and palate patients, ectodermal dysplasia, down syndrome, or having history of tooth loss due dental caries, traumas, orthodontic reasons, or periodontal disease were excluded from study. Children of less than 12 years were excluded from the study since no tooth, excluding third molar, was found to mineralize in children after 12 years.<sup>14</sup> Diagnosis of hypodontia was based on panoramic radiographs, dental history and study. Using panoramic radiograph in diagnosis of hypodontia has been verified to be reliable in the previous reports.<sup>14-16</sup>

The difference between two proportions test was used to investigate the difference between the prevalence of hypodontia between males and females.

Mann-whitney U Non-parametric test was used to investigate gender difference in missing of teeth per child.

Chi-square test was used to investigate the relationship between type of malocclusion according to Angle's classification and the number of missing teeth. The data were analyzed using SPSS soft ware version 11, the level of significance was set at 5%.

## RESULTS

A total of 123 of orthodontic patients were found to have hypodontia in the permanent dentition, excluding

third molars. The prevalence of hypodontia was 7.1%. The one hundred twenty three patients with hypodontia compromise 87 (5.01%) female and 36 (2.10%) male, with out statistically significant difference between both sexes. ( $p > 0.05$ ), Table 1.

A total of 197 teeth, excluding third molar, were congenitally missing, with an average 1.6 teeth per patient. Females had 135 congenitally missing teeth with an average of 1.55 per patient,  $SD \pm 0.89$ . The male patients had 62 congenitally missing teeth, with an average 1.72 per patient,  $SD \pm 0.97$ . The difference in the number of missing teeth per patient between both sexes was not significant ( $p > 0.05$ ).

The missing teeth were distributed as follow: eighty seven (44.2%) were maxillary permanent lateral incisors: 45 on the right side and 42 on the left side. Eighty (40.6%) of missing teeth were permanent second premolars: 39 on the right side, 41 on the left side, 55 permanent premolar teeth were missing from mandible and 25 teeth were missing from the maxilla. 25 (12.7%) of congenitally missing teeth were mandibular permanent central incisors, 11 on the right side and 14 on the left side, in addition three maxillary permanent central incisors, one permanent canine, one lower right permanent first premolar were considered as congenitally missing and Table 2.

TABLE 1: DISTRIBUTION OF PATIENTS BY GENDER

Gender	Patients with out Hypodontia n (%)	Patients with Hypodontia n (%)	Total n (%)
Male	36 (2.1%)	589 (34.1%)	625 (36.2%)
Female	87 (5.0%)	1041 (58.8%)	1101 (63.8%)
Total	123 (7.1%)	1603 (92.9%)	1726 (100%)

TABLE 2: DISTRIBUTION OF CONGENITALLY MISSING TEETH BY TYPE AND GENDER.

Tooth type	Male n (%)	Female n (%)	Total n (%)
Maxillary right lateral incisor	12 ( 6.1% )	33 (16.8%)	45 (22.8%)
Maxillary left lateral incisor	16 ( 8.1% )	26 (13.2%)	42 (21.3%)
Maxillary right second premolar	4 ( 2.0% )	6 (3.0%)	10 (5.1%)
Mandibular right second premolar	7 (3.6%)	22 (11.2%)	29 (14.7%)
Maxillary left second premolar	6 (3.0%)	9 (4.6%)	15 (7.6%)
Mandibular left second premolar	8 (4.1%)	18 (9.1%)	26 (13.2%)
Mandibular right central incisor	4 (2.0%)	7 (3.6%)	11 (5.6%)
Mandibular left central incisor	5 (2.5%)	9 (4.6%)	14 (7.1%)
Maxillary right central incisor	0	1 (1.0%)	1 (1.0%)
Maxillary left central incisor	0	2 (1.0%)	2 (1.0%)
Mandibular right first premolar	0	1 (1.0%)	1 (1.0%)
Maxillary right canine	0	1 (1.0%)	1 (1.0%)
Total	62 (31.5%)	135 (68.5%)	197 (100%)

TABLE 3: DISTRIBUTION OF PATIENTS BY GENDER AND NUMBER OF MISSING TEETH

Gender	One tooth n (%)	Two teeth n (%)	Three teeth or more n (%)	Total n (%)
Male	19(15.4%)	12(9.8%)	5(4.1%)	36(29.3%)
Female	53(43.1%)	27(22%)	7(5.7%)	87(70.1%)
Total	72(58.5%)	39(31.7%)	12(9.8%)	123(100%)

TABLE 4: DISTRIBUTION OF PATIENTS BY NUMBER OF MISSING TEETH AND JAW RELATIONSHIP (ACCORDING TO ANGLE)

	One tooth n (%)	Two teeth n (%)	Three teeth or more n	Total n (%)
Class 1	39(31.7%)	24(19.5%)	2(1.6 %)	65(52.8%)
Class 2	26(21.1%)	9(7.3%)	0(0%)	35(28.5%)
Class 3	7(5.7%)	6(4.9%)	10(8.1%)	23(18.7%)
Total	72(58.5%)	39(31.7%)	12(9.8%)	123(100%)

The most of congenitally missing teeth were in the maxilla 116 (58.9%). Almost, equal distribution of congenitally missing teeth between right and left sides. The majority of patients had one or 2 missing teeth. But few who had three or more, Table 3.

There was a significant relationship between the type of malocclusion according to Angle and the number of missing teeth ( $p < 0.05$ ) Table 4.

## DISCUSSION

Congenital absence of one or more teeth is a common anomaly, but severe hypodontia is rare, and might be linked with some syndromes as ectodermal dysplasia.<sup>8</sup> In the present study, the prevalence of hypodontia, excluding third molars, was 7.1 % in orthodontically treated patients. This result is within the range of 2.3 %-8.1% as reported in the previous studies<sup>15, 17-21</sup> of normal population. In comparison to orthodontically treated patients, the result of this study is lower than some reports<sup>22,23</sup>, but is considered higher than the 2.7%, 4.3% reported by Meza and Rosa respectively.<sup>24,25</sup> Variation in results could be related to methodology used by authors.

The present study showed that the congenital absence of teeth was found more frequently in females than males, but the difference was not statistically significant. This finding is in consistent with some researchers.<sup>6, 22-24, 26, 27</sup> While disagree with others, who found a statistically significant difference in the prevalence of hypodontia in both sexes.<sup>16, 20, 28, 29</sup>

Regarding the type of congenitally missing teeth, the mandibular second permanent premolar is the most frequently absent tooth after third molar, followed by the maxillary permanent lateral incisor and upper second premolar in Europeans.<sup>30</sup> Niswider and Sujaka and Davis<sup>31,32</sup> reported that mandibular permanent incisors were the most frequently absent teeth in

Japanese and Chinese population respectively. In the present study, dental agenesis affects maxillary permanent lateral incisors more frequently (44%) followed by permanent second premolars (40.6%). The result of this study is in collaboration with previous reports on orthodontic patients.<sup>22,24</sup> But it is not in agreement with Endo et al<sup>23</sup> who found that mandibular incisors were the most commonly missing teeth in orthodontic patients in a group of patients who is having one or two congenitally missing teeth. Rose<sup>25</sup> found in a survey of 6000 orthodontic patients, mandibular second premolar followed by maxillary lateral incisor being the most frequently absent teeth.

This study showed that congenitally absent teeth was more often in the maxilla (58.9%). This result is in consistent with some previous reports<sup>17, 22, 24, 27, 33</sup>, but differ from the results of other authors who found that hypodontia tend to be common in the mandible<sup>34, 35</sup>. Maklin<sup>19</sup> found no difference in hypodontia between maxillary and mandibular arches. Endo et al<sup>23</sup> found more teeth were absent from maxilla than from mandible in patients with one or two missing teeth, but the opposite is true for patients with four or more congenitally absent teeth.

There was almost similar distribution of congenitally missing permanent teeth between the right (50.3%) and the left side (49.7%) of the arches. This finding is in agreement with previous reports.<sup>14,15,19,20,22-25,29,33,36-38,39,40</sup> Some authors reported of predominant of hypodontia on the left side in some Scandinavian studies.<sup>29,38</sup> The number of congenitally missing teeth per patient in males and females together was 1.6, which was within the previously reported range, 1.5-4.8.<sup>22, 23, 32, 41</sup> The difference in the number of missing teeth per patient is not significant between both sexes

Some studies compared the prevalence rate of congenitally missing teeth in anterior and posterior

region of mouths.<sup>14, 42</sup> In the present study majority of dental agenesis (hypodontia) were seen more in the anterior region than in the posterior region. Endo et al<sup>23</sup> found anterior tooth agenesis were predominant in children with one or two congenital missing teeth. In calculating of the number of congenitally missing teeth in a study by Fekonja<sup>22</sup>, the majority of teeth were missing in anterior part of mouth. Similar result was found in the present study.

Previous studies reported that patients with severe hypodontia showed tendencies to a class 3 skeletal and Angle relationship.<sup>22, 43</sup> The result of the present study showed a significant relationship between the number of congenitally missing teeth and the type of malocclusion according to angle.

## CONCLUSION

Hypodontia was mostly seen in maxillary permanent lateral incisors, followed by maxillary and mandibular permanent second premolars. There was a significant relationship in hypodontia between both sexes but a significant difference between number of congenitally missing teeth and type of malocclusion.

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