

Research Paper: Hypodontia Prevalence in Permanent Dentition in Orthodontics Patients in Kerman (2010-2015)

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ABSTRACT

Introduction: Hypodontia is one of the most prevalent craniofacial anomalies worldwide. Malocclusion could be prevented, by early treatment of this anomaly. The aim of the present study was to investigate the prevalence of congenital missing tooth (hypodontia) in patients, referred to Orthodontic Department of Kerman Dental School, as well as other private Dental Care centers.

Methods: In this descriptive, cross-sectional study, 1883 orthodontic records from 2010-2015 were examined. Demographic characteristics and types of occlusion were obtained from the patients' records. Data were collected from patients' panoramic radiography, dental casts, lateral cephalography and, intra-oral photographs. Data was entered to our checklist. Exclusion criteria consisted of tooth loss due to decay or other factors, third molars and individuals under 10 years of age. The data were analyzed by the SPSS software (version 21) and statistical Chi-square test at 0.05 significance level.

Results: Of all 1883 participants, 101(5.4%) had dental agenesis. Mandibular second premolar was the most common congenital missing teeth (42.44%), followed by upper lateral incisors (24.41%). Hypodontia in the posterior of mandible were higher than the other site of jaws, and this difference was significant. Gender, unilateral or bilateral hypodontia and type of occlusion difference were not found to be statistically significant.

Conclusion: The findings of the present study showed that the prevalence of hypodontia was within the range of which reported in the literature. Lower second premolar was recognized as the most common dental agenesis. Hypodontia requires an appropriate intervention to restore the esthetic and function of teeth and improve patient's self-esteem.

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1. Introduction

Hypodontia is a condition of missing 6 or more teeth. Hypodontia is among most prevalent dental anomalies [1]. A combination of genetic and environment factors may lead to hypodontia [2, 3]. A series of recent studies has indicated that hypodontia can affect individual's esthetic, function and oral health related quality of life [3-5]. Some authors have driven the further development that hypodontia can lead to tooth delay eruption, tooth size anomaly, canines malposition, peg shape laterals and taurodontism [4-7].

It has been reported that hypodontia was also in charge of periodontal diseases, malocclusion and, alveolar bone growth reduction [8]. Previous studies have emphasized that the most common complain among patients with hypodontia consisted of unesthetic appearance and spaces in their dental arch [9].

Early diagnosis and suitable treatment could play an important role in prevention of its physiological, functional and, aesthetical complications [8]. Kreczi et al. have demonstrated that children with hypodontia experienced increased overjet and overbite compared to the normal population of children [10]. The prevalence rate of hypodontia in orthodontic patients were reported 8.7% in Shiraz and, 9.1% in Tehran [8, 11]. Also, the prevalence of hypodontia have been reported 6.02% and 9% in dental clinics of Puerto Rico and Italy, respectively [12, 13]. Previous studies confirmed a significant correlation between malocclusion and hypodontia [8, 11].

Mandibular second premolar was recognized as the most frequent hypodontia teeth in the Japanese population [14]. Prevalence of hypodontia varies in different studies, due to varieties in applied methods of assessment, clinical examination, gender, age, geographic area and ethnics [15]. Hypodontia requires extensive treatment from simple restoration to multiple treatments, and the key point to the hypodontia treatment is to consider a multidisciplinary approach. Orthodontic treatment is essential for patients with hypodontia, especially in case of lower incisor hypodontia [16]. The aim of the present study was to investigate the prevalence of congenital missing tooth in patients, referred to Orthodontic Department of Kerman Dental School, as well as some private dental care centers.

2. Materials and Methods

The current descriptive retrospective cross-sectional study conducted on 1883 patients referred to the

Orthodontics Department of Kerman Dental School and other private Orthodontics offices during September 2010 to September 2015. The research was approved by the Ethics Committee of the Kerman Medical University under the ethical code of IR.KMU.REC.1393.494. A signed informed consent was obtained from all patient who participated in our study.

A total number of 1883 records of patients including dental casts, intraoral photographs, lateral cephalometric and panoramic radiographs were evaluated. Patients with any syndrome, periodontal diseases, trauma, past orthodontic treatment history, dental caries and tooth extraction were excluded from the setting of the study. Poor quality radiographies, incomplete files of patients and third molars, were also excluded. Patients information regarding age, gender, number and type of hypodontia, location of hypodontia (maxilla or mandible, right or left side, unilateral or bilateral) were recorded.

Type of occlusion were assessed by patients cephalography through ANB angle measurement method. ANB angle between 2 and 4 degrees were categorized as class I occlusion/malocclusion and higher and lower ANB angles were categorized as class II and class III malocclusions, respectively. All measures were evaluated by two independent clinicians. Statistical analyses were performed using the SPSS software version 21. The data were analyzed by Chi-square test. A significance level of 0.05 was considered.

3. Results

Of all cases examined (1883), 22.31% were males and 77.69% were females. The mean age of patients were 17.93 ± 6.14 years. One hundred and one (5.36%) patients had congenital missing. Also, of all of the patients with missing teeth, 62 were females (61.38%) and 39 were males (38.61%). Our findings showed no significant differences between gender and hypodontia ($P=0.939$). Our results demonstrated that mandibular second premolar was the most frequently affected teeth followed by maxillary lateral incisor. In the present study, congenital molars hypodontia were not found (Table 1). In addition, class II malocclusion was the most frequent malocclusion (39.60%).

Bilateral Congenital absence was observed in 59 (3.13%) patients. The most frequent bilateral missing were maxillary lateral incisors. Of all 101 patients with hypodontia, 36.6% were classified into class I, 39.6% into class II, and 23.8% were of class III malocclusions. According to our data, there was no significant

Table 1. Frequency of hypodontia according to the type of tooth agenesis and gender

Type of Congenital Missing Teeth	Gender		Total
	Male	Female	
Mandibular second premolar	17(42.50)	23(57.50)	40(39.60)
Maxillary lateral incisor	10(43.47)	13(56.52)	23(22.77)
Maxillary second premolar	6(33.33)	12(66.66)	18(17.82)
Maxillary canine	4(57.14)	3(42.85)	7(6.92)
Maxillary first premolar	1(20.00)	4(80.00)	5(4.95)
Mandibular first premolar	1(25.00)	3(75.00)	4(3.96)
Mandibular central incisor	0	2(100)	2(1.98)
Mandibular canine	0	1(100)	1(0.99)
Maxillary central incisor	0	1(100)	1(0.99)
Total	39(38.61)	62(61.38)	101(100)
P	0.939		

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correlation between type of occlusion and, type and number of congenital hypodontia ($P=0.91$) (Table 2). Hypodontia was higher in the posterior of mandible, compared to the other site of jaws, which this difference was statistically significant ($P=0.000$).

4. Discussion

The prevalence of hypodontia was calculated 5.4% in the present study. Results of the study conducted by Hedayati et al. showed that 7.6% of orthodontic patients

Table 2. Prevalence of various tooth type agenesis in different malocclusion

Type of Congenital Missing Teeth	Occlusion Type			
	No(%)			
	Class I	Class II	Class III	Total
Mandibular second premolar	12(11.88)	20(19.80)	8(7.92)	40(39.60)
Maxillary lateral incisor	10(9.90)	10(9.90)	3(2.97)	23(22.77)
Maxillary second premolar	7(6.93)	9(8.91)	2(1.98)	18(17.82)
Maxillary canine	5(4.95)	-	2(1.98)	7(6.92)
Maxillary first premolar	2(1.96)	1(0.99)	2(1.98)	5(4.95)
Mandibular first premolar	-	-	4(3.96)	4(3.96)
Mandibular central incisor	1(0.99)	-	1(0.99)	2(1.98)
Mandibular canine	-	-	1(0.99)	1(0.99)
Maxillary central incisor	-	-	1(0.99)	1(0.99)
Total	37(36.63)	40(39.60)	24(23.76)	101(100)
P	0.912			

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suffered from congenital missing teeth [8]. Furthermore, same value in the research by Vahid-Dastjerdi et al. was reported 9.1%, higher than our study [11]. Iran is a vast country with various ethnic groups. Therefore, this might explain the reason to such epidemiologic differences.

Prevalence of hypodontia obtained in our study is comparable to the results of Medina in pediatric orthodontic population in Venezuela (4%), and Celikoglu 4.6% in Turkish orthodontic patients which was lower than findings of Endo et al. (8.5%), and Gracco et al. 9% [13, 14, 17, 18]. Such differences might be due to varieties in study designs, geographic characteristics, gender, races, and genetics differences in the criteria of selection among various investigations.

The prevalence of hypodontia calculated in the present study was within the broad range reported in previous studies on Asian populations (2.6 to 11.2%) [15]. The most prevalent missing teeth consisted of lower second premolars, in the present research (42%). This data is comparable with the reports of Endo et al. and Gracco et al. that showed the most prevalent congenital hypodontia in orthodontic patients were second premolars [13, 14].

Based on our findings, maxillary lateral incisors were the second most frequent congenital missing teeth. This result is in consistent with findings of, Endo et al. and Gracco et al. [13, 14]. In addition, Hedayati et al., Ammini et al., and Gomes et al. studies documented that the prevalence of maxillary lateral incisor was the most frequent hypodontia [7, 8, 15]. Such differences might be due to disparate sample population of different studies. From these results it is clear that hypodontia in posterior of mandible were significantly higher than anterior segment, contrary to the findings of Vahid Dasjerdi study [11]. As we found second premolar, the most prevalent teeth mandibular, posterior of the mandible was the most frequent segment for hypodontia.

Our results highlighted that the frequency of hypodontia was greater in females. Also, no significant correlation was observed between gender and hypodontia. This finding is in line with the studies of Gracco et al., Endo et al., Vahid-Dastjerdi et al., Gomes et al., Hedayati et al., and Fekonja et al. [7, 8, 11, 13, 14, 19]. Based on the type of occlusion in the present study, occlusion class II was the most frequent one in individuals with hypodontia. Our data suggested no significant correlation between hypodontia and type of occlusion. This finding is compatible with the results of Uslu et al., and Hedayati et al. studies [8, 20]. However, Bauer et al. did not find

any significant correlation between craniofacial growth and congenital permanent teeth missing [21].

The pattern and prevalence of hypodontia varies among different races and ethnic groups. The prevalence of hypodontia/ was calculated 5.4% in the current study and no statistically significant differences were observed between males and females. The second mandibular premolar was recognized as the most frequently missing tooth. Tooth agenesis in the lower arch was more prevalent. Class II malocclusion was the most among the malocclusions, in patients with hypodontia. However, this finding was not statistically significant. Early detection of congenital missing teeth and, intervention by a multidisciplinary team should be considered and planned in order to minimize such complications.

Ethical Considerations

Compliance with ethical guidelines

The research was approved by the Ethics Committee of the Kerman Medical University under the ethical code of IR.KMU.REC.1393.494. A signed informed consent was obtained from all patient who participated in our study.

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Conflict of interest

Authors have no conflict of interest to declare.

References

- [1] Altug-Atac AT, Erdem D. Prevalence and distribution of dental anomalies in orthodontic patients. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2007; 131(4):510-4. [DOI:10.1016/j.ajodo.2005.06.027] [PMID]
- [2] Agarwal A, Gundappa M, Miglani S, Nagar R. Asyndromic hypodontia associated with tooth morphology alteration: A rare case report. *Journal of Conservative Dentistry*. 2013; 16(3):269-71. [DOI:10.4103/0972-0707.111332] [PMID] [PMCID]
- [3] Goya HA, Tanaka S, Maeda T, Akimoto Y. An orthopantomographic study of hypodontia in permanent teeth of Japanese pediatric patients. *Journal of Oral Science*. 2008; 50(2):143-50. [DOI:10.2334/josnuds.50.143] [PMID]

- [4] Meaney S, Anweigi L, Ziada H, Allen F. The impact of hypodontia: A qualitative study on the experiences of patients. *European Journal of Orthodontics*. 2011; 34(5):547-552. [DOI:10.1093/ejo/cjr061] [PMID]
- [5] De Coster PJ, Marks LA, Martens LC, Huysseune A. Dental agenesis: Genetic and clinical perspectives. *Journal of Oral Pathology & Medicine*. 2009; 38:1-17. [DOI:10.1111/j.1600-0714.2008.00699.x] [PMID]
- [6] Wu CCL, Wong RWK, Hägg E. [A review of hypodontia: the possible etiologies and orthodontic, surgical and restorative treatment options: Conventional and futuristic (Chinese)]. *Hong Kong Dental Journal*. 2007; 4(2):113-21.
- [7] Gomes RR, da Fonseca JA, Paula LM, Faber J, Acevedo AC. Prevalence of hypodontia in orthodontic patients in Brasilia, Brazil. *Eur J Orthod*. 2010; 32(3):302-6. [DOI:10.1093/ejo/cjp107] [PMID]
- [8] Hedayati Z, Nazari Dashlibrun Y. The prevalence and distribution pattern of hypodontia among orthodontic patients in Southern Iran. *European Journal of Dentistry*. 2013; 7(5):78-82. [DOI:10.4103/1305-7456.119080] [PMID] [PMCID]
- [9] Hobkirk JA, Goodman JR, Jones SP. Presenting complaints and findings from a group of patients attending a hypodontia clinic. *British Dental Journal*. 1994; 177:337-9. [DOI:10.1038/sj.bdj.4808606] [PMID]
- [10] Kreczi A, Proff P, Reicheneder C, Faltermeier A. Effects of hypodontia on craniofacial structures and mandibular growth pattern. *Head & Face Medicine* 2011; 7:23. [DOI:10.1186/1746-160X-7-23] [PMID] [PMCID]
- [11] Vahid-Dastgerdi E, Borzabadi-Farahani A, Mahdian M, Amini N. Non-syndromic hypodontia in Iranian orthodontic population. *Journal of Oral Science*. 2010; 52(3):455-61. [DOI:10.2334/josnurd.52.455]
- [12] Pagán-Collazo GJ, Oliva J, Cuadrado L, Rivas-Tumanyan S, Elías-Boneta AR. Prevalence of hypodontia in 10- to 14-year-olds seeking orthodontic treatment at a group of clinics in Puerto Rico. *Puerto Rico Health Sciences Journal*. 2014; 33(1):9-13. [PMID]
- [13] Gracco ALT, Zanatta S, Forin Valvecchi F, Bignotti D, Perri A, Baciliero F. Prevalence of dental agenesis in a sample of Italian orthodontic patients: an epidemiological study. *Progress in Orthodontics*. 2017; 18(1):33. [DOI:10.1186/s40510-017-0186-9] [PMID] [PMCID]
- [14] Endo T, Ozoe R, Kubota M, Akiyama M, Shimooka S. A survey of hypodontia in Japanese orthodontic patients. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2006; 129(1):29-35. [DOI:10.1016/j.ajodo.2004.09.024] [PMID]
- [15] Amini F, Rakhshan V, Babaei P. Prevalence and pattern of hypodontia in the permanent dentition of 3374 Iranian orthodontic patients. *Dental Research Journal (Isfahan)*. 2012; 9(3):245-50. [PMCID] [PMID]
- [16] Vallet AL, Lorenzoni FC, Martins LM, Valle CV, Henriques JF, Almeida AL, et al. A multidisciplinary approach for the management of hypodontia: case report. *Journal of Applied Oral Science*. 2011; 19 (5):92-95. [PMCID] [PMID]
- [17] Medina AC. Radiographic study of prevalence and distribution of hypodontia in a pediatric orthodontic population in Venezuela. *Pediatric Dentistry*. 2012; 34(2):113-6. [PMID]
- [18] Celikoglu M, Kazanci F, Miloglu O, Oztek O, Kamak H, Ceylan I. Frequency and characteristics of tooth agenesis among an orthodontic patient population. *Medicina Oral, Patología Oral y Cirugía Bucal*. 2010; 15(5):e797-801. [PMID]
- [19] Fekonja A. Hypodontia in orthodontically treated children. *European Orthodontic Society*. 2005; 27(5):457-60. [DOI:10.1093/ejo/cji027] [PMID]
- [20] Uslu O, Akcam MO, Evirgen S, Cebeci I. Prevalence of dental anomalies in various malocclusions. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2009; 135(3):328-35. [DOI:10.1016/j.ajodo.2007.03.030] [PMID]
- [21] Bauer N, Heckmann K, Sand A, Lisson JA. Craniofacial growth patterns in patients with congenitally missing permanent teeth. *Journal of Orofacial Orthopedics*. 2009; 70(2):139-51. [DOI:10.1007/s00056-009-0744-y] [PMID]

