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Clinical and radiographical evaluation of non-syndromic hypodontia and hyperdontia in permanent dentition

Ilkay Peker [1], Elif Kaya [1], Sis Darendeliler-Yaman [2]

[1] Research Assistant, Gazi University Faculty of Dentistry, Department of Oral Diagnosis and Radiology
[2] Professor, Gazi University Faculty of Dentistry, Department of Restorative Dentistry and Endodontics

Correspondence:
Gazi University Faculty of Dentistry
Department of Oral Diagnosis and Radiology
8. Cad. 82. Sok. 06510 Emek/Ankara-Turkey
drilkaypeker@gmail.com

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Abstract

Objectives: The purpose of this study was to evaluate the clinical and radiographical characteristics of non-syndromic hypodontia and hyperdontia in the permanent dentition.

Study design: This study included 139 patients. Clinical and radiographical examinations were carried out by two examiners. Number and localization of missing or supernumerary teeth, and pathologies associated with the teeth, were recorded. Other teeth in the mouth were also examined for the presence of additional dental anomalies.

Results: A total of 256 congenitally missing teeth were observed in 102 patients, and 73 supernumerary teeth were observed in 37 patients. The rate of missing teeth was much higher in females (67.6 %) than males (32.4 %) and in the maxilla (64.5 %) than mandible (35.5 %). The rate of supernumerary teeth was slightly higher in males (59.5 %) than females (40.5 %) and in maxilla (53.4 %) than mandible (46.6 %). The most common hypodontia type was mild to moderate hypodontia (62.7 %) and the most observed hyperdontia was a single supernumerary tooth (54.1 %). Microdontia, talon cusp, taurodontic molars were observed in 18.6 % of patients with hypodontia; and microdontia and dilacerated molars were observed in 8.1 % of patients with hyperdontia.

Conclusions: Although missing and supernumerary teeth are asymptomatic in most cases, they may lead to malocclusions, aesthetic, functional and psychological problems.

Key words: *Hypodontia, hyperdontia, non-syndrome.*

Introduction

Hypodontia is defined as developmental absence of one or more teeth (1) and hyperdontia is defined as an increase in the number of teeth which is more than 20 deciduous teeth, and/or over 32 teeth in permanent dentition (2).

Hypodontia is the failure of one or more but not all teeth to develop. When two to five missing teeth refer as mild to moderate hypodontia; oligodontia, partial anodontia or severe hypodontia refers to the congenital absence of six or more permanent teeth. The complete failure of all teeth to develop in an individual is defined as total anodontia (1,3,4). Hypodontia in the permanent dentition, excluding third molars, is found in 3 % to 8.5 % of the population (5,6), and its prevalence in deciduous dentition is approximately 1 % (7). Developmentally missing teeth may be the result of numerous etiologic factors such as changes of the dental lamina formation, failure of tooth germ to develop at the optimal time, space limitation, systemic condition and genetic factors (4,5). Excepted third molars, the most common affected teeth from hypodontia are second premolars and lateral incisors (5,8). Hyperdontia is more common in the permanent dentition than primary one (9). The prevalence of hyperdontia in the permanent dentition is reported to vary between 0.1 and 3.8 % and its prevalence in the primary dentition is found to be 0.3-0.8 %. Etiology of hyperdontia is unknown, there is familial tendency (10). Several syndromes and developmental disorders have been found to be associated with single and multiple supernumerary teeth developing as part of systemic conditions such as cleidocranial dysplasia, Gardner's syndrome, and cleft lip and palate. (5,10,11). Supernumeraries may be categorized into three types according to their locations. The supernumerary teeth occurring among the maxillary central incisors are mesiodens, those occurring in the molar area are paramolar and those that locate distal to the third molar are called distomolar teeth (10).

The purpose of this study was to evaluate the clinic and radiographic characteristics of non-syndrome hypodontia and hyperdontia in permanent dentition.

Material and Methods

This study included 139 patients (84 females and 55 males) aged between 10 and 71 years who applied to Gazi University Faculty of Dentistry, Department of Oral Diagnosis and Radiology due to several dental causes. The data collection was conducted in April 2007 and May 2008.

When the clinicians observed the patients with missing and/or supernumerary teeth during routine clinic and radiographic evaluations, panoramic radiographs and also periapical radiographs were taken where indicated. Routine clinical evaluations consisted of medical, dental and familial histories, extraoral and intraoral examinations and routine radiographic evaluations consisted of panoramic radiographic examination. All evaluations were carried out by two specialists of oral diagnosis and radiology with at least 10 years of experience. Obtained data including age, gender, systemic diseases, syndromes and their familial histories, number and localization about missing or supernumerary teeth, pathologies associated with the teeth were recorded and also other teeth in the mouth were examined for the presence of dental anomalies such as microdontia, talon cusp and taurodontism etc. Generally, when the missing and supernumerary teeth localized in anterior regions of jaws, there were esthetics complaints of patients. The patients were referred to departments of restorative dentistry, orthodontics or prosthetic dentistry according to requirements of cases.

All data were statistically analyzed with SPSS-15.0 version (SPSS, Inc, IL, USA) software program for Windows by using descriptive statistics, cross-tabulations and chi-square test.

Results

Hypodontia

Excluding third molars, 256 congenitally missing teeth were observed in 102 patients (69 females and 33 males) with mean age of 26.2. There were no systemic diseases and syndromes in the patients and only 9 patients reported familial histories about missing teeth. The rate of missing teeth was higher in females (67.6 %) than males (32.4 %) and in maxilla (64.5 %, n=165) than mandible (35.5 %, n=91) and in left side (52.7 %, n=135) than right side (47.3 %, n=121).

The most observed hypodontia type was mild to moderate hypodontia (two to five missing teeth) in 64 patients (62.7 %), followed by single tooth absence and six or more teeth absence in 31 (30.4 %) and 7 patients (6.9 %), respectively (Table1). The rates of single tooth absence and two or more missing teeth were higher in females than males and there was no statistically significant difference ($p>0.05$) for gender according to number of missing teeth (Table2).

The rate of missing teeth were higher in maxilla (64.5 %, n=165) than mandible (35.5 %, n=91). The most affected teeth were maxillary laterals (33.2 %, n=85) and followed by mandibular second premolars (18.8 %, n=48), maxillary second premolars (12.5 %, n=32), maxillary first premolars (7.4 %, n=19), mandibular centrals (7 %, n=18), maxillary second molars (5.1 %, n=13), maxillary canines (3.9 %, n=10), mandibular second molars (3.5 %, n=9), mandibular laterals and first premolars (2.3 %, n=6) as equal, mandibular first molars (1.6 %, n=4), maxillary centrals, first molars and mandibular canines (0.8 %, n=2) as equal.

The missing teeth were mostly bilateral in 64 patients

Table 1. Distribution of patients according to number of missing and supernumerary teeth.

Hypodontia and hyperdontia		Number of missing / supernumerary teeth	Gender	
			Female n (%)	Male n (%)
Hypodontia	Single tooth absence	One missing tooth	19 (61.3)	12 (38.7)
	Mild to moderate hypodontia	Two missing teeth	38 (71.7)	15 (28.3)
		Three missing teeth	6 (75)	2 (25)
		Four missing teeth	1 (50)	1 (50)
		Five missing teeth	0 (0)	1 (100)
	Severe hypodontia	Six missing teeth	2 (100)	0 (0)
		Seven missing teeth	1 (100)	0 (0)
		Ten missing teeth	1 (100)	0 (0)
		Twelve missing teeth	1 (100)	0 (0)
		Fourteen missing teeth	0 (0)	2 (100)
	Total		69 (100)	33 (100)
Hyperdontia	Single supernumerary tooth		8 (40)	12 (60)
	Two supernumerary teeth		3 (37.5)	5 (62.5)
	Three supernumerary teeth		3 (60)	2 (40)
	Four supernumerary teeth		1 (50)	1 (50)
	Six supernumerary teeth		0 (0)	2 (100)
	Total		15 (100)	22 (100)

Table 2. The results of chi-square tests for gender according to number of missing and supernumerary teeth.

Hypodontia and hyperdontia		Gender		Statistics		
		Female n (%)	Male n (%)	Yates' chisquare	Degrees of freedom (df)	p value
Number of missing teeth	Single tooth absence	19 (61.3)	12 (38.7)	0.536	1	0.464
	Two or more missing teeth	50 (70.4)	21 (29.6)			
	Total	69 (100)	33 (100)			
Number of supernumerary teeth	Single supernumerary tooth	8 (40)	12 (60)	0.042	1	0.837
	Two or more supernumerary teeth	7 (41.2)	10 (58.8)			
	Total	15 (100)	22 (100)			

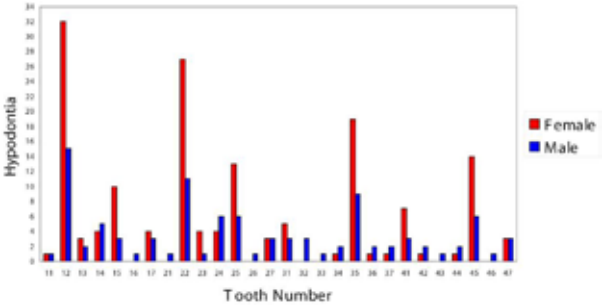

Fig. 1. Distribution of affected tooth types with hypodontic patients according to gender.

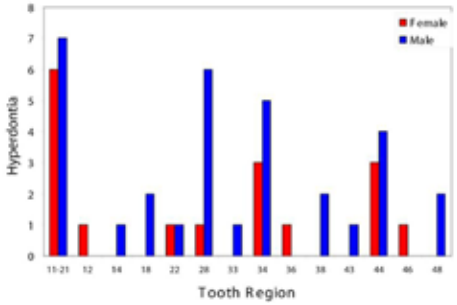

Fig. 2. Distribution of affected tooth types with hyperdontic patients according to gender.

(62.7 %) and were unilateral in 38 patients (37.3 %). Missing teeth were observed with microdontia in 13 patients (12.7 % and 12 females, 1 male) and with taurodontic permanent molars in 4 patients (3.9 % and 2 females, 2 males) and with talon cusp in 2 patients (1.9 % and 1 female, 1 male). There were 49 persistent deciduous teeth in 36 patients (35.5 % and 24 females, 12 males) with hypodontia and 13 of these teeth (36.1 %) were in infraocclusion.

Distribution of affected tooth types according to gender is presented in (Fig.1) for the patients with hypodontia.

Hyperdontia

Totally 73 supernumerary teeth were observed in 37 patients (15 females, 22 males) with mean age of 25.9. The rate of supernumerary teeth was higher in males (59.5 %) than females (40.5 %) and in maxilla (53.4 %, n=39) than mandible (46.6 %, n=34) and in right side (72.6 %, n=53) than left side (27.4 %, n=20). There were no systemic diseases and syndromes in the patients and only 2 patients reported familial histories about supernumerary teeth.

The most supernumerary teeth were observed in mandibular premolar region (34.3 %, n=25) followed by maxillary third molar region (21.9 %, n=16) as called distomolar, maxillary midline as called mesiodens (19.2, % n=14), maxillary molar region (6.8 %, n=5), mandibular third molar region (5.5 %, n=4), maxillary lateral tooth and mandibular molar regions (4.1 %, n=3) as equal, mandibular canine region (2.7 %, n=2) and maxillary premolar region (1.4 %, n=1).

The most observed number of supernumerary teeth was only one (54.1 %) followed by two (21.6 %), three (13.5 %), four (5.4 %) and six supernumerary teeth (5.4 %) (Table1). The rates of single supernumerary tooth and two or more supernumerary teeth were higher in males than females. There was no statistically significant difference ($p>0.05$) for gender according to number of supernumerary teeth (Table2).

The supernumerary teeth were observed bilaterally in 15 patients (40.5 %) and in 22 patients (59.5 %) unilaterally. There were 2 patients (5.4 % and 1 female, 1 male) with microdontia and only one patient (2.7 % and one male) with permanent molar dilacerated root in other teeth. Fifty-one of the supernumerary teeth (69.9 %) were impacted and no cysts, enlargement of follicular epithelium were observed.

Distribution of affected tooth types according to gender is presented in (Fig.2) for the patients with hyperdontia.

Discussion

Although hypodontia can occur over with 60 different syndromes (12) and hyperdontia can occur over with 20 syndromes (10), these anomalies can occur without any syndrome or systemic disease. However, hypodontia is seen more common in non-syndromic or familial form than syndromic form (12) and hyperdontia can be hereditary (10). In this study, there were no syndromes and systemic diseases in all patients and only 11 patients (8 %) reported familial history about missing or supernumerary teeth.

Numerous studies reported that hypodontia occurrence (1,6,13) is higher in females than males and hyperdontia occurrence (2,9,10) is higher in males than females. In this study, hypodontia was more common in females than males and hyperdontia was more common in males than females which is in accordance with previous studies.

Although several studies (8,13,14) reported that missing teeth are more common in maxilla than mandible, one study (15) reported that missing teeth are more common in mandible than maxilla. Excluding third molars, the most affected teeth from hypodontia are maxillary lateral incisors, mandibular and maxillary second premolars in previous studies (3,5,8,15). Absence of maxillary central incisors, maxillary and mandibular first molars and canines are very rarely seen (4,7,15). In this study, hypodontia was more common in maxilla than mandible. The most affected teeth were maxillary laterals, mandibular and maxillary second premolars and the least affected teeth were maxillary central incisors, maxillary first molars and mandibular canines. These results are in accordance with various studies. However, the localization of missing teeth may change according to ethnicity of the populations.

Various studies reported that supernumerary teeth are the most common anomaly in maxillary anterior region as mesiodens (3,9,10). However, the other studies reported that mesiodens is seen commonly in pediatric populations and supernumerary teeth are seen frequently in maxillary posterior region for adult populations (16,17). Additionally, one to four supernumerary teeth are appeared frequently in maxillary anterior and molar region, five or more supernumerary teeth are appeared in mandibular premolar region (10,11,18). In this study, the most supernumerary teeth were observed in mandibular premolar region, followed by maxillary distomolars, mesiodens, maxillary molar region, mandibular distomolars, maxillary lateral region and mandibular molar region in equal number, mandibular canine region and mandibular premolar region.

It was reported that the majority of the hypodontic patients are in mild to moderate group (15). Oligodontia and especially anodontia without any genetic disease are rare (12). Several studies reported that bilateral hypodontia is more common than unilateral form (8,15,19). In this study, while mild to moderate hypodontia were the most common (62 %) and only 7 % of the patients were affected from oligodontia, no anodontia was observed and the missing teeth were frequently bilateral.

Previous studies reported that single supernumeraries occur in 76-86 % of cases, double supernumeraries occur in 12-23 % of cases, and multiple supernumeraries occur in less than 1 % of cases and especially multiple supernumerary teeth occur very rare without any syndromes and systemic diseases (5,10). In this study, the most single supernumerary tooth were observed in 54.1 % of patients and followed by two, three and equal number of four and six supernumerary teeth in 21.6 %, 13.5 %, 5.4 % of patients, respectively.

The supernumerary teeth usually cannot erupt and remain impacted, but are discovered during routine radiographic examinations. When the supernumerary teeth are erupted and clinically evident, they can cause several pathologies such as delayed eruption, tooth displacement, crowding, root resorption of the adjacent tooth and cystic formations (10). In this study, 51 of the supernumerary teeth (69.9 %) were impacted and no cysts or enlargement of follicular epithelium were observed.

Hypodontia and hyperdontia may occur with other dental anomalies such as microdontia, taurodontism, talon cusp, macrodontia and gemination (15,20). In this study, microdontia, talon cusp, taurodontic molars were observed in 18.6 % of patients with hypodontia and microdontia and dilacerated molars were observed in 8.1 % of patients with hyperdontia.

Although missing and supernumerary teeth are asymptomatic in most cases, they may lead to some clinical problems including malocclusions, esthetic and functional complaints and also psychological problems. All cases should be evaluated by interdisciplinary approach for appropriate treatment choice. Orthodontic or prosthetic treatment approaches can be recommended for patients with hypodontia. If delayed eruption, displacement and root resorption of adjacent tooth, crowding and cystic formation have occurred, surgical removal of supernumerary teeth may be needed. Periodic clinical and radiographical examinations should be carried out as in absence of any pathologic condition. Both hypodontia and hyperdontia cases should be evaluated carefully by clinicians and early diagnosis and treatment planning should be made for appropriate treatment modalities to minimize the complications of these dental anomalies.

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