

Prevalence and Characteristics of Hyperdontia among Jordanian Nonsyndromic Orthodontic Patients

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ABSTRACT

Objectives: To investigate the distribution and characteristics of nonsyndromic hyperdontia in a sample of Jordanian orthodontic patients.

Methods: A total of 2140 non-syndromic orthodontic patients (1070 females and 1070 males), attended the Dental Department at Prince Hashem Bin Al- Hussien Hospital between July 2013 and April 2015, were included in this study. Their ages ranged from 6 to 16 years, with a mean of 13.8 years (± 2.6). Dental history, pretreatment records, intra oral radiographs, and orthopantomograms were used for the diagnosis of various supernumerary teeth. Patients were evaluated for age, gender, status of dentition, number, position, orientation, and type of supernumerary teeth. The Pearson chi- square test was used for statistical analysis.

Results: In 51 (2.38%) of 2140 orthodontic patients, at least one supernumerary tooth was detected (70 supernumerary teeth in 33 males and 18 females). A significant predominance of hyperdontia in males (1.83:1; $P = 0.038$) was detected. Most supernumerary teeth were single (51.43%), conical (47.14%), normally oriented (57.14%), impacted (78.57%), located in the premaxilla (52.86%) and detected in mixed dentition (58.82%).

Conclusion: A hyperdontia prevalence of (2.38%) was detected with a significant male predominance. The characteristics of supernumerary teeth in this sample of Jordanian nonsyndromic orthodontic patients were comparable with the findings of most studies conducted in other countries.

Key words: Hyperdontia, Orthopantomograms, Orthodontic patients, Prevalence

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Introduction

Hyperdontia, also known as hypergenesis or the entity of supernumerary teeth, is an infrequent developmental dental anomaly which is characterized by the countenance of teeth or tooth-like structures in excess of the customary array of dentition. ⁽¹⁾ Supernumerary teeth can occur in both primary and permanent dentitions as a single, double, or multiple teeth in one or both jaws, may be erupted or impacted, unilateral or bilateral, straight or inverted in position, malformed morphologically or normal in size and shape, and can be classified according to their location and morphology. ⁽²⁾ In various populations, the reported prevalence of hyperdontia is (0.1-3.8%) with a particular male predilection, and the coincidence of multiple hyperdontia in the absence of associated syndromes or systemic conditions is rare. ^(2,3)

Odontogenesis is multifactorial, multidimensional and progressive over time; this process is under genetic control and is regulated by reciprocal interactions between ectodermal epithelium and neural crest-derived mesenchyme. Despite improved knowledge of tooth morphogenesis and differentiation, yet, little is known about the etiology and molecular mechanisms underlying supernumerary tooth formation. ⁽³⁾ Clinically, supernumerary teeth can induce various alterations which require surgical or orthodontic intervention. Furthermore, early recognition of hyperdontia provides a diagnostic indicator of some multiple congenital anomaly syndromes, such as cleidocranial dysplasia, trichorhinophalangeal syndrome, familial adenomatous polyposis, and craniosynostosis. ⁽⁴⁾ A literature review revealed limited data for hyperdontia in Jordanian orthodontic

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patients. Therefore, our study aimed to evaluate the prevalence and characteristics of hyperdontia in a sample of nonsyndromic Jordanian orthodontic patients and to adjoin a new contribution to the current orthodontic literature in this field.

Methods

A total of 2140 non-syndromic orthodontic patients (1070 females and 1070 males), attended the orthodontic clinic at Prince Hashem Bin Al- Hussein Hospital over a period of two years from April 2013 to July 2015, were non-randomly selected and enrolled in this descriptive study. The study protocol was reviewed and approved by the Human Research Ethics Committee at the Royal Medical Services. Informed consent was taken from the parents of the patients. Diagnosis of supernumerary teeth was based on detailed dental history, intraoral examination, pretreatment records, panoramic and intraoral radiographs. All the patients were examined clinically and radiographically in the orthodontic clinic by two examiners for the presence of any supernumerary and all radiographs had diagnostic clarity. Patients were not considered eligible for the study if they had any syndrome or congenital anomalies such as cleft lip/palate. The demographic variables (age and gender), number and location, eruption status, morphology (conical, tuberculate, or supplemental), primary or permanent, and orientation were recorded for each patient with hyperdontia. The study group comprised 51 healthy orthodontic patients (18 females and 33 males) each with at least one supernumerary tooth. Their ages ranged from 6 to 16 years, with a mean of 13.8 years (\pm 2.6). Concomitant dental anomalies were not found. The Pearson chi-square test was used to perform the descriptive statistics and results were tabulated. The data were analyzed using SPSS software version 17 for statistical analysis (Statistical Package for Social Sciences, SPSS Inc., Chicago, Illinois, USA), the level of significance tested was ($P < 0.05$).

Results

In the present study, 70 supernumerary teeth were found in 51 patients (18 females and 33 males). It represented (2.38%) of 2140 examined subjects and comprised 18 (35.30%) females and 33 (64.70%) males. The frequency of supernumerary teeth was

2.38% (0.84% for females and 1.54% for males) for this sample of Jordanian orthodontic patients, with statistically significant gender differences ($P = 0.038$; 33 males vs. 18 females; 1.83:1). The distribution of patients by gender was shown in Table I. Table II compares the patients by gender and by number of supernumerary teeth. The table shows that 36 patients (70.59%) had one supernumerary, 12 patients (23.53%) had two, and the remaining 3 patients (5.88%) had three or more supernumeraries. The average number of supernumerary teeth in the 51 patients was 1.37, and the average number did not significantly differ ($P = 0.96$) by gender (1.36 in males and 1.39 in females). The most common site of supernumerary teeth was the premaxillary region ($n = 37$, 52.86%) followed by the mandibular premolar region ($n=19$, 27.14%), the maxillary molar region ($n=5$, 7.14%), the maxillary premolar region ($n = 4$, 5.71%), the mandibular molar region ($n= 3$, 4.29%), and, finally, the mandibular anterior region ($n = 2$, 2.86%; Table III). Of the 37 supernumerary teeth identified in the premaxillary region, 10 (27.03%) were mesiodens. Of the 70 supernumerary teeth analyzed, the shape was conical in 33 (47.14%), supplemental in 29 (41.43%), and tuberculate in 8 (11.43%). Fifteen (21.43%) supernumerary teeth were erupted and 55 (78.55%) were unerupted Table IV. Erupted teeth were observed in (15.15%) of the conical teeth, in (27.59%) of the supplemental teeth, and in (25.00%) of the tuberculate teeth. The rate of eruption was higher in supplemental- and tuberculate-shaped supernumerary teeth compared to conical-shaped supernumerary teeth. There was a statistically significant difference between numbers of erupted and unerupted conical and supplemental supernumerary teeth ($P < 0.05$). Table V demonstrates the relationship between orientation of supernumerary teeth and eruption. Normal orientation of supernumerary teeth (57.14%) was more common than transverse (27.14%) and inverted (15.71%) orientation. Out of the fifteen erupted supernumerary teeth, orientation was normal in 12 (30%) and transverse in three (15.79%). In unerupted supernumerary teeth, however, orientation was normal in 28 (70%), transverse in 16 (84.21%), and inverted in 11 (100%). Orientation was significantly correlated with the eruption of supernumerary teeth ($P < 0.05$).

Table I: Distribution of the patients with supernumerary teeth by gender

Gender	Patients with supernumerary teeth		Patients without supernumerary teeth		Total	
	n	(%)	n	(%)	n	(%)
Male	33	(1.54)	1037	(48.46)	1070	(50.00)
Female	18	(0.84)	1052	(49.16)	1070	(50.00)
Total	51	(2.38)	2089	(97.62)	2140	(100)

($P = 0.0379$), statistically significant gender differences.

Table II: Frequency of supernumerary teeth by number, genders, and results of chi-square tests

Number of supernumerary teeth	Female (%) n =51		Male (%) n =51		P	Total (%) n=51	
	n	(%)	n	(%)		n	(%)
Single supernumerary	12	(1.12)	24	(2.24)	0.0473*	36	(1.68)
Two supernumeraries	5	(0.47)	7	(0.65)	0.565	12	(0.56)
Three supernumeraries	1	(0.09)	1	(0.09)	1.000	2	(0.09)
Four supernumeraries	—		1	(0.09)		1	(0.05)
Total	18	(1.68)	33	(3.08)	0.0379*	51	(2.38)

*($P < 0.05$), P values equal to or less than 0.05 were considered significant.

Table III: Distribution of supernumerary teeth by position in the jaws

Position	n	%
Maxilla		
Anterior	37	(52.86)
Premolar	4	(05.71)
Molar	5	(07.14)
Mandible		
Anterior	2	(02.86)
Premolar	19	(27.14)
Molar	3	(04.29)
Total	70	(100)

Table IV: Relationship between morphological type of supernumerary teeth and eruption

morphology type of supernumerary teeth	Erupted n %	Unerupted n %	Total n %	P
Conical	5 (15.15)	28 (84.85)	33 (47.14)	0.0008*
Tuberculate	2 (25.00)	6 (75.00)	8 (11.43)	0.2416
Supplemental	8 (27.59)	21 (72.41)	29 (41.43)	0.0462*
Total	15 (21.43)	55 (78.57)	70 (100.00)	0.0001*

*($P < 0.05$), P values equal to or less than 0.05 were considered significant.

Table V. Relationship between orientation of supernumerary teeth and eruption

Orientation	Erupted n %	Unerupted n %	Total n %	P
Normal	12 (30.00)	28 (70.00)	40 (57.14)	0.0371*
Transverse	3 (15.79)	16 (84.21)	19 (27.14)	0.2124*
Inverted	0 (0)	11 (100.00)	11 (15.71)	
Total	15 (21.43)	55 (78.57)	70 (100.00)	0.0001*

*($P < 0.05$), P values equal to or less than 0.05 were considered significant.

Discussion

Several studies have addressed the prevalence of hyperdontia; however, the results of these studies were inconsistent between and within populations. This variation may be attributed to varying sampling techniques, ethnic, genetic, and environmental differences. ⁽²⁾ Comparatively, hyperdontia is more frequently encountered in orthodontic patients than in general population ⁽¹⁾. Whereas several studies have investigated the prevalence of hyperdontia, only a few have accomplished in orthodontic patients. To our knowledge there is no report in the English literature concerning the prevalence of hyperdontia in the Jordanian orthodontic patients. Another study was carried out at Prince Rashed Hospital with some sort of a different geographic area with a different sample came with this results The male to female ratio was 2.2:1. Of the 186 supernumerary teeth investigated (65.0%) were conical, (23.7%) supplemental, (10.8%) tuberculate and (0.5%) odontoma. Two-thirds of the supernumeraries were erupted. Of this sample (21.6%) patients had multiple supernumerary teeth. The most frequent location was at the premaxilla level. The most common effect on adjacent teeth was delayed eruption (23.1%). Simple and surgical extractions of supernumerary teeth were done for (81.7%) of the cases and orthodontic treatment was needed in (74.1%) of patients ⁽²⁵⁾. One of the limitations that are encountered in our study was represented by the study sample which is limited to a specific geographic area (patients attending prince Hashim Bin Al-Hussin military hospital; that provide medical service for the middle and east

of Jordan, yet the origin of the sample taken is versatile. other limitation that we encountered is the age group of the sample which is under the legal age; parents take the responsibility for their children seeking orthodontic consultation , accordingly parents own educational level, awareness and interests,..etc will affect the likely of their children to present at our clinic .finally most of supernumeraries are detected at the stage of mixed dentition ;this may be misleading for both patients and parents ,considering the presence and the presentation of the supernumeraries as being developmentally normal .Nonsyndromic hyperdontia is usually is diagnosed as an unintended radiographic finding in the course of routine examination rather than as the result of a related disease. Multiple hyperdontia usually occurs in syndromic patients with developmental disorders such as cleft lip and palate, ^(19,20) cleidocranial dysplasia, ⁽²¹⁾ Ehlers-Danlos syndrome, ⁽²²⁾ and familial adenomatous polyposis (Gardner's syndrome), ⁽²³⁾ and rarely occurs without associated syndromes or systemic conditions. ⁽²²⁾ Even though radiographic examination is fundamental for differentiating hyperdontia, image particularity evidently depends on the radiograph type. This implicates that picking the convenient diagnostic tool is extremely important for precisely distinguishing hyperdontia. Consequently, in advent studies the routine use of three-dimensional images acquired by cone beam computed tomography is recommended as it is distinctly characterized the orientation of hyperdontia ⁽²⁴⁾

Conclusion

The prevalence of hyperdontia in this study was (2.38%), the most frequent location being at the premaxilla. Early and comprehensive diagnosis of hyperdontia is imperative. Many factors must be speculated when appraising hyperdontia. Particularly, the demographic profiles of patients with hyperdontia award useful epidemiological information. Our study stands out since it is the first carried out on Jordanian orthodontic patients. Hopefully, the study findings can take a hand not only in a mode of clinical diagnosis and treatment planning but also in future investigation of hyperdontia.

References

1. **Multani RK, Sangeri KK, Ramalakshmi M, et al.** Supernumerary Teeth: An Investigating Tool in Forensic Crime Investigation. *Journal of International Oral Health* 2015; 7(5):56-58.
2. **Mallineni SK.** Supernumerary Teeth: Review of the Literature with Recent Updates. *Conference Papers in Science* 2014; 2014:1-6.
3. **Galluccio G, Castellano M, Monaca La C.** Genetic basis of non-syndromic anomalies of human tooth number. *ARCHIVES OF OAL BIOLOGY* 2012; 57(7): 918-930.
4. **Nakamura T, Fukumoto S.** Genetics of supernumerary tooth formation. *Journal of Oral Biosciences* 2013; 55(4): 180-183.
5. **Berrocal MIL, Morales JFM, González JMM.** An observational study of the frequency of supernumerary teeth in a population of 2000 patients. *Med Oral Patol Oral Cir Bucal.* 2007; 12: 134-138.
6. **Shokry SM, Alenazy MS.** Consanguinity-related hyperdontia: An orthopantomographic study. *Dental Research Journal* 2013; 10 (6): 732-736.
7. **Karayilmaz H, Kirzioğlu Z, Saritekin A.** Characteristics of nonsyndromic supernumerary teeth in children and adolescents. *Turk J Med Sci* 2013; 43(6): 1013-1018.
8. **Schmuckli R, Lipowsky C, Peltomaki T.** Prevalence and Morphology of Supernumerary Teeth in the population of a Swiss Community. Short communication. *Schweiz Monatsschr Zahnmed* 2010; 120(11):987-93.
9. **Anegundi RT, Tegginmani VS, Battepati, et al.** Prevalence and characteristics of supernumerary teeth in a non-syndromic South Indian pediatric population. *J Indian Soc Pedod Prev Dent* 2014; 32(1):9-12.
10. **Singh VP, Sharma A, Sharma S.** Supernumerary Teeth in Nepalese Children. *The Scientific World Journal* 2014; 2014:1-5.
11. **Shokri A, Poorolajal J, Khajeh S, et al.** Prevalence of dental anomalies among 7- to 35-year-

old people in Hamadan, Iran in 2012-2013 as observed using panoramic radiographs. *Imaging Sci Dent* 2014; 44(1): 7-13.

12. **Rajab L D, Hamdan M A M.** Supernumerary teeth: review of the literature and a survey of 152 cases. *International Journal of Paediatric Dentistry* 2002; 12: 244 – 254.
13. **Ferrés-Padró E, Prats-Armengol J, Ferrés-Amat E.** A descriptive study of 113 unerupted supernumerary teeth in 79 pediatric patients in Barcelona. *Med Oral Patol Oral Cir Bucal* 2009; 14 (3):146-152.
14. **Demiriz L, Durmuşlar MC, Mısır AF.** Prevalence and characteristics of supernumerary teeth: A survey on 7348 people. *J Int Soc Prevent Communit Dent.* 2015; 5 (1): 39-43.
15. **Esenlik E, Sayin MO, Atilla AO, et al.** Supernumerary teeth in a Turkish population. *Am J Orthod Dentofacial Orthop.* 2009; 136(6):848-52.
16. **Açıköz A, Açıköz G, Tunga U, Otan F.** Characteristics and prevalence of non-syndrome multiple supernumerary teeth: a retrospective study. *Dentomaxillofacial Radiology* 2006; 35(3): 185–190.
17. **Yagüe-García J, Berini-Aytés L, Gay-Escoda C.** Multiple supernumerary teeth not associated with complex syndromes: A retrospective study. *Med Oral Patol Oral Cir Bucal.* 2009; 14(7):331-336.
18. **Vahid-Dastjerdi E, Borzabadi-Farahani A, Mahdian M, et al.** Supernumerary teeth amongst Iranian orthodontic patients. A retrospective radiographic and clinical survey. *Acta Odontologica Scandinavica* 2011; 69 (2): 125–128.
19. **Vinodh KP, Shruthi BS.** Supernumerary Teeth: An Epitome of Variability and Unpredictability – A Comprehensive Review And Five Case Reports. *Indian Journal of Multidisciplinary Dentistry* 2013; 4(1): 860-868.
20. **Tereza GP, Carrara CF, Costa B.** Tooth Abnormalities of Number and Position in the Permanent Dentition of Patients With Complete Bilateral Cleft Lip and Palate. *Cleft Palate Craniofac J.* 2010; 47(3):247-252.
21. **Lee KE, Seymen F, Yildirim M, et al.** RUNX2 mutations in cleidocranial dysplasia. *Genet Mol Res.* 2013; 12(4): 4567-4574.
22. **Subasioglu A, Savas S, Kucukyilmaz E, et al.** Genetic background of supernumerary teeth. *Eur J Dent.* 2015; 9(1):153-158.
23. **Cankaya AB, Erdem MA, Isler SC, et al.** Oral and Maxillofacial Considerations in Gardner's Syndrome. *Int J Med Sci.* 2012; 9(2):137-141.

24. **Brauer HU.** Case Report: Non-syndromic multiple supernumerary teeth localized by cone beam computed tomography. *European Archives of Paediatric Dentistry* 2010; 11 (1):41-43.

25. **Othman M Yassin, Eman Hamori .** Characteristics, Clinical Features and Treatment of Supernumerary Teeth.