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Supernumerary teeth amongst Iranian orthodontic patients. A retrospective radiographic and clinical survey

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Abstract

Objective. To investigate the prevalence, characteristics (malocclusion, location, type) and gender distribution of supernumerary teeth (ST) in an Iranian orthodontic population. ***Material and methods***. A retrospective study was carried out using radiographs (periapicals, panoramic) and study models of 1751 subjects (870 girls, 881 boys; age range 9–27 years). The Pearson chi-square test was used to determine differences in the distribution of ST when stratified by gender and malocclusion type. ***Results***. Fourteen ST were found in 13 patients (six males, seven females), giving a prevalence rate of 0.74%. The prevalence rate of ST was higher in Class III malocclusions (5.2%) and was a rare finding among Class II malocclusions (0.1%). The occurrence rate of ST was higher in maxilla (78.5%) than in mandible (21.5%). The most common type of ST was the conical form (43%). We did not observe any late-developing paramolar or distomolar ST. ***Conclusion***. The prevalence rate of ST in our study was 0.74% and ST were more common among Class III malocclusions.

Key Words: *Iranian orthodontic population, malocclusion, supernumerary teeth*

Introduction

Hyperdontic or supernumerary teeth (ST) exceed the normal dental complement independently of their location and form [1,2]. Classification of ST is based on their location [3] (mesioden, parapremolar, paramolar, distomolar), morphological type (conical, tuberculate, supplemental, odontome) and association with syndromic traits (syndromic and non-syndromic). In the non-syndromic form, hyperdontia is the primary condition afflicting the individual. In the syndromic form, hyperdontia is found in individuals who have an underlying recognizable clinical syndrome (e.g. Gardner's syndrome). Supernumerary teeth, as an isolated finding in a patient, are relatively common in the general population and they are more likely to appear in patients with a positive family history [1]. The concomitant occurrence of ST and hypodontia mainly occurs in cleidocranial dysplasia [4], Down's syndrome [1], Ellis–Van Creveld syndrome [5], Elhers–Danlos syndrome [1,6] and familial adenomatous polyposis (Gardner) [7]. However, concomitant hypodontia and hyperodontia are not associated only with syndromes and can be seen in normal subjects [8].

The aetiology of ST is not completely understood and several theories have been proposed to explain their development [2,3]. ST could develop from a dichotomy of the tooth bud [9,10]. It has also been suggested that ST are a result of hyperactivity of the dental lamina, characterized by embryogenic aberrations during facial development, and by excessive proliferative activity of epithelial remnants of the dental lamina induced by pressure from the permanent dentition [2,9]. The clinical complications more frequently associated with ST include dental impactions, delayed or ectopic eruption of adjacent regular teeth, dental crowding, disruption in tooth spacing (e.g. development of a median diastema when the supernumerary tooth is in the midline of the maxilla),

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malocclusion, root resorption, dilaceration, delayed or abnormal root development of permanent teeth, ectopic eruption (e.g. into the floor of the nasal cavity) and the formation of follicular cysts [9,11].

The most frequent locations of ST are the premaxilla and the mandibular premolar regions. The morphology of ST observed in the primary dentition is usually normal or conical, whereas ST found in the permanent dentition show a variable morphological pattern, namely conical or peg-shaped, tuberculate, supplemental and odontome. ST displaying normal size and shape are referred to as supplemental [10]. These are most often the permanent maxillary lateral incisors [3].

The prevalence rate of ST ranges between 1% and 3% in the general Caucasian population [11] and they have been found in both permanent and primary dentition. In the Caucasian population, the prevalence of ST in the permanent dentition varies between 0.1% and 3.8% and in the primary dentition between 0.3% and 0.8% [2]. In the sub-Saharan and Asian populations the estimated prevalence is higher, being between 2.7% and 3.4% [12]. In individuals with ST, 76–86% have one extra tooth, 12–23% two extra teeth and only 1% three or more ST [13]. Isolated ST are more common in the permanent dentition, where they demonstrate a preference for the anterior and then posterior regions of the maxillary arch [14]. However, multiple ST occur more commonly in the mandibular premolar region [15].

There are some reports on the prevalence of dental anomalies in Iranian patients referred to university hospitals [16,17]; however, to our knowledge there is no report in the English literature concerning the prevalence of supernumeraries in the general or orthodontic Iranian populations. According to a recent study [18], nearly a third of Iranian schoolchildren examined needed orthodontic treatment. The presence of ST can be an indication for orthodontic treatment and it has been given a very high priority (grade 5) by the dental health component of the Index of Orthodontic Treatment Needs [19]. Within this context, the purpose of the present study was to investigate the prevalence, characteristics and gender distribution of ST in an Iranian orthodontic population and also to investigate the association between the presence of ST and malocclusion type.

Material and methods

The material for this retrospective study consisted of records of Iranian orthodontic patients treated between September 1999 and December 2009. Ethical approval for the study was given by the deputy of Research Council, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Exclusion criteria for this study were patients with developmental anomalies such as cleft lip or palate, Down's syndrome and those who had undergone orthodontic treatment previously. The age range was 9–27 years (mean age 12.5 years). The subjects had visited the orthodontic departments at Shahid Beheshti and Tehran University dental schools in Tehran. A total of 1751 children and adolescents (870 girls, 881 boys) were included in the study and the sample was equally divided between the genders. Late development of ST has been discussed in the literature [20]. Therefore, we used pretreatment and longitudinal radiographs for the present investigation (panoramic and periapical radiographs), study models and intraoral photographs. The dental history of patients was also checked in terms of extraction of previously erupted or impacted ST. Gender, age, type of ST, location and malocclusion were recorded for all subjects who participated in the study. Angle's classification was used to define the malocclusion type.

Statistical analysis

Data were collected and entered into the SPSS 17 program (SPSS Inc., Chicago, IL) for statistical analysis. The Pearson chi-square test was used to determine potential differences in the distribution of ST when stratified by gender and malocclusion type. The level of significance was set at 5%.

Results

In total ($n = 1751$), 14 ST were observed in 13 patients (mean age 12.5 years; six males, seven females). The prevalence rate was 0.74% and the difference in prevalence between the genders was not significant ($\chi^2 = 0.09$, $P = 0.76$). The prevalence rate of ST was significantly higher (5.2%) in Class III malocclusions ($\chi^2 = 37.99$, $P = 0.000$) (Table I). In contrast, a supernumerary tooth was a rare finding among Class II malocclusions (0.1%). Table II shows the gender distribution of ST according to the malocclusion type. The occurrence rate of ST was higher in the maxilla (78.5%, $n = 11$) than in the mandible (21.5%, $n = 3$).

Table I. Distribution [n (%)] of patients with ST according to malocclusion type[a].

	Malocclusion			
ST	Class I	Class II	Class III	Total
No	570 (99.0)	1059 (99.9)	109 (94.8)	1738 (99.3)
Yes	6 (1.0)	1 (0.1)	6 (5.2)	13 (0.7)
Total	576	1060	115	1751

[a]$\chi^2 = 37.99$; $P = 0.000$.

Table II. Gender distribution of ST according to malocclusion type.

	Malocclusion			
Gender	Class I	Class II	Class III	Total
Female	2	1	4	7
Male	4	0	2	6
Total	6	1	6	13

As Table III shows, the most common type was the conical type ($n = 6$), followed by supplementals ($n = 3$), odontomes ($n = 3$) and tuberculates ($n = 2$). ST appeared in a singular form in 85.7% of cases ($n = 12$). We did not observe any late-developing, paramolar or distomolar ST.

Discussion

Although several studies have reported the prevalence of dental anomalies, there has been no study investigating the general or orthodontic Iranian populations. Previous studies using non-specific data collection and small sample sizes reported significantly higher prevalence rates for ST of 2.4% [16] and 3.5% [17]. The present study, using a relatively large study sample of 1751 subjects, provided preliminary information on the prevalence and distribution of ST in an Iranian orthodontic population treated between 1999 and 2009 at several university orthodontic clinics. Current data in the literature reveal that ST are observed in 0.1–3.8% of the general population, but this prevalence can be as high as 28% in patients with cleft lip and palate [21,22]. Ethnicity is an important factor in these varying results. A higher prevalence of ST was reported for Chinese children than for white children [23]. The incidence of ST is usually higher among East Asians, patients with cleft lip and palate and in those with cleidocranial dysplasia [24]. In the present study, the prevalence of ST was found to be 0.74% and did not vary significantly between the genders. This is in contrast to the findings of some studies [9,22,25], which reported that males are affected approximately twice as frequently in the permanent dentition as females.

Table III. Distribution of different types of ST in the study sample.

Type of ST	Maxilla	Mandible
Conical	6	0
Tuberculate	2 (seen in one person)	0
Supplemental	2	1
Odontome	1	2

The diagnosis of ST cannot be confirmed without the use of radiographs [26]. Theoretically, it would be ideal to randomly select a sample of subjects and evaluate the corresponding panoramic radiographs for the presence of ST. However, due to ethical issues this was not possible and the present study consisted of a referred orthodontic population. Accordingly, the prevalence of ST (0.74%) in the present study might not represent that in the general Iranian population. In comparison to a report of a study in India on an orthodontic population [27], our prevalence rate was much lower. Similar to the study by Esenlik et al. [28] all ST in the present study were located mesially to the first molars. According to Solares and Romero [20], subjects with a history of ST in the anterior region (conical or tuberculate) at an early age have a 24% possibility of developing single or multiple supernumerary premolars. However, we did not detect a similar trend in our study on reviewing the longitudinal records.

ST most frequently present as a single tooth, while multiple ST appear frequently as two teeth [11,21]. In agreement with the literature, 85.7% of ST in our study were found to be single teeth and 14.28% were two teeth (in one person only). Regarding the location of observed ST, 78% were found to be in the maxillary arch. This is similar to the findings of Osuji and Hardie [29] in Saudi Arabia (79%). This value was higher than the value reported by Salcido-Garcia et al. [30] in the Mexican population, who found 66% of ST to be in the maxillary arch. However, this value was lower than that (91.3%) reported by De Oliveira Gomes et al. [31] in Brazilian children. The differences could be due to different sample sizes and racial differences. In agreement with previous studies, we found the mesiodens to be the most common type of ST (43%) [13,28,30]. However, Yusof [15] reviewed the literature and found that premolars were the most frequent ST, followed by molars and mesiodens.

Similar to Basdra et al. [32], we found a higher prevalence (5.2%) of ST in Class III malocclusions. In contrast to this, Uslu et al. [33] did not find any differences between malocclusions in terms of ST prevalence. Given the relatively high prevalence of Class III malocclusions in the Iranian population [34] and the positive associations derived using a relatively small sample size in this preliminary study, further studies with larger sample sizes are indicated to further investigate this association. A possible limitation of this study is the small number of ST observed, which makes it difficult to draw conclusions regarding jaw preferences, association with particular malocclusions or gender differences. However, the present findings can provide preliminary information for clinicians on which areas to concentrate orthodontic examinations of patients when ST are suspected.

Conclusions

The prevalence rate of ST was 0.74% and there was no difference in prevalence between the genders. ST were more common in Class III malocclusions and presented mostly in the maxillary arch. The most common form of ST was the mesiodens (conical form).

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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