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Study of the frequency, localisation and morphology of supernumerary teeth in 1960 Spanish non-syndromic paediatric patients

ABSTRACT

Aim The main objective was to study supernumerary teeth diagnosed during the routine checkups at the Paediatric Dentistry Service of Hospital de Nens, Barcelona (Spain), for four months.

Materials and methods A transversal, descriptive study, was performed in 1,960 patients, aged 1 to 17 years, visited during routine oral checkups. An intraoral exploration (with intraoral mirror and probe) was performed to all patients, and subjects older than 5 years also underwent panoramic x-ray examination.

Results A total of 33 patients showed supernumerary teeth (1.68%), 22 boys and 11 girls. A total of 10 patients (8 boys/2 girls) had supernumerary teeth in the temporary dentition, 20 patients (12 boys/8 girls) in the permanent dentition and 3 patients (2 boys/1girl) in both temporary and permanent dentition. A total of 46 supernumerary teeth were diagnosed.

Conclusion Any alteration in the number of teeth in patients younger than 5 years are difficult to diagnose, as x-rays are usually not taken. We believe that starting at 5 years old, a radiological exploration (panoramic x-ray) has to be carried out as a complement to the clinical examination.

Keywords Hyperdontia, Mesiodens, Supernumerary teeth.

Introduction

Agenesis and supernumerary teeth are two alterations of the development of the oral and maxillofacial region.

Hyperdontia, or presence of supernumerary teeth, is an unusual alteration of odontogenesis resulting in teeth in addition to the regular dental formula that can appear in any area of the dental arch [Primosch, 1981; Garvey et al., 1999; Ferrés-Padró et al., 2009].

Supernumerary teeth are more common in the temporary than in the permanent dentition, and are usually found in the anterosuperior area. [Alberti et al., 2006; Ferrés-Padró et al., 2009; Thesleff, 2006]. The prevalence of hyperdontia reported in the literature related to the temporary dentition ranges between 0.3 and 0.8%, while in the permanent one it is between 0.8 and 3.8% [Bondemark et al., 2006; Kassai et al., 2005; Thesleff, 2003]. Furthermore, there is a high ratio between supernumerary teeth and patients with syndromic conditions (cleidocranial dysplasia or Gardner's syndrome) [Alberti et al., 2006] and also in the patients with cleft lip and palate [Fernández Montenegro et al., 2006; Sacal et al., 2001].

Supernumerary teeth can appear alone or grouped in any area of the maxilla or/and mandible and have different shapes. Moreover, their development state and the development's state of the affected teeth influence the treatment plan.

About 90% of supernumerary teeth are found in the maxilla, with special predilection for the anterosuperior area. The most common site is the midline of the maxilla. In this case, the supernumerary tooth is known as mesiodens.

Supernumerary teeth can erupt or remain retained, and they do not allow the normal development and the

normal eruption of the corresponding permanent teeth. The presence of one or more supernumerary teeth can alter the development and normal eruption of the other teeth causing crowding, displacement, diastema, retention, radicular resorption and, in some cases, dentigerous cyst. In other cases the supernumerary teeth are asymptomatic and they are an accidental radiographic finding [Atwan et al., 2000; Ersin et al., 2004; Kassai et al., 2005]

The study of the supernumerary teeth and associated conditions is important for the oral and maxillofacial development. This study performed on a local population was compared with previous ones conducted in different geographical areas. The main objective of the investigation was to study the supernumerary teeth (diagnosed during routine checkups of the Paediatric Dentistry Service in a Children's Hospitals) in order to contribute to increase the knowledge on hyperdontia.

Materials and methods

A transversal, descriptive study, in about 1960 patients (948 boys and 1,012 girls), aged between 1 and 17 years, was conducted during routine oral checkups at the Paediatric Dentistry Service of Hospital de Nens (Barcelona), for four months (September-December, 2012).

A clinical examination (with intraoral mirror and dental probe) was performed to all patients and those over 5 years of age also underwent a panoramic radiograph (1,653 patients: 860 boys and 793 girls). All examinations were performed by the same clinical examiner, a paediatric dentistry specialist. The informed consent was obtained.

Selection of the patients was based on the following inclusion and exclusion criteria.

Selection criteria included healthy patients visited during routine checkup at the Paediatric Dentistry Service, who had no syndrome or disease involving alterations of odontogenesis and/or dental eruption, and also with no previous history of supernumerary teeth.

A database was designed for collection of date of dental exploration and patient's personal data with gender, age, diagnosis (clinical or radiological), type of dentition (temporary, permanent or mixed dentition), location (six possible locations), number (unique, double, more than three), morphology (conoid, supplemental, tubercular and mixed), eruption alterations and also family history. The anatomic location the supernumerary teeth was limited to six possible maxillary and mandibular areas: interincisal (mesiodens), incisor, canine, premolar, paramolar, and distomolar site. The morphologic classification (Fig. 1) groups supernumerary teeth as follows: conoid (small conical tooth shape), supplemental (similar to the other

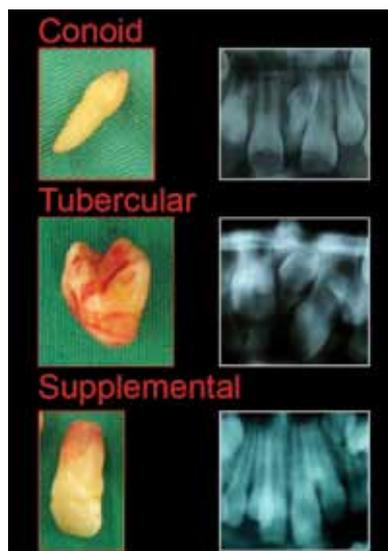


FIG. 1
Morphologic
classification.

teeth of that group), tubercular (usually having one or more tuber or cusp) or mixed (when a supernumerary cannot be identified as conoid, supplemental or tubercular).

Statistic analysis was carried out by means of Statgraphics Plus 5.1.

Results

The study population was composed of 1,960 paediatric patients: 948 boys and 1,012 girls, for a total of 1,653 patients over 5 years and 307 children under 5 years of age.

In total, 46 supernumerary teeth were diagnosed in 33 patients, 22 boys (66.66%) and 11 girls (33.33%): 6 were children under 5 years of age (18.18%) and 27 were older than 5 years (81.82%). The prevalence in our sample of 1,960 paediatric patients was 1.68%.

Five of the 6 patients under 5 years of age were diagnosed by clinical exploration and 1 with a periapical radiograph taken for trauma checkup.

The 27 patients over 5 years old were diagnosed during routine oral checkups, through an x-ray examination (orthopantomography). A total of 10 patients (30.30%), 8 boys and 2 girls, had supernumerary teeth in the primary dentition; 20 patients (60.61%), 12 boys and 2 girls, had supernumerary teeth in the permanent dentition and 3 patients (9.09%), 2 boys and 1 girl, had supernumerary teeth in both the temporary and permanent dentition.

Supernumerary classification according to their location in the jaws: 45.45% were located in the midline of the upper jaw (mesiodens) (Fig. 2); in 39.39% of cases in the upper incisor area; 9.09% were found in the upper incisor zone together with a mesiodens and only 6.06% in the lower incisor area (Fig. 3). No supernumerary teeth located in the canine, or premolar

and molar areas were found, this is probably due to the average age of the study population, which is 6 years and 4 months.

Number of supernumerary teeth (Fig. 4) found in each patient: 78.79% of patients had a single supernumerary tooth; 18.18% of patients had two supernumerary teeth and only one had multiple (more than two) supernumerary teeth 3.03%.

As regards morphology (Fig. 5), 48.48% were supplemental, 45.45% were conoid, 3.03% were mixed and 3.03% were tubercular supplemental.

The existence of tooth eruption alterations has been studied, and only 9.09% of patients with supernumerary teeth suffered some type of alteration of the eruption of the adjacent teeth (90.91% unaltered teeth eruption)

Only one patient (6.05%) had a family history of supernumerary teeth and 93.94% had none.

Discussion

Supernumerary teeth are a rare alteration of the stomathognathic system. They can appear in any area of the maxilla or mandible and can affect any teeth. It also can be associated with syndromes [Salcido-García et al., 2004; Gábris et al., 2006].

A comparative analysis was performed and results reported in the literature were compared with those of our study, focusing on: number of supernumeraries, age, gender, location and morphology (Table 1).

Hyperdontia aetiology is still unknown but some theories have been formulated: the supernumerary teeth could be the result of a dichotomy of the tooth germ [Liu et al., 2009]. According to another theory supernumerary teeth are the result of local hyperactivity of the dental lamina during embryogenesis [Levine, 1961]. The current genetic studies explain the action of the ectodin as a protein that inhibits the third dentition [Thesleff, 2003; Thesleff, 2006]. Several studies suggest a family tendency; in our study, 6.05% of the patients had a family history of supernumerary teeth.

In this investigation, a sample of 1,960 non-syndromic patients from the Barcelona area was studied. They were visited during a dental routine checkup performed by the same paediatric dentist. A total of 33 affected patients were found and 46 supernumerary teeth were detected: 0.51% of them appeared with the temporary dentition, 1.02% in the permanent one and 0.15% in both. This finding agrees with previous studies [Díaz et al., 2009; Celikoglu et al., 2010].

The most affected area in young populations is the premaxilla [Fernández Montenegro et al., 2006; Sacal et al., 2001; Salcido-García et al., 2004]; in contrast, the retromolar area is the most commonly affected area in the adult population [Leco-Berrocá et al., 2007]. The average age in this study was 6.25 years; this explains



FIG. 2 Localisation: Mesiodens.

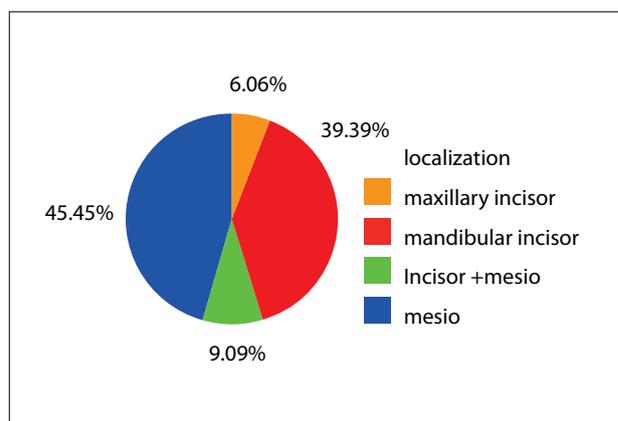


FIG. 3 Localisation.

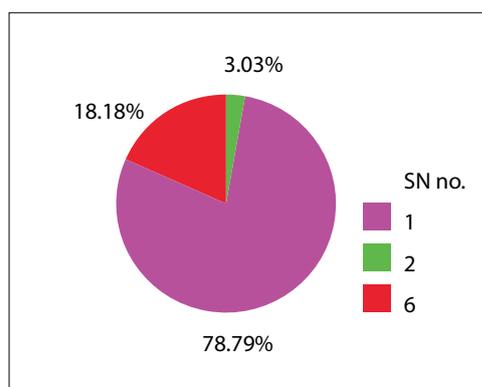


FIG. 4 Number of super-numerary.

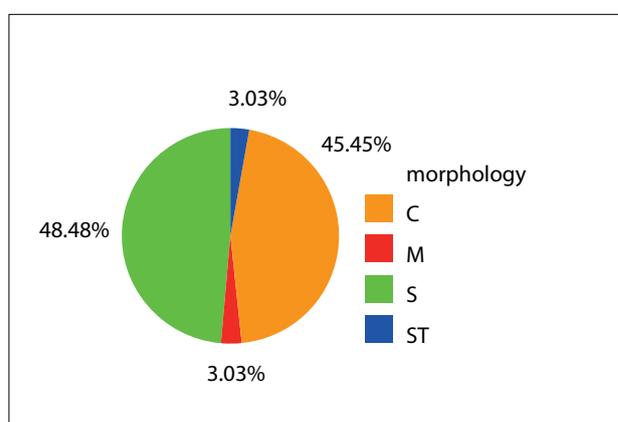


FIG. 5 Morphology of supernumerary.

Study	Country	N pac.pz	Ratio gender M:F	Age -range	Mean age	N snt ¿??	1snt	2snt	>3snt
Bruce et al. (1994)	USA	1,49%/ 2,267	NR	NR	NR	NR	NR	NR	NR
Whittington BR and Durward CS (1996)	New Zeland	3/1,680	2:1	5	NR	NR	NR	NR	NR
Sacal et al. (2001)	USA	12/500		3-5	NR	14	NR	NR	NR
Costa Pinho et al. (2004)	Portugal	127/16,771	3:1	5-63	NR	151	105	20	2
Ersin NK et al. (2004)	Turkey	24	3:1	NR	NR	NR	NR	NR	NR
Salcido-García et al. (2004)	Mexico	72/2,241	1.18:1	2 - 55	14 y 4 m	102	63	NR	NR
Alberti G et al. (2006)	Italy	1,577	2:1	6-10	NR	NR	NR	NR	NR
Bondemark et al. (2006)	Sweden	496	NR	NR	11.2 y	NR	NR	NR	NR
Gabris K et al. (2006)	Hungary	2219	NR	6-18	NR	NR	NR	NR	NR
Fdez-Montenegro et al. (2006)	Spain	102/36,057	1.42:1	5 - 56	17.6 yrs	147	77	14	9
Leco-Berrocal et al (2007)	Spain	21/2,000	2.49:1	7 - 34	20 yrs 2 m	24	NR	NR	NR
Schmuckli et al (2010)	Swiss	3,004/1,5%	2,75:1	6-15	9,45	44	NR	NR	NR
Lara TS et al. (2013)	Brazil	30/1995	1.5:1	4-13	8 yrs 3 m.	36	24	6	NR
Patil S. et al. (2014)	Indian	76/4,750	2:1	8-72	34.6 yrs	76	NR	NR	NR
Our Study	Spain	33/1,960	2:1	1 - 17	6 yrs 3 m.	46	26	6	1

n=number, pacpz=patients, snt=supernumerary teeth, NR = No not reported.

TABLE 1 Demographic data, gender ratio and number of supernumerary teeth.

why no supernumerary teeth was found in retromolar area. Mesiodens (premaxila area) is the most reported type in supernumerary teeth studied, and represents 45.45% of supernumerary teeth of our study.

Supplemental and conoid supernumerary teeth usually have a radicular morphology and development similar to the adjacent permanent teeth [Foster and Taylor, 1969; Kara et al., 2012; Lara et al., 2013; Leco-Berrocal et al., 2007; Patil and Maheshwari, 2014]. Foster and Taylor [1969] explained that tubercular supernumerary teeth are those usually associated with alterations of dental eruption, while conoid ones cause tooth displacement.

In the present study the most common morphology was supplemental (48.48%), followed by conoid (45.45%).

The distribution according to gender found in our study indicates a higher prevalence in males than in females, with a M:F ratio of 2:1. In contrast, other studies report that there are no differences in the gender ratio in primary dentition, while it is 2:1 in the permanent dentition [Atwan et al. 2000; Salcido-García et al., 2004; Patil and Maheshwari, 2014].

Treatment planning of supernumerary teeth depends on their morphology and location. Extraction is the treatment of choice, with can be combined with other treatment options such as orthodontic therapy.

Conclusion

Supernumerary teeth are more frequent in boys than in girls and the diagnostic technique of choice is the ortopantomography.

Normally, supernumery tooth are found alone in the premaxilla area, where they are called mesiodens. The most frequent morphology is supplemental, followed by conoid.

Most patients with supernumerary teeth have no alterations in dental eruption, nor family history.

Any alterations in the number of teeth in patients younger than 5 years are difficult to diagnose, as X-rays are usually not taken.

From our point of view, a radiological examination (ortopantomography) has to be carried out as complement to the clinical exploration in patients over 5 years old.

Conflicts of interest

The authors declare that they do not have any conflict of interest. This study has been performed by the Research Group of the Fundació Hospital de Nens of Barcelona.

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