

## Retrospective study of 145 supernumerary teeth

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### ABSTRACT

**Objective:** The goal of the present retrospective study is to describe the distribution of the supernumerary teeth in a population of patients that have been attended at the Public Clinic of the Department of Oral Surgery.

**Background:** Supernumerary teeth and multiple hyperdontia are usually associated with different syndromes, such as Gardner syndrome, or with facial fissures; however, they can appear in patients without any pathology. Their prevalence oscillates to 0.5-3.8% in patients with permanent teeth and to 0.35-0.6% in patients with primary teeth.

**Patients and Methods:** A total of 36,057 clinical histories of patients that were admitted at the clinic between September of 1991 and March of 2003 were revised. The following data were extrapolated: age, sex, number of extracted supernumerary teeth, localization, morphology and type of supernumerary teeth. Consequently, 102 patients were included into the present study.

**Results:** Of the 147 supernumerary teeth identified in the oral cavities of patients 145 were extracted. The most frequent supernumerary teeth identified were mesiodens (46.9%), followed by premolars (24.1%) and fourth molars or distal molars (18%). As for location, 74.5% of the supernumerary teeth were found in the superior maxillary bone and 46.9% of the supernumerary teeth were present in the palatine/lingual area. Heteromorphology was found in two thirds of the supernumerary teeth, with conical shape being the most frequent. Finally, 29.7% of the supernumerary teeth had occlusion with permanent teeth, and mesiodens were the predominating type of supernumerary teeth that showed this feature.

**Conclusions:** Mesiodens very frequently cause retention of permanent incisors, which erupt spontaneously after the extraction of supernumerary teeth, if there is sufficient space in the dental arch and if they conserve the eruptive force. Generally, supernumerary premolars are eumorphic and are casually discovered during radiological exam, if not producing any symptomology.

**Key words:** *Supernumerary teeth, mesiodens, supernumerary premolars, distal molars, paramolars, oral surgery.*

### RESUMEN

**Objetivo:** El presente estudio retrospectivo pretende describir la distribución de los dientes supernumerarios en una población de pacientes que acuden a una Unidad ambulatoria de Cirugía Bucal.

**Introducción:** Los dientes supernumerarios y la hiperodoncia múltiple se asocian normalmente con diferentes síndromes como el de Gardner o con fisuras faciales; sin embargo, pueden aparecer en pacientes sin ningún tipo de patología. Su prevalencia oscila entre el 0,5 y el 3,8% en la dentición permanente y entre el 0,35 y el 0,6% en la decidua.

**Pacientes y método:** Para ello, se revisaron 36.057 historias clínicas de pacientes que acudieron a nuestro Servicio entre septiembre de 1991 y marzo de 2003. Se recogieron los siguientes datos: edad, sexo, número de dientes supernumerarios extraídos, localización, morfología y tipo de diente supernumerario. El número de pacientes incluidos en el estudio fue de 102.

**Resultados:** De los 147 dientes supernumerarios descubiertos en la cavidad bucal, se extrajeron un total de 145. El grupo más frecuente fue el de los mesiodens (46,9%), seguido por los premolares supernumerarios (24,1%) y los cuartos molares supernumerarios o distomolares (18%). El 74,5% de los dientes supernumerarios se localizaban en el maxilar superior y un 46,9% de los dientes supernumerarios se localizaban en palatino/lingual. La morfología heteromórfica aparecía en dos tercios de los dientes supernumerarios, siendo la más frecuente la conoide. El 29,7% de los dientes supernumerarios producían la inclusión de los dientes permanentes, siendo el mesiodens el que la producía con mayor frecuencia.

**Conclusiones:** Los mesiodens producen con elevada frecuencia la retención de los incisivos permanentes, que erupcionan espontáneamente después de la extracción de los dientes supernumerarios, si tienen espacio suficiente en la arcada y conservan la fuerza eruptiva. Los premolares supernumerarios tienen normalmente morfología eumórfica y son un hallazgo radiológico casual, al no producir ningún tipo de sintomatología.

**Palabras clave:** Dientes supernumerarios, mesiodens, premolares supernumerarios, distomolares, paramolares, cirugía bucal.

## INTRODUCTION

Supernumerary teeth, or hyperdontia, are the teeth that exceed the normal dental formula, independent of their location and form (1-9). The prevalence of supernumerary teeth in permanent teething oscillates to 0.5-3.8%, in comparison to 0.3-0.6% in primary teething (1, 2, 4, 5, 9-11). Supernumerary teeth appear with a higher frequency in men than in women, with a 2:1 ratio (1-3, 5, 8, 12-14).

The presence of only one supernumerary tooth occurs in 76-86% of cases, two in 12-23% and only 1% of individuals have three or more supernumerary teeth. Multiple hyperdontia can be associated with Gardner syndrome, Fabry-Anderson syndrome, Ehlers-Danlos syndrome, facial fistulas or cleidocranial dysplasia (1, 3-8, 12-14).

Mesiodens are a type of supernumerary teeth that appear most frequently, between 47% and 67% of cases, with a prevalence of 0.15-1.9% in general population. The next most common types are distomolars or fourth supernumerary molars (26% of cases) and paramolars and supernumerary premolars (1, 2, 4, 15). The degree of prevalence of supernumerary teeth in general population ranges between 0.09% and 0.29%, corresponding to 8-9.1% of supernumerary teeth (1, 2, 4, 7-9, 11, 12). Table 1 demonstrates the prevalence and frequency of supernumerary teeth according to type (1, 4, 16).

Eumorphic supernumerary teeth display similar morphology to their corresponding tooth type, whereas heteromorphic ones show distinct forms such as conical or pin, tuberculate, infundibular, and molariform (1, 14, 17).

The objective of the present study was to determine the frequency and clinical status of the supernumerary teeth that were surgically removed at the Department of Oral Surgery at the University of Barcelona.

## METHODS AND PATIENTS

The study population comprised of patients that were attended at the Department of Oral Surgery between September of 1991 and March of 2003. Of the 36,057 clinical histories revised, 175 histories were selected, since they gathered the following inclusion data: age, sex, number of supernumerary teeth, morphology, localization and type of supernumerary tooth, status of supernumerary tooth (teeth) and whether any orthodontic treatment has been carried out. However, 73 of these clinical histories had to be excluded from the study due to missing data such as the status, localization and morphology of supernumerary teeth, which were necessary to determine the frequency parameters. Therefore, the final number of patients included in the study was 102, with a total of 147 supernumerary teeth. For statistical analysis, Shapiro-Wilks test was applied using Statistical Package of the Social Sciences (SPSS) program for Windows 9.0.

**Table 1.** Frequency and prevalence of the supernumerary teeth according to dental group (1, 4, 16).

	Mesiodens	Premolars	Distomolars	Paramolars	Lateral Incisor	Canine
<b>Frequency</b>	47-67%	8-9%	26%	15%	2,05%	0,40%
<b>Prevalence in the population</b>	0,15 - 1,9%	0,09 - 0,29%	0,13 - 0,6%	0,08 - 0,5%	0,01 - 0,08%	0,002 - 0,02%

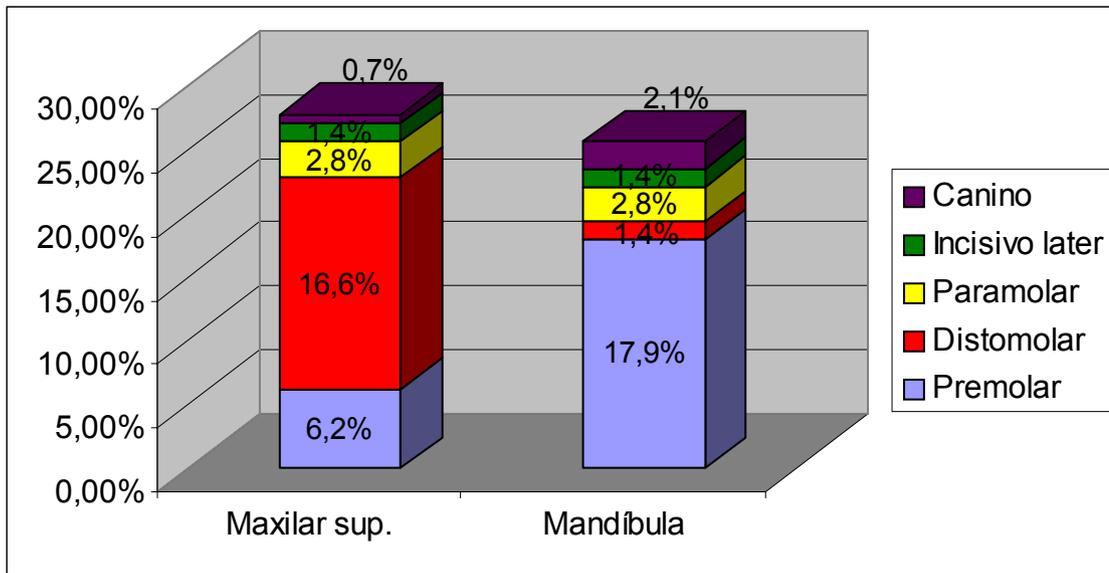
**RESULTS**

A total of 145 supernumerary teeth were extracted from 102 patients, of which 60 were men and 42 were women, with a ratio of 1.4:1. The age of the patients ranged from 5 years to 56 years (median age: 17.11 years, standard deviation: 10.53 years). In 77.5% of cases, one supernumerary tooth was extracted, in 14.5% two supernumerary teeth, and in the remainder of the patients three or more supernumerary teeth were removed. Moreover, an extraordinary case was discovered in one of the patients who had 12 supernumerary premolars, half of which erupted and were asymptomatic with four of them of conical morphology. The supernumerary teeth were extracted in all patients, except for three who chose to keep the teeth and undergo periodical revisions, since surgical intervention could have lesioned the neighboring teeth (3 inferior supernumerary premolars, 1 superior supernumerary premolar and 1 inferior paramolar).

The mesiodens were the type of teeth that appeared more frequently as supernumerary teeth (46.9% of the patients), followed by supernumerary premolars (24.1%), then by fourth supernumerary molars (18%) and, finally, supernumerary paramolars were found in 5.6% of the cases. The extracted supernumerary teeth were most frequently identified in the superior maxillary (74.5%) and their common position was in the palatine/lingual area, followed by the vestibular localization. In Figure 1, the frequency of the extracted supernumerary teeth, excluding the mesiodens, is described according to their localization in the maxillary bones, and Table 2 denotes the position of the supernumerary teeth in the maxillary bones (erupted, vestibular, palatine/lingual or inverted inclusion), as well as morphology and associated clinical status. Finally, 75.9% of supernumerary teeth included in this study were heteromorphic and the rest were eumorphic (Table 2).

**Table 2.** Localization, morphology and clinical status of the supernumerary teeth.

		Mesioden	Premolar	Distomolar	Paramolar	Lateral Incisor	Canine	Total	
<b>Localization</b>	Vestibular Inclusion	12	9	24	4	1	1	51 (35.2%)	
	Palatine / Lingual Inclusion	40	20	1	3	3	1	68 (46.9%)	
	Erupted	10	6	1	1	-	2	20 (13.8%)	
	Inverted position	6	-	-	-	-	-	6 (4.1%)	
<b>Morphology</b>	Eumorphic	-	28	3	1	1	2	35 (24.2%)	
	Heteromorphic	Conical	58	7	14	3	3	2	87 (60%)
		Molariform	7	-	9	4	-	-	20 (13.7%)
		Infundibular	3	-	-	-	-	-	3 (2.1%)
<b>Clinical Status</b>	Asymptomatic	27	32	16	4	3	2	84 (57.9%)	
	Inclusion of permanent teeth	35	-	5	2	-	1	43 (29.7%)	
	Facial Algias	-	2	5	1	-	-	8 (5.6%)	
	Dental/diastem malposition	5	-	-	-	-	1	6 (4.1%)	
	Rhizolysis/pulpal pathology	-	1	-	1	-	-	2 (1.4%)	
	Formation of follicular cyst	1	-	-	-	1	-	2 (1.4%)	



Maxillar superior: Upper maxilla. Incisivo lateral: Lat. incisor. Canino: canine. Distomolar: distal molar. Mesiodens: 46.9%

Fig. 1. Distribution of the supernumerary extracted teeth by type, excluding the mesiodens.

**DISCUSSION**

Our study showed that the proportion of supernumerary teeth in relation to sex was more prevalent in men, with a 1.4:1 ratio, which is slightly inferior to the results reported by other authors (1-3, 5, 8, 12, 13, 15, 18). All patients included in the study were Caucasian, except for an immigrant from Gambia, West Africa. The higher tendency of discovering supernumerary teeth in Subsaharan and Asian patients has been previously mentioned in the articles by Brown (19) and Zhu et al.(4), stating the prevalence of between 2.7% and 3.4% in these populations.

The results of this study clearly show that mesiodens are the most frequent type of supernumerary teeth (46.9%), followed by supernumerary premolars (24.1%) and distomolars (18%). These results coincide with the ones published by Raja and Hamdam (17), who showed that premolars were the second most frequent type of supernumerary teeth in their study population. Nevertheless, the authors such as Gay-Escoda and Berini (1), Menardía et al.(20), Nasif et al. (21) state that the supernumerary teeth of the molar group are the most prevalent type in general population.

In the present study, two thirds of the supernumerary teeth were located in the superior maxillary bone, with the palatine position being the most frequent, in 46.9% of the cases. Nevertheless, the reviews by Zhu et al. (4) or Hattab et al. (3) claim that 90% of supernumerary teeth are found in the superior maxillary bone.

Heteromorphology was seen in 75.8% of supernumerary teeth, especially the conical form (60% of cases), which was found in a majority of mesiodens; these results coincide with the ones reported by Rajab and Hamdan (17) and Kim and Lee (18).

The mesiodens were the type of teeth that caused more complications in terms of dental inclusion, one of the habitual motives for patient consultation at our department. This clinical fact is also highlighted in the reports by Mitchell and Bennett (22) and by Seddon et al. (23). Since our study is of retrospective nature, we were unable to inspect whether extraction of mesiodens resulted in a spontaneous eruption of retained permanent incisors or whether it was necessary to carry out another type of surgical and/or orthodontic treatment. According to Michell and Bennett (22), 70% of the permanent teeth included in their study population erupted spontaneously, although this percentage value does not coincide with the data by Patchett et al. (24), probably due to the fact that the authors did not differentiate between exposure of permanent incisors at the moment of extraction of mesiodens and later surgical treatment.

In our study as well as in those by Giacontti et al. (15), Seddon and Johnstone (23) and Kim and Lee (18), conical morphology and palatine position were the most common characteristics of the supernumerary teeth. Other authors, including Mitchell and Bennett (22), Mason et al. (13) and Patchett et al. (24) have attempted to find a correlation between conical or tuberculate morphologies and retention of permanent teeth. While Mitchell and Bennett concluded that they were unable to establish such relationship, the latter two postulated that teeth of tuberculate morphology were more likely to be retained than those of conical shape. These claims suggest two approaches for the extraction of mesiodens: early extraction (before the radicular formation of permanent incisors) and late extraction (when permanent incisors have completed their formation) (14, 17, 22). Based on our experience, we believe that early extraction

favors the eruption of permanent incisors, prevents the loss of anterior space in the dental arch and averts further complications of cystic (follicular cyst) or pulpal (rhizolysis of permanent incisors) nature. However, in cases where the supernumerary tooth does not cause any symptoms or when there is an elevated risk of damaging the development of the permanent tooth it is advisable to avoid therapeutic approach and instead adhere to periodic clinical and radiological examinations (1, 25, 26).

In our patient sample, the second most frequent group of supernumerary teeth were the premolars (24.1%), most of which were eumorphic (81.8%) and located in the mandible in the lingual position. These results coincide with the ones disclosed by Rubenstein et al. (27) and Hedge and Munshi (28), although less frequent, between 8% and 9% of all supernumerary teeth. On the other hand, the identification and discovery of supernumerary premolars was carried out via radiological examination (51.4%), when no symptoms were observed, and were found in patients older than 12 years, as also reflected by McNamara et al. (8), Rodríguez-Armijo et al. (7) and Hedge and Munshi (28).

The next most common type was the supernumerary molars (23.6%), especially distomolars, which constituted 18% of the supernumerary teeth. The supernumerary molars were ordinarily located in the superior maxillary bone, subsuming 90% according to literature reports (29, 30) and representing 82.4% in our study. The presence of supernumerary distomolar affected third molars (impacted) only in 14.7% of cases, however, these results do not coincide with those of Menardia et al. (20) who reported 40% of third molars being affected. Overall, 58.8% of the supernumerary molars were discovered in a routine radiological exam and did not show any sign or associated symptom. Generally, supernumerary teeth in this group were heteromorphic, displaying conical (50%) and molariform (38.3%) shapes (1, 3).

In our study, the group comprised of supernumerary canines and supernumerary lateral incisors had a rather low frequency (2.8%), which is concurrent with the data from previous reviews, and 75% of supernumerary lateral incisors located on both maxillary bones in the same position did not cause any symptoms (1, 17).

As aforementioned, retrospective nature of the present study sets certain limitations, including the inability to evaluate the time of eruption of impacted permanent incisors and the need for a future orthodontic and/or surgical treatment. Therefore, prospective studies on this topic will help investigate in more detail the evolution of the permanent teeth and establish possible relationship between morphology of the supernumerary tooth and dental inclusion.

We have observed that 51.47% of mesiodens caused retention of permanent incisors. Authors such as Mitchell and Bennett (22) and Patchett et al. (24) claim that approximately 65% of permanent teeth erupt spontaneously after the extraction of the supernumerary teeth, if there is sufficient space in the dental arch and if they conserve the erupting force. The supernumerary premolars tend to be discovered

during a casual radiological exam, since they normally do not produce any symptoms, and in the majority of cases are detected in patients older than 12 years of age.

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