

# Characteristics of premaxillary hyperodontia

## A radiographic study

Bjørn Hurlen and Diderich Humerfelt

Department of Oral Surgery and Oral Medicine and Department of Oral Radiology,  
University of Oslo, Oslo, Norway

Hurlen B, Humerfelt D. Characteristics of premaxillary hyperodontia. A radiographic study. *Acta Odontol Scand* 1985;43:75-81. Oslo. ISSN 0001-6537.

Among 63,029 patients admitted to Department of Oral Radiology, University of Oslo, 900 had a total of 1153 supernumerary teeth located to the premaxillary region. Characteristics of the supernumeraries were predominance in males, predominance in the permanent dentition, predominant location in the central incisor region, and predominant position palatally to the dental arch, vertically oriented, half of them inverted. Interference with the normal dentition included malposition, diastema, maleruption, and resorption. Sequelae included widened follicular space, dentigerous cyst formation, dental pulp necrosis, pulp canal obliteration, root resorption, and ankylosis. Nearly 60% of the patients had radiographic or clinical signs of interference with the normal dentition or of associated complications. □ *Epidemiology; sequelae; supernumerary teeth*

*Bjørn Hurlen, Department of Oral Surgery and Oral Medicine, University of Oslo, P.O.B. 1109, Blindern, Oslo 3, Norway*

Hyperodontia is a well-recognized anomaly of the human dentition, and a great body of information about the phenomenon has accumulated in the dental literature. The bulk of information seems to concentrate on complications and on peculiar features encountered in single cases, but also prevalence studies on various populations have been reported. These have disclosed prevalences ranging from 0.1% to 3.6% (1), much depending on whether dental radiographs were utilized and whether the material included patients referred for the evaluation of hyperodontia or associated sequelae.

The premaxillary region appears to be the site of predilection for hyperodontia (2, 3), and in a recent clinicoradiographic study on a representative population of 2043 Norwegian children, 25 (1.2%) presented with supernumerary teeth, all of which were located in the premaxilla (4). In this study the distribution of other characteristics was also evaluated, but since the material was limited, rendering small subgroups, the results may have been vulnerable to random occurrences. The purpose of the present investigation was to remedy this deficiency by studying the distribution of various

characteristics of hyperodontia in a large Norwegian university clinic population.

## Materials and methods

The present study involved 921 patients with a diagnosis of hyperodontia of the premaxillary region. The diagnosis was based on clinical and radiographic examination and constituted the total number of patients with this diagnosis out of 63,029 individuals, 31,641 males and 31,388 females, who had attended the Department of Oral Radiology, University of Oslo, during the past 15 years. Twenty-one patients were rejected from the study, 11 because of foreign ethnic origin and 10 because of a diagnosis of odontomas or congenital disorders known to predispose for hyperodontia, such as cleft lip and palate and cleidocranial dysostosis (1). The remaining 900 had been referred for several reasons including the evaluation of hyperodontia.

Demographic and history information were drawn from the patient files and, whenever necessary, supplemented with direct inquiry. Clinical examination included any abnormal condition but in particular

dyseruption or malposition of the regular front teeth and the presence of supernumerary teeth, erupted or partially erupted.

The radiographic examination was based on full mouth survey comprising 14 films or/and panoramic dental radiograms. Any radiogram disclosing or indicating the presence of an unerupted supernumerary tooth, or tooth bud, was supplemented with profile views and with radiograms for the exact determination of the position of the supernumerary relative to the regular teeth. The position was recorded by a method described previously (4), by plotting the image of both ends of the long axis of the supernumerary tooth on to transparent diagrams superimposed on frontal and profile views. The coordinate system of the diagrams was oriented in accordance with predetermined landmarks of the radiograms.

Further radiographic observations included: number of supernumeraries, single or multiple; dentitional origin, primary or permanent; stage of development; morphological characteristics, normal or dysplastic; interference with regular teeth; and other pathological conditions associated with supernumerary teeth.

Standard equipment and films were used, and the processing followed standard routines. Examination and interpretation of the radiograms were also done under standard conditions. All information and all data were coded and transferred to a computer for analysis.

## Results

### *General occurrence of hyperodontia*

Supernumerary teeth occurred in the premaxilla of 900 patients of Norwegian origin. An additional 188 patients had supernumerary teeth, but in other regions. In 15 patients with premaxillary hyperodontia supernumeraries were detected also outside the premaxillary region. A total of 1153 premaxillary supernumeraries were found, for an average of 1.28 per individual. Most of the patients had a single supernumerary

Table 1. Premaxillary hyperodontia. Distribution by sex and number of supernumerary teeth per patient

Sex	No. of supernumerary teeth per patient					Total
	1	2	3	4	5	
Male	451	144	13	4	2	614
Female	231	49	4	2	0	286
Total	682	193	17	6	2	900

tooth, and some had two, but very few had more (Table 1).

### *Age and sex distribution*

Table 2 shows the distribution of age and sex. The age at the time of first examination ranged from 9 months to 80 years, but most, 71%, were younger than 13 years. The sex ratio was about 2:1 in favor of males. The number of supernumeraries per male was 1.31 and per female 1.22. The male to female ratio was unevenly distributed among the age groups, being greatest in the 7-12-year-old group, 2.7:1, and lowest in the 19-24-year-old group, 1.3:1.

Table 2. Premaxillary hyperodontia. Distribution by age and sex

Age, years	Male, no.	Female, no.	Total, no.
<4	41	25	66
4-6	105	48	153
7-12	307	114	421
13-18	44	21	65
19-24	29	22	51
≥25	88	56	144
Total	614	286	900

Table 3. Distribution of premaxillary supernumeraries in 63,029 patients, by sex and side

Sex	No. of patients	No. of supernumerary teeth		Total
		Right	Left	
Male	614	358	446	804
Female	286	161	188	349
Total	900	519	634	1153

*Location*

Premaxillary supernumerary teeth were found slightly more often on the left side than on the right side of the midline, 55% and 45%, respectively. This distribution was equal for both sexes (Table 3). Most, 80.1%, were situated in the region of the central incisor, and 13.5% of them were found in the lateral incisor region. The remaining involved both regions equally (Table 4).

*Position*

Most supernumeraries had an inclination angle with the occlusal plane above 45° and were recorded as vertically positioned. They comprised 89% of the material. However, nearly half of these had an inverted position (Table 5). Those with an inclination angle of 45° or below were recorded as having a horizontal position and comprised 10.9% of the material. Otherwise, Table 5 shows a great tendency of supernumeraries to be palatally positioned. Only 2.9% of them had a totally labial position. In 7.5% of the cases the supernumerary tooth was discernible both labially and palatally to the dental arch on sagittal views.

Table 4. Distribution of supernumerary teeth by sex and region in premaxilla

Sex	Region						Total
	11/12*	12	11	21	22	21/22*	
Male	21	59	278	358	58	30	804
Female	12	14	135	153	25	10	349
Total	33	73	413	511	83	40	1153

\* Combination of both sites.

In 193 cases the position of the supernumerary was characterized as special, comprising 143 in close proximity to the nasal floor, 12 erupted into the nasal cavity, 3 erupted in the palate, 26 lying dorsally in the palate, most often parallel to the median palatal suture, 3 that had pierced through the wall of the incisive canal, 10 lying in the anterior nasal spine, and 5 that had erupted just below it.

*Dentitional origin*

Out of 1153 supernumerary teeth, 93 (8.4%) had emanated from the primary dentition, and most of them occurred in young patients. In the youngest age group, below 4 years of age, nearly half of the supernumeraries belonged to the primary dentition. Nineteen of these children, 18 boys and 1 girl, had supernumeraries belonging to both dentitions. Otherwise, the sex distribution of patients with primary supernumerary teeth did not differ significantly from the others. All of the primary supernumeraries had a vertical position with a downward direction of the crown. Eighty per cent of them were within the dental arch, and the rest had a palatal or partly palatal position. They appeared to prevail in the lateral incisor region, as opposed to those of the permanent dentition, which prevailed in the central incisor region.

*Eruption*

Only 161 supernumerary teeth (14%) had erupted at the time of radiographic examination. Of these teeth 105 belonged to patients below 7 years of age, and 59 of them belonged to the primary dentition (37%).

Table 5. Distribution of supernumerary teeth by axial orientation and position relative to the dental arch as observed in sagittal views

	Labial	Labial/ within	Labial/ palatal*	Within	Palatal/ within	Palatal	Total
Vertical	23	9	10	123	19	411	595
Inverted	10	12	35	4	34	337	432
Horizontal	1	3	41	—	13	68	126
Total	34	24	86	127	66	816	1153

\* Supernumerary piercing through the dental arch.

Table 6. Distribution of supernumerary teeth by the stage of development compared with that of the regular corresponding teeth, assessed in 497 cases

Root development of supernumerary	Stage of development compared with that of the regular tooth			
	Ahead	Similar	Behind	Total
Incomplete	37	91	179	252
Complete	151	21	0	172
Total	188	112	197	497

### Stage of development

The stage of development of the supernumerary tooth relative to that of the corresponding regular tooth could be assessed in 381 of the patients presenting with 497 supernumerary teeth. The results are shown in Table 6, in which the supernumeraries are grouped in accordance with terminated or not terminated development. The former were usually ahead of the corresponding regular teeth, whereas the latter were behind or contemporaneous with their neighbors with regard to stage of development at the time of diagnosis.

### Malformation

Malformation was not seen in any of the regular teeth adjacent to supernumerary teeth in this material. However, 522 supernumeraries (45.3%) in 434 patients were malformed. Dens invaginatus occurred in 54 supernumeraries, 13 of which were inverted. Furthermore, 74 supernumeraries were peg-shaped, 65 had hook-shaped roots, 3 had otherwise malformed roots, and twinning, gemination, fusion, and concrescence occurred in 94, 11, 17, and 5 cases, respectively. Some of the patients were affected by more than one of the morphogenetic irregularities.

### Supernumerary teeth in other regions

In 15 patients with premaxillary hyperodontia, 17 supernumeraries occurred in other regions as well. The location of these were mandibular front region, 7; maxillary premolar region, 5; molar region, 4; and canine region, 1. Eleven of these patients were males.

### Interference with the median palatal suture

In 279 patients the supernumerary tooth had caused a displacement of the median palatal suture towards the opposite side. Displacement to the right side was observed in 57.7% of these cases and to the left in 42.3%.

### Interference with the regular dentition

*Disturbed eruption.* In 123 patients 157 supernumerary teeth had disturbed the normal eruption of the corresponding regular tooth. This occurred bilaterally in 33 patients. A typical constellation was that a permanent incisor tooth was impacted within the alveolar process by a supernumerary tooth residing in the concavity of the palatal surface of the crown of the regular tooth, occlusally to the tuberculum. The bone lamella between the two teeth was regularly lacking or incomplete. Development of the supernumerary tooth appeared arrested—that is, the radiograms displayed only a tooth crown. In 26 patients this could be confirmed by follow-up radiograms. The regular incisor usually developed at a normal rate, but as the developing root reached the nasal floor, it had deviated distally in 112 cases. After removal of the supernumerary the regular tooth usually erupted—however, often in an abnormal position.

Table 7. Distribution of patients in whom supernumerary teeth had caused malposition of the regular teeth, by sex and by type of malposition

Malposition	Males	Females	Total
Deviation/diastema	167	74	310
Rotation	58	28	86
Both types of malposition	69	24	93
Total	294	102	396

**Malposition.** In 396 patients (41%) the supernumeraries had caused malposition of the regular teeth, including deviation, diastema, and rotation. These complications occurred three times more frequently in males than in females. In 93 patients combinations of these types of complications were observed (Table 7).

#### *Other sequelae of hyperodontia*

In 183 patients with 195 supernumerary teeth, hyperodontia had given rise to the disorders listed in Table 8. The predominant disorder was pathological widening of the follicular space. Dentigerous cysts associated with the supernumerary, however, occurred in only 15 cases. Pathological resorption of teeth was seen more frequently in the supernumeraries themselves than in the neighboring teeth. In one of four cases involving normal teeth, extreme resorption required removal of a central incisor. Some of the patients were affected by more than one type of sequelae.

In summary, supernumeraries had been harmful or disadvantageous, in one or more ways, to 521 (57.9%) of the patients, comprising 376 (61.2%) males and 145 (50.7%) females.

#### *A follow-up study*

Follow-up radiograms were obtained for 26 of the patients whose supernumeraries

Table 8. Distribution of pathological conditions accompanying supernumerary teeth in 183 patients\*

	No. of patients affected	%
Resorption of supernumerary	35	17.2
Resorption of neighbor	4	2.0
Periapical osteitis of neighbor	3	1.5
Widened follicular space	105	51.5
Follicular cyst	15	7.4
Pulp canal obliteration	41	20.1
Ankylosis	1	0.5
Total	204*	100

\* Some of the patients were affected by more than one of the pathological conditions.

were not removed after the first examination. Reexamination was carried out from 1½ to 9½ years after diagnosis. In one male patient a dentigerous cyst had developed. In 12 cases of unerupted, inverted, and palatally positioned supernumerary teeth, displacement of the supernumerary was demonstrated: 3 in a labiocranial direction towards the nasal spine, 6 in a straight cranial direction parallel to the long axis of the adjacent normal tooth, and 3 in a dorsal direction parallel to the median palatal suture.

#### Discussion

The present material comprised patients attending a university clinic for the evaluation of various disorders, including hyperodontia. Even though patients with this anomaly constituted a minor proportion, some overrepresentation could not be excluded. The magnitude of this overrepresentation may be presented by the difference between the frequencies of the present and our previous investigation (4), 1.4 and 1.2%, respectively. With this modest impact on the prevalence value, we believe that the impact of possible overrepresentation on the distribution of most characteristics of hyperodontia included in this study is negligible.

The male to female ratio of 2:1 of premaxillary hyperodontia was in agreement with the results of others (5-7), but slightly higher than the finding of our previous study, 1.7:1 (4). The preponderance of males afflicted with the anomaly parallels the sex distribution of cleft lip and palate in this country (8). For both anomalies the left side of the maxilla predominated. These agreements could be purely coincidental but support the suggestions of some common pathogenetic factors (9, 10).

The age distribution in this material reflects only the patients' age at diagnosis. The accumulation of individuals in the age of mixed dentition, therefore, was not surprising. This age group is usually subjected to orthodontic and general dental surveillance, and, furthermore, irregularities of the eruption of permanent teeth and other sequelae

of hyperodontia often occur in this age, prompting a diagnosis. The relatively low number of supernumeraries in the higher age groups obviously was due to removal, or exfoliation, before examination.

The predominant location of premaxillary supernumeraries, the region of the central incisors, has also been established by others (2, 5, 6). Those situated close to the median palatal suture have been denominated mesiodentes, and in 31% of the cases the mesiodens had caused deviation of the suture towards the opposite side.

It is widely held that supernumerary teeth occur less frequently in the primary than in the permanent dentition. The prevalence of primary supernumeraries in the present material was 0.13%, which was lower than assessed by Grahnén & Granath (11). However, the possible loss by exfoliation of primary supernumeraries in patients more than 6 years old renders the present material improper for assessment of this prevalence. In the patients below 4 years of age nearly 50% of the supernumeraries had emanated from the primary dentition, suggesting that the prevalence of primary supernumeraries has been considerably underestimated. Their higher frequency of eruption also supports the concept that they may frequently be subjected to normal exfoliation without being recognized as supernumerary teeth.

The reason why primary supernumeraries, unlike the permanent ones, prevail in the lateral incisor region is not known. The coincidence of the formation of the primary dentition and the fusion of the incisive bone with the maxillary process forming the incisive suture may be an explanation. The biological activity connected with the fusion may induce proliferation from the dental lamina of an extra tooth germ in this area. Whether the biological activity leading to the formation of the median palatal suture may coincide with and disturb the normal formation of the permanent dentition is more questionable. Anyway, hyperactivity of the dental lamina has been considered a pathogenetic factor in hyperodontia (12) and may possibly be induced in many ways.

The clinical importance of hyperodontia is chiefly connected with the interference with

the regular teeth and with possible pathological changes in the jaw due to the presence of supernumerary teeth. If not removed immediately, supernumeraries should be subjected to follow-up examination.

In our study we observed that supernumeraries preventing the normal eruption of regular incisors frequently did not develop completely. Some of these, which for some reason were not removed immediately after diagnosis, provided the material for an unintentional follow-up study. Even after several years these supernumeraries remained unchanged, displaying mineralization only of the crown and at best very little of the root. In three cases, only an insignificant continuation of the root formation appeared. The nature of this inhibition is obscure, but the close contact between the follicles of the supernumerary and the regular tooth in these cases may somehow have an inhibitory effect.

In most cases the erupting forces of the regular teeth sustained a delay, and eruption occurred after removal of the supernumerary. However, the site and direction of eruption were frequently erroneous. In such cases early removal may be beneficial.

## References

1. Pindborg JJ. Pathology of the dental hard tissues. Copenhagen: Munksgaard, 1970:26-35;186-7.
2. Luten JR Jr. The prevalence of supernumerary teeth in primary and mixed dentitions. *J Dent Child* 1967;34:346-53.
3. Lind V. Medfödda antalsvariationer i permanenta dentitionen. *Odontol Rev* 1959;10:176-88.
4. Hurlen B, Humerfelt D. Prevalence of premaxillary supernumerary teeth in Norwegian children: a radiographic study. *Dentomaxillofac Radiol* 1984; 13:109-15.
5. Bodin I, Julin P, Thomsson M. Hyperodontia. I. Frequency and distribution of supernumerary teeth among 21,609 patients. *Dentomaxillofac Radiol* 1978;7:15-7.
6. Bergström K. An orthopantomographic study of hypodontia, supernumerary teeth and other anomalies in school children between the ages of 8-9 years. *Swed Dent J* 1977;1:145-57.
7. Wallfelt A. Övertaliga tänder i överkäkens incisivregion. *Odontol Rev* 1961;12:67-74.
8. Åbyholm F. Cleft lip and palate in Norway. *Scand J Plas Reconstr Surg* 1978;12:29-43.
9. Bøhn A. Dental anomalies in harelip and cleft palate. *Acta Odontol Scand* 1963 (suppl 38).

10. Hanihara K, Masuda T, Tanaka T. Evolutionary significance of reduced and supernumerary teeth in the dentition. *J Anthropol Soc Nippon* 1965;73:72-80.
11. Grahnén H, Granath L-E. Numerical variations in primary dentition and their correlation with the permanent dentition. *Odontol Rev* 1961;12:348-57.
12. Saarenmaa L. The origin of supernumerary teeth. *Acta Odontol Scand* 1950;9:293-303.

---

Received for publication 24 April 1984