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## Supernumerary teeth diagnosis and treatment approach

Six case reports

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Supernumerary teeth are relatively common in the general population, affecting the primary and the permanent dentition and have been reported in many genetic syndromes. They are classified according to form and shape. Seven different examples of hyperodontia are presented to highlight the numerical and morphological variation in dental abnormalities manifestations, empathising the importance of thorough clinical and radiological examination and of a correct therapeutic approach. The patients presented single or multiple hyperodontia, with particular interest for a 12 supernumerary teeth case. The clinical problems linked to supernumerary teeth were: impaction or ectopic eruption, crowding, possible root resorption of adjacent teeth. The therapeutic approach of supernumerary teeth varied on the position of the element in excess and on the complexity of the clinical case. In some cases the single extraction of the supernumerary tooth was indicated, while in other cases the extraction of the tooth was needed in addition to orthodontic treatment to gain sufficient space for the tooth with delayed eruption.

**Key words:** Tooth abnormalities, diagnosis - Tooth abnormalities, therapy - Tooth abnormalities, radiography.

Hyperodontia is considered as an abnormality in the number of teeth character-

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ized by an excess of dental elements.<sup>1</sup> This abnormality may be also present when the total number of teeth in the arch is normal. For example, hyperodontia can occur when 32 permanent teeth or 20 deciduous teeth are present and at the same time 5 incisors or 3 cuspids are observed.<sup>2,3</sup>

The supernumerary teeth are usually located next to the most distal dental element belonging to a group of teeth, such as incisors, cuspids and bicuspid.

Hyperodontia may be considered "true hyperodontia" if determined by an increase of dental element in the dental arch; "false hyperodontia" if caused by the residual presence of deciduous teeth after the shedding period.<sup>4</sup>

It is also widely known that the development of supernumerary teeth can be linked to genetical factors<sup>5</sup> and that hyperodontia is relatively common in the Caucasian race.<sup>6</sup>

However, the etiology of supernumerary teeth is still uncertain. A hypothesis suggests that the supernumerary tooth may originate from the division of the dental bud;<sup>7</sup> another theory suggests that the supernumerary

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teeth are the result of a local and independent hyperactivity of the dental lamina.<sup>6</sup>

Hyperodontia could be related to inherited factors, as a matter of fact the abnormalities in tooth numbers may be present in some family unit. However, it can be stated that this abnormality follows precisely a Mendelian model.<sup>7</sup>

The incidence of supernumerary teeth varies between 1.3% with a major incidence of mesiodens of 0.15-1.9%.<sup>8</sup>

The occurrence of a single supernumerary tooth is between 76-86%. The occurrence of 2 supernumerary teeth fluctuates between 12-23%, and finally the occurrence of multiple supernumerary teeth occurs in less than 1% of the cases.<sup>9</sup>

Mesiodens seems to be more common in male than female; the male to female ratio is 2:1.<sup>10</sup> The presence of supernumerary teeth seems to be very frequent in the maxilla when compared to the mandible.<sup>6</sup>

The numerical abnormalities are usually associated to systemic and inherited syndromes, like lip cleft and palate, the cleidocranial disostosis (22% in the incisors maxillary region, 5% in the bicuspid maxillary region),<sup>11</sup> the Gardner syndrome,<sup>12</sup> the Down syndrome, the Sturge-Weber syndrome, the Orofacial syndrome, the Allerman-Streif syndrome.<sup>13</sup>

In case of non-physiologic development of the palate and the lip, the presence of supernumerary teeth seems to be associated with fragmentation of the dental lamina during the genesis of cleft lip and palate.<sup>6</sup>

The percentage of supernumerary teeth in children affected fluctuates approximately around 22%.<sup>14</sup>

Later on, the teeth in excess were classified as Supplementary if they showed a normal morphology, or as Supernumerary if they presented abnormalities in the shape and volume.<sup>15</sup> Afterwards, they were classified by Bush in different forms: Peg shape, Tuberculate shape and Infundibuliform shape.<sup>16</sup> The first group has a reduced volume, crown and root form usually conical, and is more commonly present in the upper jaw. The tuberculate teeth show a reduced clinical crown with numerous cusps and tubercles.



Fig. 1.—Panoramic radiograph showing the presence of a supernumerary tooth distally to 3.8, determining the retention of the 3<sup>rd</sup> molar.

*Rx ortopanoramica che evidenzia la presenza di un elemento soprannumerario distalmente a 3.8, con consecutiva ritenzione del terzo molare.*

Infundibuliform teeth are present only in the central area of the upper jaw and show a funnel-like shape.

Another further classification names the supernumerary teeth as Single or Multiple, and again reports two subclasses: the first comprises conoids teeth, complex and compound odontomas, the second group includes anomalies linked to systemic and non-systemic syndromes.<sup>17, 18</sup>

### Clinical series

**Case 1**—The patient was 19 years old when she/he arrived to our department of Oral Surgery for the extraction of the 4 3<sup>rd</sup> bicuspid. The radiographic examination (Figure 1) showed the presence of the 4 impacted 3<sup>rd</sup> molars also revealing the presence of a supernumerary tooth distally to 3.8, thus determining the retention of the 3<sup>rd</sup> molar. The treatment plan was based only on the extraction of the 4 3<sup>rd</sup> molars and the supernumerary with complete resolution of the case (Figure 2).

**Case 2**—A 10-years-old child presented an apically impacted mesiodens that obstructed the eruption of the permanent central incisor. The panoramic radiograph (Figure 3) showed the presence of the impacted mesiodens and the unerupted permanent incisor diverted in his natural eruption. The clinical exam showed a swelling in the vestibular area above the lateral deciduous incisor, relating to the eruption of the central permanent incisor (Figure 4). The supernumerary tooth was immediately removed to facilitate the eruption of the maxillary



Fig. 2—Radiographic examination after the oral surgery. *Immagine radiografica dopo rimozione del soprannumerario*

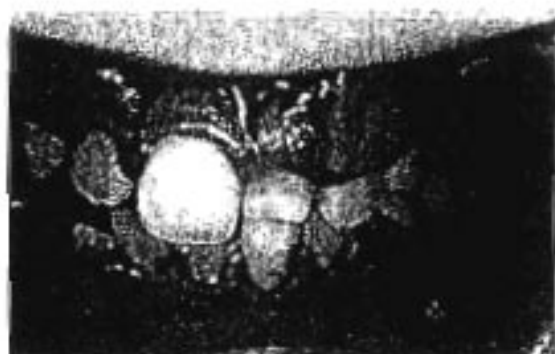


Fig. 4—Clinical examination: swelling in the vestibular area relating to the eruption of the central permanent incisor. *Esame clinico: tumefazione in sede vestibolare corrispondente al punto d'eruzione dell'incisivo centrale permanente*



Fig. 3—Panoramic radiograph showing the presence of an impacted mesiodens and an unerupted permanent incisor. *Rcortopanoramica che evidenzia la presenza di un mesiodens in inclusione e ritenzione dell'incisivo centrale permanente*



Fig. 5—Two supernumerary teeth distally to 1.8 and 2.8. *Due elementi soprannumerari in posizione distale 1.8 e 2.8.*

central incisor and avoid orthodontic therapy. The patient had not a past or present familiar history of dental abnormalities.

**Case 3**—A 19-years-old patient was admitted for the extraction of the 3<sup>rd</sup> molars. The panoramic X-ray showed the presence of 2 supernumerary teeth in the upper arch, distally to 1.8 and 2.8 (Figure 5). The treatment protocol was limited to the extraction of the 2 supernumerary and all the 3<sup>rd</sup> molars (Figure 6).

**Case 4**—A 32-years-old female patient was sent to our department for the extraction of a supernumerary permanent tooth, which was in a state of impaction between the roots of 4.4 e 4.5 (Figure 7). The supernumerary tooth was diagnosed during a routine visit of control, the immediate objective examination showed the presence of a lingual swelling, consistent with the zone of eruption of the crown of the tooth. Moreover, the radiographic exam presented the roots of the adjacent teeth with a slight inclination linked to the presence of the supernumerary tooth. There was not any known past and present family history of supernumerary teeth.

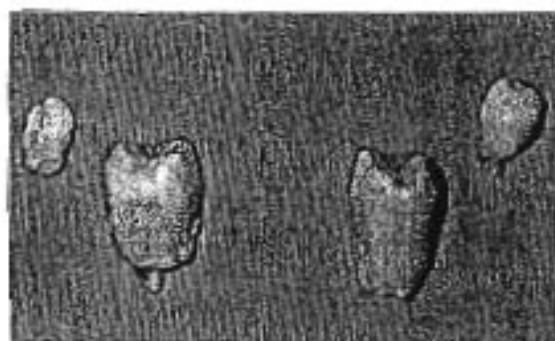


Fig. 6—The 3<sup>rd</sup> molars extracted with the supernumerary teeth. *I terzi molari estratti assieme ai soprannumerari*

**Case 5**—A 10-years-old patient with mixed dentition presents a deciduous supernumerary tooth in the right side of the lower arch, in the 8.4-8.5 areas (Figures 8, 9). Since the roots of the 2 permanent

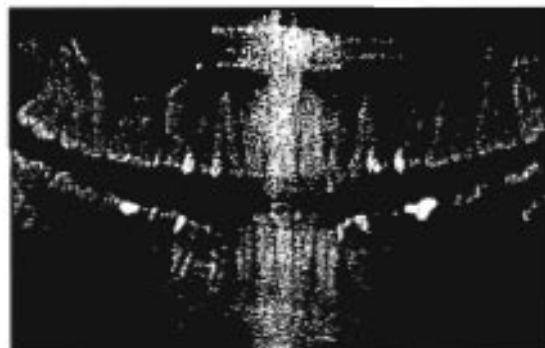


Fig. 7.—Panoramic radiograph: supernumerary permanent tooth impacted between the roots of 44 and 45.  
*Rx ortopantomica: elemento permanente soprannumerario in inclusione tra le radici di 44 e 45.*



Fig. 8.—Deciduous supernumerary tooth in the 8.4-8.5 areas.  
*Elemento soprannumerario deciduo in sede 8.4-8.5*



Fig. 9.—A particular.  
*Un particolare*

premolars were almost formed in their 2 thirds, it was decided to remove the 2 deciduous premolars, which were seriously compromised because of a carious process, the extraction of the supernumerary



Fig. 10.—Panoramic radiograph documenting multiple supernumerary teeth: 2 distally to 16 and 26 and a mesiodens.  
*Rx ortopantomica che documenta la presenza di 2 elementi soprannumerari, distalmente a 16 e 26, ed un mesiodens.*



Fig. 11.—Panoramic radiograph after 4 years: 3 supernumerary teeth in the 1<sup>st</sup> quadrant, 4 in the 2<sup>nd</sup>, 3 in the 3<sup>rd</sup> and 2 in the 4<sup>th</sup> quadrant.  
*Panoramica a 4 anni di distanza: si osservano 3 soprannumerari nel primo quadrante, 4 nel secondo, 3 nel terzo e 2 nel quarto.*

tooth was also planned to facilitate the physiologic eruption of the 2 premolars.

*Case 6*—The last case is a very interesting one presenting a detailed documentation and evolution in time. The clinical history of the patient begins at the age of 9. At that time she presented with a radiographic exam documenting 2 supernumerary teeth distally to 16 and 26 and a mesiodens (Figure 10). It was then decided to perform an extraction of the mesiodens and to observe a waiting period for the residual supernumerary teeth. Four years later the patient was again observed, at radiogram the situation was the following: 3 supernumerary teeth in the 1<sup>st</sup> quadrant (2 distally to 16 and 18 and one between 14 and 15), 4 supernumerary in the second (2 in the canine-premolar area, 1 distally to 26 and the last distally to 28), 3 supernumerary in the 3<sup>rd</sup> (1





Fig. 12.—Dent Scan radiographic exam six years later  
*Dent scan a 6 anni di distanza*

between the lateral incisor and the canine, and 2 in the premolar area) and, finally, 2 supernumerary in the 4<sup>th</sup> quadrant (in the premolar area) (Figure 11). At the age of 19, after having done a Dent Scan radiographic exam (Figure 12), it was decided to proceed with the extractions of the 1.6 supernumerary, of the 2 supernumerary in the 2.3-2.4 area, of the all supernumerary in the 3<sup>rd</sup> quadrant, while the situation in the fourth quadrant remained unchanged. After 1 year the 2 supernumerary in the 4<sup>th</sup> quadrant were also extracted, together with the one in the premolar region in the first quadrant (Figure 13). The extractions in the distal upper arch are still to be performed.

### Discussion and conclusions

In this study we present 6 different hyperodontia cases, where both the variety of clinical evidence and treatment plan have been emphasized. In particular we brought our attention on a case of multiple bilateral hyperodontia in the mandibular and maxillary areas.

The occurrence of a supernumerary tooth is usually diagnosed with a clinical exam, or more frequently by one of the parents that notices the lack of eruption of one dental element. In other cases it is usually a routine radiological survey that shows a presence of numerical variations.

Becker *et al.*<sup>19</sup> reported a case of a 12-year old patient who showed multiple hyperodontia in the canine-premolar area after the extraction of 1 supernumerary tooth in the anterior region at 8 years of age. This event highlights the continuous activity of the den-



Fig. 13.—Panoramic radiograph after 1 year. All the teeth in the 3<sup>rd</sup> quadrant have been extracted.  
*Rx ortopantomia a 1 anno di distanza. Tutti gli elementi supernumerari nel terzo quadrante sono stati estratti.*

tal lamina although the completed development of the permanent dentition has occurred.

The patient with multiple bilateral hyperodontia treated in our department seems to emphasize this hypothesis. In fact, since the patient was checked regularly, the genesis of the 2 supernumerary dental buds was observed at the 1<sup>st</sup> radiographic exam.

Our cases represent a small series respect to the total cases of supernumerary teeth, however, our report shows how easy it is to observe a case of hyperodontia both clinically and radiographically. In such an instance a correct clinical and therapeutical approach is mandatory.

The clinical problems related to supernumerary teeth are usually the impaction or retention of a permanent or, rarely, a deciduous tooth (rotation, displacement).<sup>20, 21</sup> They include also follicular cysts, adjacent teeth root resorption, diastemas or non-accessibility to bone grafts in patients with cleft palate or lip.<sup>14</sup>

Foster and Taylor<sup>22</sup> examined the consequences related to the supernumerary teeth; they concluded that tuberculate teeth usually cause a delay of eruption of the teeth, while the peg teeth usually cause the dislocation of the adjacent teeth.

The therapy of supernumerary teeth depends on the position of the element in excess and on the presence of pathological processes. In some cases the single extraction

of the supernumerary tooth is indicated, while in other cases the extraction of the tooth is needed in addition to orthodontic treatment to gain sufficient space for the tooth with delayed eruption.<sup>23</sup>

This process can occur with or without surgical exposure during extraction of the supernumerary tooth.

No therapy is suggested in case of supernumerary teeth properly aligned in the arch and no therapy is needed for impacted teeth, which do not create general or local problems.

Mitchell and Bennet<sup>24</sup> report in 78% of the cases the spontaneous tooth eruption after 18 months since the extraction of the supernumerary tooth (the average time of eruption was 16 months).

Only 14% of the patients needed a second surgical intervention to pull orthodontically the impacted tooth into the arch (average time of eruption was 30 months).

This period of time dramatically reduced when a space retainer was placed before the eruption.

There are still doubts about the aetiology of hyperodontia and about the importance of the family related factors.<sup>25</sup>

Unfortunately none of our patients showed related family cases of hyperodontia. It could be concluded that it is not possible to share between one or another theory, but it is necessary, in cases of supernumerary or supplementary teeth, to manage correctly therapeutic path in order to reach a good functional and aesthetic rehabilitation for the oral apparatus.

### Riassunto

#### *Approccio diagnostico e terapeutico ai denti soprannumerari: 6 casi clinici*

I denti soprannumerari sono relativamente frequenti nella popolazione, possono interessare tanto la dentizione decidua quanto quella permanente, e possono essere associati a differenti sindromi o patologie genetiche. Sono classificati in base alla forma, alle dimensioni ed alla sede. Vengono presentati 7 differenti casi di iperodontia per sottolineare le alterazioni numeriche e morfologiche, enfatizzando l'importanza diagnostica dell'esame clinico e radiologico

e di un corretto approccio terapeutico. I pazienti presentavano quadri di iperodontia singola o multipla, in particolare in un soggetto si è rilevata la presenza di 12 denti soprannumerari. I problemi clinici connessi ai denti soprannumerari sono stati: inclusione, eruzione ectopica, affollamento, spostamento o possibile riassorbimento delle radici dei denti adiacenti. L'approccio terapeutico è variato in base alla posizione dell'elemento in soprannumero ed alla complessità del quadro generale. In alcuni casi era indicata la semplice estrazione del soprannumerario, mentre in altri è stato necessario considerare anche un trattamento ortodontico per garantire la fisiologica eruzione del dente della serie normale.

Parole chiave: Iperodontia · Denti soprannumerari · Mesiodens

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