Anomalies in Number of Teeth in Patients with Lip and/or Palate Clefts

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The authors present a radiographic survey of dental anomalies in 86 patients with cleft lip and/or palate and compare the values observed with those reported in the literature and with those found in the general population.

Key Words: anomalies in number of teeth, anodontia, supernumerary teeth.

Introduction

Full rehabilitation of patients with lip and palate malformations requires multidisciplinary teamwork by physicians, dentists, phonoaudiologists and social assistants. In the specific area of dentistry, oral rehabilitation is a challenge to the various specialities. In view of the complexity of the lesion and of the importance of the facial region involved, the treatment of these patients requires constant follow-up so that the preventive, interceptive and corrective measures used may be applied in harmony with oronasal development.

During follow-up, the dentist will frequently note anomalies involving the shape, number and position of the teeth which may have a deleterious effect on dentition, leading not only to esthetic problems but also to impairment of mastication, respiration, deglutition and phonation (Figures 1 and 2). Alertness to the appearance of these anomalies is imperative in the case of patients with cleft lip and/or palate if treatment during the development of the maxillo-dental complex is to be effective.

The lateral and oronasal maxillary processes are already markedly developed in 6-week human embryos and will fuse at about the 7th week, giving origin to the prolabium and primary palate medially and to the lateral portions of the lip and the upper maxillary bone laterally. At the same time, two horizontal laminae arise from the lateral maxillary process, i.e., the palatine processes which develop medially and fuse at about the 10th week. Fusion occurs by contact and fusion of the epithelial surfaces of the embryonic processes involved, followed by regression of this epithelium and penetration of the underlying mesodermal tissue.
Figure 1 - Bilateral cleft lip and palate. Presence of anodontia in mixed dentition.

Figure 2 - Bilateral cleft lip and palate. Presence of a supernumerary tooth in the deciduous dentition.
At about the 6th week, odontogenesis also starts through thickening of the oral epithelium, the dental lamina, which extends along the future occlusal border of the maxilla. At 10 sites in this lamina, the epithelial cells intensify their proliferation forming 10 epithelial cell buds which deeply invaginate into the underlying mesodermal tissue, originating the enamel organs of the dental germs of deciduous teeth. As these germs reach the stage of ameloblast and odontoblast differentiation, the dental lamina, lingually to the enamel organ, gives origin to the enamel organ of permanent teeth which will develop much more slowly.

There are many reports of the high incidence of dental anomalies in patients with cleft lip and palate, especially in the anterior maxillary region. Bohn (1950) stated that these anomalies mainly occur at the level of the lateral incisor both in the deciduous and permanent dentition, pointing out the mesial or distal position that this tooth may take in relation to the cleft.

Considering that the function of embryonic processes occurs simultaneously with odontogenesis, it may be understood, as pointed out by Jordan et al. (1966), how the dental germ will be fully or partially affected by a cleft, with the occurrence of anomalies involving tooth shape, number and position.

According to Bhaskar (1976), these anomalies occur during different phases of dental development, i.e., numerical anomalies occur during the initial formation of dental germs, shape anomalies during morphodifferentiation, and position anomalies during tooth eruption.

In view of the above considerations, and to provide a guide for researchers and clinicians, the objective of the present investigation was to report on numerical dental anomalies in patients with congenital lip and/or palate malformations.

**Material and Methods**

The study was conducted on 432 patients from the Maxillary Orthopedics Sector of the Hospital for Facial Defects, from the Maxillary Orthopedics Sector of the "Jorge Psillakis" Foundation, and from the Department of Surgery, Prostheses and Maxillo-Facial Traumatology of the Dental School of the Univesity of São Paulo, from January 1980 to December 1982.

Each patient was submitted to radiographic examination, when periapical, maxillary occlusal and panoramic X-rays were taken using Kodak Ultra-Speed film.

Upper and lower plaster of Paris casts were obtained from irreversible hydrocolloid (alginate) molds.

Special cards were elaborated and used to record general patient data and the data related to numerical anomalies involving mixed and permanent dentition.

Of the 423 patients examined, only 86 satisfied the requirement of absence of previous tooth extraction and were selected for the study. The patients ranged in age from 9 to 32 years and were divided into groups according to type of cleft: cleft lip, lip and alveolar cleft, cleft lip and cleft palate, and cleft palate.
Results and Discussion

Observation of the casts and of radiographic data yielded the data presented in Table 1.

Table 1 - Prevalence of supernumerary teeth and anodontia in patients with cleft lip and/or palate.

<table>
<thead>
<tr>
<th>Type of cleft</th>
<th>No. of patients</th>
<th>No. of patients with anomalies</th>
<th>Anodontia</th>
<th>Supernumerary teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleft lip</td>
<td>12</td>
<td></td>
<td>0</td>
<td>3 (25%)</td>
</tr>
<tr>
<td>Lip-alveolar cleft</td>
<td>16</td>
<td></td>
<td>4 (25%)</td>
<td>6 (36%)</td>
</tr>
<tr>
<td>Cleftlip/palate</td>
<td>47</td>
<td></td>
<td>14 (30%)</td>
<td>8 (17%)</td>
</tr>
<tr>
<td>Cleft palate</td>
<td>11</td>
<td></td>
<td>2 (18%)</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>86</td>
<td></td>
<td>20 (23%)</td>
<td>17 (20%)</td>
</tr>
</tbody>
</table>

Wide variation in numerical dental anomalies in patients with cleft lip and/or palate have been reported in the literature. Damante et al. (1973) established two criteria for the study of numerical anomalies in the cleft as a function of the mesial or distal position of the lateral incisor in relation to the cleft, both of them based on the embryology of the region (Figure 3). It should be emphasized that the values obtained by these investigators varied widely as a function of the two criteria.

Figure 3 - Bilateral cleft lip and palate. The lateral incisors may be absent, erupt in the incisor bone or in the lateral segments.
In the present study, we employed criterion no. 2 of Damante et al. (1973) on the basis of the arguments presented by these investigators in its favor. In addition, it is imperative to divide the sample according to type of cleft, since the cleft may directly affect the region in which the dental lamina is located during embryonic development.

The present results show that numerical anomalies are much more prevalent in the types of cleft involving the alveolar ridge. This fact is quite logical if we consider the disorders occurring within the embryonic tissue that contains the dental lamina (Figures 4 and 5).

Figure 4 - Unilateral cleft lip and palate. Anodontia of a lateral incisor in mixed dentition.

Another feature to be considered is the extent of the cleft in terms of the type of numerical anomaly. In the present study, supernumerary teeth preferentially occurred in the lip-alveolar clefts, as also observed by Bohn (1963) and Damante et al. (1973). Embryologically, it would be justified to assume that a bipartition of the dental lamina of the lateral incisor may occur in these less serious clefts, giving origin to the supernumerary tooth.

In more severe cases, i.e., lip-alveolar-palate clefts, the embryonic structures that give origin to the tissue in this region are severely impaired as early as during the phase of dental development. Thus, we may explain not only the lower prevalence of supernumerary teeth, but also the higher prevalence of anodontia in cases of cleft lip and/or palate. The higher frequency of anodontia observed here in cleft lip and/or palate patients agrees with results reported by Polaczek (1978) and Fishman (1970). On this basis, we agree with Damante et al. (1973) that "the incidence of supernumerary teeth
decreases with increasing cleft complexity, whereas the incidence of agenesis is directly proportional to cleft complexity". (Figure 6).

Isolated clefts of the palate seem to represent a separate situation since their anatomical location apparently does not interfere with the development of the dental lamina. Indeed, in the present study the prevalence of dental anomalies in patients with isolated cleft palate was extremely low when compared to other cleft types, as also pointed out by Ranta et al. (1983). Similar results were obtained by Bohn (1963) who only detected premolar anodontia and no supernumerary teeth and by Nagai et al. (1965) and Fishman (1970), who also detected only premolar anodontia in these patients. Olin (1964) observed a considerably high prevalence of premolar anodontia (13 cases in 22 patients), in contrast to the present study in which only 2 cases of premolar anodontia were detected in 11 patients.

In view of the wide variation of results reported in the literature, we believe it is imperative to standardize sample selection as well as diagnostic criteria so that future studies may clarify this matter. However, there is no doubt that patients with congenital lip and/or palate malformations exhibit a much higher prevalence of anomalies in the number of teeth than the general population (Figure 7).
Cleft lip and/or palate

Figure 6 - Bilateral cleft lip and palate. Anodontia of several teeth in mixed dentition.

Figure 7 - Anodontia in unilateral cleft lip and palate.
A comparison of the prevalence of anomalies in number between patients with cleft lip and/or palate and normal individuals is presented in Table 2.

Table 2 - Comparison of the prevalence of numerical dental anomalies between patients with cleft lip and palate and normal subjects.

The value presented for each anomaly is the mean of the values reported by Bohn (1963), Silling (1966), Olin (1964), Nagai et al. (1965), and Damante et al. (1973). The values for normal subjects are the mean of the values reviewed and presented by Ferrão (1981).

<table>
<thead>
<tr>
<th>Anomaly</th>
<th>Patients with cleft lip and palate</th>
<th>Normal subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supernumerary teeth</td>
<td>16.05%</td>
<td>2.81%</td>
</tr>
<tr>
<td>Anodontia</td>
<td>33.54%</td>
<td>4.56%</td>
</tr>
<tr>
<td>Total</td>
<td>49.59%</td>
<td>7.37%</td>
</tr>
</tbody>
</table>

It should be pointed out that the frequency of anodontia is twice the frequency of supernumerary teeth both in the general population and among subjects with lip and/or palate malformations. Furthermore, numerical anomalies involving either anodontia or the presence of supernumerary teeth are approximately seven times more frequent among patients with cleft lip/palate than among the general population, demonstrating a high correlation between cleft lip/palate and numerical dental anomalies.

Conclusions

On the basis of the methodology employed and of the results obtained, we may conclude that:

1. Numerical dental anomalies are seven times more prevalent among patients with cleft lip/palate than in the general population.

2. Anodontia is twice as frequent as supernumerary teeth both in the general population and among patients with cleft lip/palate.

3. Numerical dental anomalies are related to cleft type, with supernumerary teeth being inversely correlated to cleft complexity and anodontia being directly related to cleft complexity.

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Accepted December 12, 1990
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