

## The early diagnosis of dental anomaly and its importance to the dentist.

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The mixed dentition is a replacement of deciduous teeth for permanent ones. This transformation is characterized by biological processes, in which dental anomalies may occur in their natural course of change. The anomalies may be mild or more severe, and are characterized by problems in tooth germ formation or even its complete absence, also known as tooth agenesis.<sup>1</sup> This affects approximately 25% of the population, and so it is considered the most common development anomaly in human dentition.<sup>2</sup>

The third molar represents the most affected tooth, with 20.7% prevalence of tooth agenesis.<sup>2</sup> When excluding third molars, the prevalence of agenesis drops to between 4.3 to 7.8%, and lower second premolars are more often absent, followed by the upper lateral incisor. A great portion of patients with tooth agenesis presents the absence of one or two permanent teeth.<sup>3</sup> Agenesis is predominantly unilateral, except for upper lateral incisors, where its absence is more frequent on both sides.<sup>2</sup> The prevalence of dental anomalies in the population is not only important for dentists, but also for epidemiological studies conducted by public health departments, sufficiently describing the particularities of each population.<sup>4</sup>

Dentistry searches for the etiology of dentofacial irregularities. Recent studies have shown substantial evidence suggesting that genetics is the predominant causative factor of anomalies of number, size, position, and eruption disorders.<sup>5,6</sup> The literature has shown that a single genetic defect may define different phenotypic manifestations. The explanation for this is that the mutant or "defective" gene may be expressed differently in distinct permanent teeth, as it occurs in the association between unilateral agenesis of the upper lateral incisor and microdontia of the upper lateral incisor on the opposite side of the dental arch.<sup>1</sup>

According to gender, women are more affected than men. It is worth noting the ethnical differences in the prevalence of tooth agenesis, with a high prevalence among White individuals when compared to Black individuals, but the frequency of tooth agenesis among White individuals in several continents is slightly different, such as for Caucasian Europeans and Australians, who present a higher prevalence than Caucasian North-Americans.<sup>3</sup>

Based on the number, tooth absence may be called hypodontia, oligodontia, or anodontia. Hypodontia is frequently used to describe the absence of one to six teeth, excluding the third molars; oligodontia is used to refer to the absence of more than six teeth, excluding the third molars.<sup>4</sup> Patients with tooth agenesis tend to manifest anomalies associated with microdontia, tooth transpositions, ectopic eruption of canines, infraocclusion of deciduous molars, distal angulation of lower

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second premolars, and generalized enamel hypoplasia.<sup>7</sup> The authors<sup>7</sup> assessed the relationship between tooth agenesis and the occurrence of other dental anomalies in a group of children and adolescents aged 7 to 15 years old. Patients with tooth agenesis showed a significantly higher prevalence of microdontia of the upper lateral incisor (17.7%), distal angulation of the lower second premolar (6.5%), late development of a permanent tooth (10.8%), and infraocclusion of a deciduous molar (11.8%). In contrast, the prevalence of the supernumerary tooth was significantly higher in the control group, and there was no difference in the prevalence of ectopic eruption of a first molar.

Regarding the site of agenesis, the microdontia of the upper lateral incisors occurred more frequently in patients with agenesis of premolar and anterior teeth than in those with an absence of molars; also, distal angulation of the lower second premolars, late development of teeth, and infraocclusion of the deciduous molars were associated with premolar agenesis.

The evidence for genetics as the primary cause of anomalies originate from studies investigating families, such as the case by Tallón-Walton *et al.*,<sup>5</sup> who analyzed the phenotype and genotype of the genes *PAX9* and *MSX1* in six families that presented tooth agenesis. The authors<sup>5</sup>

observed that the patients presented no mutation in said genes, concluding that other genes such as *WNT10A* may be connected to the etiology of tooth absence, as well as to epigenetic factors. Bergendal *et al.*,<sup>6</sup> performed an analysis of the gene *WNT10A* in seven individuals with tooth agenesis and concluded that tooth agenesis may predict biallelic mutations in *WNT10A*.

The identification of dental anomalies patterns is extremely important for the dentist, because the early detection of a single dental anomaly may call the attention of professionals for a potential development of another associated<sup>1</sup> anomaly, in these individuals and their family members.<sup>4</sup>

The diagnosis of dental anomalies of shape, size, number, and position may be performed by means of a panoramic radiograph, especially in children aged 6 to 7 years old. These children should be included in a growth and eruption follow-up program by an interdisciplinary team, especially within the fields of Dentistry, Restorative Dentistry, and Pediatric Dentistry, seeking for favorable aesthetic and functional results.<sup>8</sup>

The dentist is encouraged to diagnose these dental anomalies early on and routinely through clinical and radiographic exams, so as to avoid higher complexity at the moment of establishing a treatment plan.

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