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Dental Agenesis and Malocclusion: A Systematic Review

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Abstract

The dental agenesis is a congenital disease that gives rise to the absence of one or more teeth and this can affect the deciduous dentition as the permanent too. This alteration is the result of a disorder of the dental lamina during the training process. These patients need a multidisciplinary treatment by the orthodontist, the periodontist, the oral surgeon and the prosthodontist. In this way, the planning and the collaboration from the initial diagnosis seem to be the key final outcomes of the treatment.

Introduction

The dental agenesis is a congenital disease that gives rise to the absence of one or more teeth and this can affect the deciduous dentition as the permanent too. This alteration is the result of a disorder of the dental lamina during the training process. If incidents occur during the process of calcification and formation of dental gems, the dental lamina may remain involved and damaged giving rise to phenomena of microdontia or dental absence that can be total or partial affecting both the dental elements of the deciduous dentition as those of the permanent dentition, known as dental agenesis.

Various definitions are used to describe congenital absence of dental elements such as anodonzia, hypodontia, oligodontia or dental agenesis. The term anodontia is used in patients with the total absence of teeth while oligodontia refers to the absence of six or more dental elements (without including the third molars).[1]

The dental agenesis is the most common cause of malocclusion; if untreated it can generate an occlusal imbalance that can induce functional as periodontal disorders. For example, in individuals with hypodontia it's frequently observed the maxilla retrognathism which may be due to a shorter length of the jaw or to a more posterior position of the same. At the same time, in subjects with the absence of more teeth it's common to observe that mandible rotated counterclockwise. Besides the aesthetic alterations derived by the absence of one or more teeth may be considered an additional problem with frequent patient in self repercussions.[2]

Methods

Many articles have been published on international literature about this topic. So all the possible synonyms for this malocclusion have been searched. The systematic review of literature has been performed on the principal medical databases: PubMed (Medline), Embase and Scopus. The keywords used were: *dental agenesis*, *hypodontia*, *tooth development* and *dental anomalies* to identify all articles reporting on the topic of diagnosis and treatment of patients with single or multiple tooth agenesis till October 2016. No restrictions of time and languages have been fixed. The results have been filtered and valued following our eligibility criteria and then organized following the PRISMA method. The search identified 14,852 abstracts, which were reviewed manually and each article of interest was marked for further review. The full text of the marked studies was retrieved and studies that satisfied our eligibility criteria were included in this review. At the end only 36 full articles have been selected.

Review

A study by Pino de Lemos (2012) highlights the major malocclusions resulting from the agenesis of the upper lateral incisor.[3] The results show significant clinical association between the presence of agenesis (more frequently unilateral form) and the deviation of the maxillary midline. Moreover, the evidence of agenesis is associated with molar and canine class II malocclusions, more frequently in the bilateral form. In cases of unilateral dental agenesis, it occurs in the same side of agenesis. On the other hand, in some patients with agenesis of both unilateral and bilateral, there is a report of I molar and canine class associated with the presence of diastema at the level of the anterior superior area. In a recent work, Mirabella et al (2012) study the relationship between dental agenesis and microdontia in the rest of dental elements.[4] The authors find in their results that agenesis of maxillary lateral incisors reliably predicts the size of the rest of

teeth. The investigators observed that patients with congenital absence of the upper lateral incisors have smaller teeth than patients without any kind of dental anomaly, with the only exception regarding the first upper molars. The difference in tooth size can vary according to Brook et al (2002), from 0.6 to 0.91 mm for both unilateral forms such as for bilateral.[5] In addition patients with dental agenesis can present dysmorphia to the level of other dental features. For example, the unilateral agenesis of the upper lateral incisor is frequently associated with a cone-shaped contralateral incisor.[4] A careful review of the literature reveals a discrepancy in the order of frequency of agenesis of the various teeth. But there is agreement in considering the agenesis of the upper lateral incisor and of the mandibular second premolar as the most frequent forms (excluding third molars that are in many cases the most absent teeth) .[1,2,7,8, 6.9]

However, analyzing the unilateral and bilateral forms of dental agenesis it has been observed that the lateral incisors result absent bilaterally with greater frequency than unilaterally, whereas in monolateral forms it associate with dysmorphia of the contralateral tooth which is often of conoid shape. While in agenesis of the rest of teeth the unilateral form is the most comune.[1] Different authors ascertained that the agenesis of the lower second premolar relates to the absence of more dental elements, unlike the upper lateral incisors. Furthermore the analyzed studies show that the agenesis of the anterior region may depend on genetic alterations while in the posterior region this association seems to be less sure.[2] About this etiological association, Brook (2009) states that dental anomalies are caused by multifactorial interactions between genetic, epigenetic and environmental factors that can act during the development of teeth with different phenotypic expressions.[10] This aspect explains the different multifactorial causes, aside from genetics, involved in dental agenesis. In this way the expression of the evolutionary changes in the gearing, systemic conditions, rickets, syphilis, severe intrauterine disorders, localized inflammation or infection, congenital dysplasia, environmental factors such as radiation, tumors, rubella, endocrine factors have been listed as possible causes of this type of alterations during the development of the dental elements.[1]

Conclusion(s)

The dental agenesis represents a considerable problem from both functional and aesthetical points of views. The localization in the anterior sector implies a strong impact in the smile and a negative aesthetic implication, whereas a more posterior location may have important occlusal implications with many resentments on the functions of the stomatognatic apparatus. In the treatment of dental agenesis, the orthodontist appears to have a key role considering, however, that these patients need a multidisciplinary approach not only by the orthodontist as by the periodontist, the oral surgeon and the prosthodontist. planning and collaboration in the initial diagnosis appears to be the key final outcome of the treatment.

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