

## PREVALENCE OF DENTAL AGENESIS IN PATIENTS SUBMITTED TO ORTHODONTIC TREATMENT: A RADIOGRAPHIC STUDY

### PREVALÊNCIA DE AGENESIA DENTÁRIA EM PACIENTES SUBMETIDOS A TRATAMENTO ORTODÔNTICO: UM ESTUDO RADIOGRÁFICO

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#### ABSTRACT

The most common developmental dental anomaly in human dentition is the dental agenesis which can happen in the deciduous and permanent dentitions. The most affected teeth by the agenesis are the third molars, premolars and upper lateral incisors. It is commonly associated with other types of anomalies such as microdontia, ectopias and delayed dental development. Therefore, the dental surgeon must pay attention to the development of other anomalies so that the diagnosis and orthodontic interception can happen in the appropriate moment. An evaluation of panoramic radiographs and medical records of 50 patients, randomly selected, aged between 6 and 20 years, of both genders, excluding syndromic patients, who sought orthodontic treatment in the Postgraduate Course in Orthodontics at Volta Redonda University Center, was carried out. The objective of this observational study was to evaluate the presence of agenesis of some permanent dental element, excluding the third molars, to identify the most affected teeth, as well as the association with other dental anomalies. Evaluating the results, it was observed that 9 patients had dental agenesis (18%), with a higher prevalence in females (55.6%). The most affected teeth were the upper lateral incisors, followed by the lower second premolars and second upper premolars. The presence of other dental anomalies associated with agenesis was identified in 4 patients (44.4%), with a predominance in females (75%), which were the delayed tooth development, conoid shape, ectopia in positioning and root laceration. It was concluded that in the studied sample there was a high prevalence of dental agenesis, having as reference other studies with orthodontic patients.

**Keywords:** Anodontia. Tooth abnormalities. Orthodontics.

#### RESUMO

A anomalia dentária de desenvolvimento mais comum na dentição humana é a agenesia dentária, que pode acontecer nas dentições decídua e permanente. Os dentes mais acometidos pela agenesia são os terceiros molares, pré-molares e incisivos laterais superiores. Comumente está associada a outros tipos de anomalias como a microdontia, ectopias e atraso no desenvolvimento dentário. Portanto, o cirurgião dentista deve se atentar para o desenvolvimento de outras anomalias para que o diagnóstico e a interceptação ortodôntica aconteçam em momento oportuno. Foi realizada uma avaliação das radiografias panorâmicas da documentação de 50 pacientes, selecionados aleatoriamente, com idade entre 6 e 20 anos, de ambos os gêneros, excluindo pacientes sindrômicos, que buscaram tratamento ortodôntico no Curso de Pós-graduação em Ortodontia do Centro Universitário de Volta Redonda. O objetivo desse estudo observacional foi avaliar a presença de agenesia de algum elemento dentário permanente, excluindo os terceiros molares, identificar os dentes mais acometidos, bem como, a associação com outras anomalias dentárias. Avaliando os resultados observou-se que 9 pacientes apresentavam agenesia dentária (18%), com maior prevalência no gênero feminino (55,6%). Os dentes mais acometidos foram os incisivos laterais superiores, seguido dos segundos pré-molares inferiores e segundos pré-molares superiores. A presença de outras anomalias dentárias associadas à agenesia foi identificada em 4 pacientes (44,4%), com domínio no gênero feminino (75%), que foram o atraso no desenvolvimento dentário, forma conóide, ectopia no posicionamento e dilaceração radicular. Concluiu-se que na amostra estudada houve alta prevalência de agenesia dentária, tendo como referência outros estudos com pacientes ortodônticos.

**Palavras-chave:** Anodontia. Anomalia dentária. Ortodontia.

## INTRODUCTION

Mixed dentition is characterized by the replacement of deciduous by permanent teeth and in this process some odontogenic irregularities can occur, with varying degrees of severity, which are called dental developmental anomalies (SIRIANNI; GONÇALVES, 2019).

Dental agenesis represents the absence of formation of the dental element, the most common developmental anomaly in human dentition, with a prevalence of approximately 25% in the population, being genetics as a probable etiological factor (GARIB; ALENCAR, 2013).

It is a rare anomaly in primary dentition, however, the absence of a primary tooth has a 95% recurrence rate in permanent dentition (SILVA FILHO; GARIB, 2013; NEVILLE *et al.*, 2016).

The teeth most frequently affected by agenesis are the third molars, followed by the mandibular second premolars, soon after, the maxillary lateral incisors and maxillary second premolars (GARIB; ALENCAR, 2013; NEVILLE *et al.*, 2016; MARTINS, 2018).

The same genetic defect can cause different phenotypic manifestations, explaining the fact that dental agenesis is usually associated with other types of anomalies such as microdontia, ectopias and delayed dental development, therefore, the early detection of an anomaly serves as a warning to the dental surgeon for the possibility of the development of other anomalies, in the same patient or in family members, allowing the diagnosis and orthodontic treatment, when necessary, in due time (GARIB; ZANELLA; PECK, 2005; GARIB *et al.*, 2010).

The objective of this study was to evaluate the prevalence of dental agenesis, the most affected teeth, as well as the association with other developmental dental anomalies, in patients undergoing orthodontic treatment at the University Center of Volta Redonda (UniFOA).

## MATERIAL AND METHODS

This is an observational study approved by the Research Ethics Committee of the University Center of Volta Redonda-RJ, on April 9, 2020, under number CAAE 29868620.4.0000.5237. To build the theoretical framework, scientific studies were analyzed, mainly from 2010 onwards, indexed in the LILACS, MEDLINE and SciELO databases.

An evaluation of panoramic radiographs and dental documentation of 50 randomly selected patients who started orthodontic treatment in the Postgraduate Course in Orthodontics at UniFOA, from November 2019 to March 2020 was carried out.

Examinations of patients of both genders, aged between 6 and 20 years were included. Examinations of syndromic patients and exams with no quality to perform proper interpretation were excluded.

The absence of a radiographic image of the tooth or its alveolar crypt was considered agenesis. The examinations in which dental agenesis was detected, were evaluated for the presence of other types of associated developmental dental anomalies.

The third molars were excluded from this research due to the age of the patients that constituted the sample, and in some cases it cannot be said whether the absence was congenital or if the development of these teeth had not yet started.

The images were interpreted by students from the last year of the Dentistry degree at UniFOA, authors of this study, with the guiding professor, using a negatoscope and magnifying glass, with ideal lighting conditions.

## RESULTS AND DISCUSSION

A total of nine patients (18%) with dental agenesis were detected, excluding the third molars (Figures 1 and 2).

**Figure 1** - Agenesis of elements 12 and 22

**Source:** the authors.

**Figure 2** - Agenesis of elements 12 and 22; delay in the development of 35

**Source:** the authors.

In studies with a sample of orthodontic patients, of similar age and with the same exclusion criteria, lower values were identified, such as the study by Pinheiro, Tostes and Pinheiro (2008) with 4.73%; Torres *et al.* (2015) with 4.9% and the studies by Lotito and Araújo (2017) and Soares (2018), both with a prevalence of agenesis of 5%, and in the 4 studies the samples were larger, respectively 1,054,402, 1,129 and 1,902 participants.

In the analyzed studies, lower prevalence of agenesis was presented, when patients were evaluated in general and not only orthodontic patients, but also when the third molars were excluded, as in the study by França (2011) detecting agenesis in only 2.8% of patients. On the other hand, the values were higher when the third molars were included, as in the study by Martins Neto *et al.* (2019) who identified 3.9% of agenesis; study by Carvalho and Rodini (2003) 6.8% and Arrué (2017) 28.7%.

Regarding the prevalence of agenesis in genders, in the present study higher values were detected in females (55.6%), in 5 patients, compared to males (44.4%), in 4 patients.

This higher prevalence in females was also found in most studies (CASTRO; OLIVEIRA; SALES, 2004; FRANCE, 2011; LOTITO; ARAÚJO, 2017; SOARES, 2018; MARTINS NETO *et al.*, 2019), however, some studies reported that there is no significant difference between genders (CARVALHO; RODINI, 2003; TORRES *et al.*, 2015; SIRIANNI; GONÇALVES, 2019).

Of the nine patients with dental agenesis in the current study, the absence of 28 elements was detected, oligodontics was found in two patients (22.2%), with the absence of seven and nine elements, and also, a patient with the absence of three elements, three with the absence of two elements and three with the absence of 1 element.

The 28 missing teeth were distributed as follows: 11 maxillary lateral incisors (39.2%), six mandibular second-premolar (21.4%), four maxillary second-premolar (14.2%), two first premolars - upper molars (7.1%) and two lower central incisors (7.1%), in addition to the 1st and 2nd upper molar and 1st lower molar.

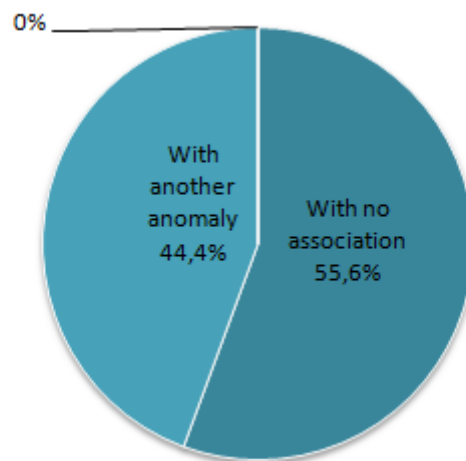
The teeth most affected by agenesis were the maxillary lateral incisors, as in the studies by Torres *et al.* (2015) and Arrué (2017), and as in the study by Arrué (2017), the most prevalent lateral incisor was element 12.

However, in the researched literature, also excluding the third molars, a higher prevalence of agenesis of the mandibular second premolars was identified (CARVALHO; RODINI, 2003; GARIB; ALENCAR, 2013; NEVILLE *et al.*, 2016; LOTITO; ARAÚJO, 2017; MARTINS, 2018; SOARES, 2018).

According to Garib *et al.* (2010) there is a genetic interrelation in the development of some dental anomalies, therefore, professionals should be alert to identify patients with a pattern of associated dental anomalies, which are expressed with different degrees of severity.

Assessing the presence of the association of developmental anomalies, of the nine patients with dental agenesis, four (44.4%) presented another associated dental anomaly, which were, delay in the dental development of element 35, conoid shape of element 22, ectopia in the positioning of the element 23, ectopia in the positioning of element 11 and root laceration of elements 37 and 47. Of the four patients with another associated dental anomaly, 3 (75%) were female (Figure 3).

**Figure 3** -Association with other dental anomalies



**Source:** the authors.

Several studies have also evaluated this association, as a result of the same genetic defect:

Peck, Peck and Kataja (1998) analyzed 60 patients, mean age 9 to 12 years, with transposition of the lower lateral and canine incisor, with a statistically significant association with dental agenesis ( $p < 0.01$ ) and conoid shape ( $p < 0.001$ ) on the maxillary lateral incisors.

Garib, Peck and Gomes (2009) evaluated 203 patients, aged 8 to 22 years, with agenesis of at least one second premolar and comparing with other studies, concluded that these patients had a higher prevalence of other dental anomalies, such as microdontia of maxillary lateral incisors, infraocclusion of deciduous molars, disto-angulation of the mandibular second premolar and ectopic position of the upper canine to the palate.

Soares (2018) identified in 80% of cases of agenesis, association with prolonged retention of the deciduous tooth, ectopic eruption of the canine, conoid-shaped tooth, microdontia and dentoalveolar ankylosis in primary teeth.

The dental anomalies found associated with agenesis, identified at the end of this study, with the exception of root laceration, were also mentioned in the studies cited. And the highest prevalence of this pattern of association of anomalies occurred in the female gender, as mentioned by Garib and Alencar (2013).

## CONCLUSION

In the sample evaluated, it was observed that 18% of patients had dental agenesis, with a higher prevalence in females (55.6%). The most affected teeth were the maxillary lateral incisors (39.2%), followed by the mandibular second premolars (21.4%) and maxillary second premolars (14.2%). The presence of other dental anomalies associated with agenesis was identified in 44.4% of the patients, with a predominance in females, which were delayed tooth development, conoid shape, ectopia in positioning and root laceration.

It was concluded that in the studied sample there was a high prevalence of dental agenesis, having other studies with orthodontic patients as a reference.

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