

Dental anomalies in orthodontic patients with and without skeletal discrepancies

Introduction

Dental [REDACTED] are clinical alterations resulting from disturbances during the tooth formation process.¹ They represent [REDACTED] of number, size, shape, position and structure of the teeth.^{1,2} The prevalence of dental anomalies can [REDACTED] from 5.46 to 74.7%,^{1,3} due to different [REDACTED] and diagnostic criteria.^{1,4,5} The [REDACTED] of dental anomalies includes genetic and environmental factors.^{2,5,6}

Skeletal malocclusions are usually categorized and described by disturbances in the craniofacial and occlusal [REDACTED] and often appear together with the dental anomalies, asserting their relation and complicating [REDACTED].⁸ It appears that dental anomalies may be more likely to occur if individuals have Class II or Class III relationships in comparison to Class I.⁹ This sophisticated [REDACTED] definition is a base for phenotype-genotype correlation, that may contribute to more [REDACTED] treatment

predictions and to genetic studies.⁹ This systematic [REDACTED] aimed to confirm that evidence exists that individuals with Class I skeletal malocclusion are [REDACTED] likely to have [REDACTED] anomalies.

Material and Methods

The present systematic [REDACTED] was registered at Prospective Register of Systematic Reviews (PROSPERO; Centre for Reviews and Dissemination, University of [REDACTED] and the National Institute for Health Research) [REDACTED] the registry number

CRD42016038916 and followed the Preferred Reporting Items for Systematic Review and Meta Analyses (PRISMA) checklist.¹⁰

Search Strategy

The [redacted] focused question was formulated: "Is there a difference in the frequency of dental anomalies in orthodontic patients with Class II or III versus Class I malocclusion?" To [redacted] the focused question, a set of criteria for study eligibility was adopted, based on PECOS [redacted] (Population: orthodontic patients; Exposure: skeletal discrepancies; Comparator: standard of

normality; and Outcome: dental anomalies), using MeSH, entry terms and [redacted] words (Table 1).

The main search was conducted in November 2016 and was [redacted] on January 2019. Publications of potential relevance to this study were [redacted] after searching the main electronic medical scientific literature databases, [redacted] PubMed, Scopus, LILACS, Web of Science, the Cochrane Library, and Google Scholar. Additional articles of [redacted] relevance were identified by manual searches. Textbooks, dissertations, case reports, case series, review articles, and abstracts were excluded. Studies

in populations presenting specific systemic diseases, conditions (history of trauma, [redacted] lip and/or palate, syndromes), endocrine imbalances and/or metabolic disorders (being these sporadic or hereditary), and no descriptions of the three skeletal malocclusions were [redacted].

Two examiners (C.C.A.F. and M.G.M.) independently screened each paper by examining the title, abstract, and keywords. No restriction was applied regarding language or [redacted] of publication.

The selected studies were described in relation to the type of study, total [REDACTED], sex distribution, how the diagnosis of skeletal malocclusion and dental anomalies were performed, and the frequency of dental anomalies in each malocclusion. Dental anomalies were also [REDACTED] in anomalies of number, shape and position (Table 2).

Results and Discussion

Observational studies were included because they [REDACTED] dental anomalies in the different skeletal malocclusion patterns, enabling comparison [REDACTED] groups (Classe I, II and III) and different populations. **Figure 1** shows the flow diagram of the search results from the [REDACTED]. After search, a total of 4,768 records were found: 750 from Cochrane Library, 1,616 from PubMed, 911 from Scopus, 323 from Scopus-Med, 1,158 from Web of Science, four from LILACS and BBO, and six from Google Scholar.

The duplicated studies (1,279) [REDACTED] removed, resulting in 3,489 records to be analyzed. After screening by title, 138 were fit for screening by abstract. After that, a total of 13 records were [REDACTED] read in full and five studies containing 7,679 [REDACTED] were selected. The eight studies were excluded [REDACTED] they did not have the classification of [REDACTED] malocclusions patterns.

Table 2 shows the [redacted] of the data from the selected studies. The frequency of dental anomalies ranged from 11.2% to 40.3%.^{1,9,11,12,13} It was observed that [redacted] with skeletal discrepancies (Class II and III) had more dental anomalies when compared to individuals with no skeletal discrepancies (Class I).^{1,9,12,13} The same was [redacted] for dental anomalies of number,^{1,12,13} [redacted], and position.¹⁰ Three studies only made the diagnosis of tooth agenesis^{11,13} and/or third molar agenesis.^{11,12}

The studies included in this systematic review had a frequency of dental anomalies ranging from

11.2% to 40.3%. Celicoglu and Kamak (2012)¹² reported a frequency of 22.7% of dental anomalies. [redacted] Fernandez et al. (2018)⁹ reported a frequency of 15.7% of dental anomalies of number, shape and position. Uslu et al. (2009)¹ had the [redacted] frequency of dental anomalies among orthodontic patients of the five studies selected (40.3%), having tooth agenesis, evagination, and invagination as the [redacted] common dental anomalies. The studies that found the lowest frequency of dental anomalies in orthodontic patients were of Young (2010)⁵ and Chung et al. (2008),¹¹ with a frequency of 11.3% and 11.2%, respectively. It is likely that these differences are [redacted] to the different populations studied (Turkish, Brazilian, and Korean) and different dental anomaly definitions.

[redacted]

In summary, individuals with skeletal Class II or Class III malocclusion patterns have more dental anomalies than individuals who are Class I. In [redacted] there is an association between dental anomalies and skeletal Class II or Class III malocclusion patterns.