Gingival recession of mandibular incisor post-orthodontic treatment: a systematic review

Resesi gingiva pada insisvus rahang bawah pascaperawatan ortodontik

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ABSTRACT

Objective: To evaluate the effect of orthodontic movement on gingival recession of mandibular incisor. **Method**: Pubmed and Wiley online searches were conducted to identify articles published in dental journals until November 2018 focusing on relationship between gingival recession of mandibular incisors after orthodontic treatment. Manual searches of published full-text articles and related reviews were performed afterwards. **Result**: All articles were 103 selected for full-text review. A total 4 studies were selected for inclusion, with 462 subjects. All of the studies showed the mean increase in clinical crown height of the lower incisors was not statistically significant. **Conclusion**: It was concluded that orthodontic treatment did not affect the developmental of gingival recession on mandibular incisors.

Keyword: gingival recession, orthodontic treatment, mandibular incisor

ABSTRAK

Tujuan: Untuk mengetahui efek pergerakan ortodontik pada resesi gingiva gigi insisivus rahang bawah. **Metode**: Pencarian secara online oleh Pubmed dan Wiley untuk mengidentifikasi artikel yang diterbitkan dalam jurnal kedokteran gigi sampai November 2018, berfokus pada hubungan antara resesi gingiva gigi insisivus bawah setelah perawatan ortodontik. Pencarian manual dari artikel teks lengkap dan ulasan terkait dilakukan setelahnya. Ditemukan 103 studi, tetapi hanya 3 yang memenuhi kriteria inklusi. **Hasil**: Semua artikel dipilih untuk ulasan teks lengkap. Tiga studi dipilih untuk dimasukkan, dengan 288 subjek. Semua studi menunjukkan peningkatan rata-rata ketinggian mahkota klinis gigi insisivus bawah tidak signifikan. **Simpulan**: Pergerakan gigi secara ortodontik tidak mempengaruhi perkembangan resesi gingiva setelah perawatan.

Kata kunci: resesi gingiva, perawatan ortodontik, insisivus mandibula

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INTRODUCTION

The main characteristic of gingival recession is the apical migration of marginal gingiva as well as the fact that the latter is gradually displaced away from the cementoenamel junction (CEJ), thereby exposing the root surface to the oral environment.[1]

Gingival recession pathophysiology can be divided into the following: direct causes and predisposing factors. In gingival recession cases, the first mechanism responsible for causing apical gingival migration is loss of bone support offered by the alveolar bone crest. Whenever bone loss is limited to a single tooth surface, usually the buccal one, bone defect is best known as dehiscence. Over time, normal or inflammed gingival soft tissues tend to keep up with cervical bone levels; therefore, gingival recession is established.[1]

Orthodontic tooth movement through a thin buccal osseous plate may lead to a dehiscence beneath a thin gingiva. This situation can also lead to the recession of the gingival margin.[2]

Orthodontic treatment alone will rarely promote gingival recession which, in general, has as primary causes some of its direct causes. Orthodontic treatment carried out without any concern about gingival recession triggers one of the most important predisposing factors for the latter, which is represented by the thin, delicate structure found in the buccal, outer bone plate- which is sometimes unperceivable by CT scan.[1] Gingival recession has been found to be more frequent in mandibular than maxillary teeth, and on facial than lingual surfaces.[3]

The aim of the present review is to systematically evaluate the effect of orthodontic movement on gingival recession of mandibular incisor.

METHOD

This systematic review was written according to the guidelines of 'preferred reporting items for systematic reviews and meta-analyses' or PRISMA for reporting studies evaluating healthcare interventions. The population, intervention, control, and outcome or PICO question of the present systematic review was P is patient who hanve been treated orthodontic, I is proclined or retroclined of mandibular tooth, C is treated

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with fixed or removable orthodontic appliance, and O is increase of clinical crown height and prevalence of gingival recession.

Search strategy

Initial Pubmed and Wiley search of the English language literature was performed to establish a study protocol. This study was conducted to identify articles published in dental journals until November 2018 focusing on study of gingival recession after orthodontic treatment. The MeSH (NCBI PuBMeD) keywords were "gingival recession" and "orthodontic treatment" and "mandibular incisors". The search limits applied to the electronic search were the article types, search period. Manual searches of published full-text articles and related reviews were performed afterwards. There are 20 studies have shown on this matter in Pubmed, and 83 studies in Wiley, with only 4 studies met the inclusion criteria. Specific keywords were used to identify the appropriate studies need, and followed the characteristics of PICO question.

Eligibility criteria

The inclusion criteria were English language article, full-text article, any clinical study published until November 2018, the studies reported on gingival recessions after orthodontic treatment on mandibular incisors, the studies included information about type of orthodontic appliance and type of tooth moved.
The exclusion criteria were all studies did not satisfy the above mentioned criteria, such as animal studies and systematic review and meta-analysis.

Selection of study

Specific keywords were used by two participating authors resulted the selection of the papers based on reading of abstract and full-texts. Independently, the two investigators selected the paper based on inclusion criteria formerly set. After that, all abstracts and full-texts were downloaded and individually evaluated. The eligibility criteria were used to identify the articles that will be used for this systematic review.

Extraction of data

The data were retrieved by two reviewers that regarding following parameters: authors; year of publication; number of patients; technique; and objective. All of the full-texts which met the inclusion criteria were read independently by the two reviewers, and evaluated to formulate this systematic review.

RESULT

The database search yielded 103 references, including 20 from PubMed and 83 from Wiley. After removing duplicates references, there were 8 studies remained. The titles and abstracts were reviewed afterward, and 4 studies were eligible for further analysis. The full-texts then be reviewed by the investigators and yielded 4 articles which met the inclusion criteria. The flowchart of article selection is shown in figure 1 with total 4 selected articles from initial yield of 103 studies by electronic literature search. After 103 titles reviewed, 8 articles were selected for this systematic review inclusions, whereas the other 4 articles were excluded for some different reasons.

The four studies were published until 2018. The number of subject in the studies were 462 subject. All of the studies dealt with gingival recession. Data from studies were combined in order to evaluate treatment effect of mandibular incisors movement to gingival recessions. The clinical parameters showed in table 1.

Renkema et al[3] showed that mean increase of clinical crown height after 5 years post treatment was 0.6-0.91 mm with number of recession on mandibular incisors was 29.6%. Renkema et al[4] also showed the mean increase of clinical crown height after 5 years post treatment was 0.58-1.12 with number of recession was 24%.

Birte et al (2005) showed that mean increase of clinical crown height after 6 years post treatment was 0.34 mm with number of recession was 35%. Then Giulio et al (2015) also showed that mean increase of clinical crown height after 9 months post treatment was 1.5 mm and only one patient showed gingival recession.

DISCUSSION

A change in incisors inclination during treatment has been extensively investigated, but conflicting findings have been reported, some authors showed an association between proclination of mandibular incisors and developmental of gingival recessions.[4] Based on

Table 1 Descriptive data from clinical parameters of clinical crown height of lower incisors after orthodontic treatment.

Author	subject	Orthodontic treatment duration	Type of orthodontic therapy/teeth moved	Mean Increase of clinical crown height (mm)	% with recessions
Renkema et al (2012)	179	5 years	Full fixed appl./proclined	0.6-0.91	29.6
Renkema et al (2014)	117	5 years	Full fixed appl./proclined	0.58-1.12	24
Birte et al (2005)	150	6 years	Full Fixed appl./proclined	0.34	35
Giulio et al	16	9 month	Full Fixed appl./proclined	1.5 mm	16

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this systematic review reported that all of study have subject with recession on mandibular incisors. The mean increase of clinical crown height was 0.6-1.5 mm with prevalence of gingival recession was 16-35%.

Recession of the marginal gingiva can be associated with anatomic or pathologic factors. Subject with thin periodontal biotype were considered more susceptible to gingival recession than patient with thick biotype.[5] Active orthodontic treatment can induced gingival recession when teeth are moved outside alveolar bone.[6]

Giulio et al reported that only one patient showed a gingival recession of 1.5 mm on mandibular incisors after 9 month follow up. Renkema et al and Birte et al also reported that mean increase of clinical crown height was less than 1 mm after more than 5 years proclined mandibular incisors.

Every study reported that there is gingival recession at least one subject with gingival recession after orthodontic treatment on mandibular incisors. Only minimal amount of gingival recession was evident and all recession cases were Miller class I.

There are many causal effects in development of gingival recession, that is, tooth brushing trauma, destructive periodontal disease, tooth malpositioning, and destructive periodontal disease; tooth malpositioning, alveolar bone dehiscence, thin and delicate marginal tissue covering a non-vascularized root surface, high muscle attachment and frenal pull, and occlusal trauma; lip piercing and iatrogenic factors related to reconstructive, conservative periodontologic, orthodontic, or prosthetic treatment.[7]

It was concluded that the orthodontic treatment did not affect the developmental of gingival recession on mandibular incisors.

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Conflict of interest

The authors report no conflict of interest.

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