Prevalence and type of gingival recession in adults in the city of Divinópolis, MG, Brazil

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Abstract

Aim: To evaluate the prevalence of gingival recession (GR), its classification according to Miller's classification, and its relationship with gender, age, income and level of education, in the population of the city of Divinópolis, MG, Brazil. **Methods:** Two questionnaires were distributed to the local dentists. One of them was directed to the patients and had questions referring to gender, age and socioeconomic conditions; the other was directed to dentists and had questions about the type of GR found in each patient. **Results:** 245 patients were included in the study. GR prevalence was higher in women. GR prevalence increased with age and seemed to stabilize after the age of 30. There was no relationship between GR and patient's socioeconomic status. A higher GR prevalence was found in premolars with no statistically significant difference among them. There is a higher prevalence of Miller's Class I GR. **Conclusions:** As the prevalence of GR increases with age, a frequency of 81.40% of GR was obtained. No correlation was found between socioeconomic level and GR. In addition, there was no significant difference between genders on GR prevalence. A higher Miller class I (p=0.000) prevalence was observed. There was no significant difference between mandibular and maxillary molars. However, the mandibular premolars were the most affected and there was a higher GR prevalence in maxillary teeth than in mandibular teeth.

Keywords: gingival recession, epidemiology, gingival recession classification.

Introduction

Due to increasing patients' demand for a harmonious smile, a common concern in Periodontology is solving gingival aesthetic problems, mainly gingival recession (GR), which has gained the status of discomfort in cosmetic dentistry.

As much as 25.6% of people feel unpleased with their gingival or dental esthetics in the anterior region. GR has the highest index of complaints[1]. This could be verified in a previous study in which questionnaires were sent to periodontists to investigate patients' main complains on the periodontal esthetics condition, and the correction of denuded roots was the most requested treatment[2].

Data on GR prevalence, most affected teeth, patients' age and socioeconomic conditions are scarce in the Brazilian literature, especially referring to the population living in the Minas Gerais state, which justifies the present study.

GR can be related to mechanical factors (hygiene trauma) and to periodontal disease processes and it is therefore not possible to identify a single factor, but rather a combination of factors[3]. GR is multifactorial and can occur in patients with periodontal disease as well as in those with high levels of oral hygiene[4]. GR

affects all ages but is more frequent with ageing, and can reach 100% of individuals[5]. The highest GR frequency was found on mandibular incisors and maxillary first molars at the age of 20[6].

On patients over 43 years of age, 68% had at least one tooth with GR being the mandibular teeth more affected than the maxillary[7]. It is very uncommon to find an individual over 45 years with thoroughly healthy periodontal tissues[8].

Between 20 and 34 years of age, GR has a 32% prevalence. Between 45 and 64, the prevalence raises to 64%, being the maxillary teeth more affected than the mandibular teeth, with a greater prevalence on the maxillary first molars[9]. GR in left-handed patients has a higher prevalence in the maxillary premolars and canines, with no statistically significant difference between the right and the left side[10]. The premolars, followed by incisors and canines both maxillary and mandibular, show a higher GR prevalence, and women show less prevalence than men[11].

In a Brazilian adult population aged between 35 and 59 years, a GR prevalence of 98.9% was found, with no correlation with gender; there also is an increase in lesion severity with age[12].

A previous questionnaire-based study[7] with a sample of 1,460 individuals aged 25 to 50 years reveled that GR had no statistically significant association to patient socioeconomic status.

When the impact of Miller's classification was observed[13], class l GR was more prevalent and a gradual decrease for Class ll, lll and lV was noticed[10].

The objective of this study was to obtain data on GR prevalence using questionnaires aimed at 20-49-year-old patients living in the city of Divinópolis, MG and to the dentists enrolled in the Regional Council of Dentistry of Minas Gerais that worked in that city.

Material and methods

The population of this study was 20-49-year-old individuals living in the city of Divinópolis, MG, Brazil. Data on GR prevalence, most affected age, and teeth, it's possible relation to the patient's socioeconomic status, along with the GR classification according with Miller's Classes[13] I, II, III, IV were obtained from the questionnaire.

Nine hundred and ninety nine questionnaires were sent to be filled by the dentists working in Divinópolis. These questionnaires were personally handed to the dentists at their offices, with purpose of explaining how to fill them.

For this work, in order to avoid misinterpretation on the GR prevalence, some exclusion criteria were established: GR less than 1 mm, GR not in the buccal region, smokers, patients under periodontal treatment, individuals using anticonvulsant drugs, cyclosporine or calcium blockers, patients out of the age group, patients with missing teeth (except for the third molars), and specialists in pediatric dentists and periodontics.

The questionnaire directed to patients had questions referring to gender, age, education level and income, following the IBGE methodology[14].

The patients of the sample were divided into group A, with patients from 20 to 29 years; group B from 30 to 39 years, and group C from 40 to 49 years.

The educational level was subdivided into: illiterate, elementary education, incomplete middle level, complete middle level, incomplete high school, complete high school, college and post graduate[14].

The income was subdivided into values corresponding to the minimum wage: no income, 1 minimum wage, 2 to 3, 3 to 5, 5 to 9, 9 to 15, 15 to 20, and above 20 minimum wages[14].

The studied teeth (n = 6,020) were divided in groups of anatomical denominations (except molars that were divided into first and second molars) without defining which quadrant. They were divided in mandibular incisors, maxillary incisors, mandibular canines, maxillary canines, mandibular premolars, maxillary premolars, mandibular first molars, maxillary first molars, mandibular second molars and maxillary second molars.

After the participating dentists received the forms, they handed them over to their patients with questions about age, gender, education level and income range. After receiving the answers from the patients, the dentists examined the patients for GR. In positive cases, they answered a specific questionnaire with data on the affected teeth and classification of GR according to Miller's classification[13]. This evaluation was supported by figures illustrating this classification.

Nonrandom, nonprobability sampling was used[15], since not all the population was examined, but all available cases were included.

Descriptive analyses were performed using tables of distribution of frequencies and proportions calculation. The Pearson Chi-square test was used, which is appropriate for proportion comparisons[16]. From the sample obtained, a significant power of 99.6% was achieved, allowing us to detect every existing associations[16].

Results

A 23.02% response rate was obtained, as 230 out of 999 questionnaires sent to eligible participants were returned. From these, 15 were excluded because they were not correctly filled.

Results according to gender are presented in Figure 1. As a non-random, probabilistic sample was used, the choice of gender for research followed the same principle, i.e., the frequency was determined by the gender that more commonly attended the clinics. Therefore, females were more present to the office than males. Standard deviation (s) = 13.5. No statistically significant differences were found between genders (p = 0.066).

Out of 215 patients (100% of sample) included in this work, 21.40% belong to group A (20 to 29 years), 39.53% belong to group B (30 to 39 years) and 39.07% belong to group C (40 to 49 years). GR frequency related to each age group is presented in Figure 2. (s) = 18.15. No statistically significant differences were found between groups B and C (p = 0.871), but statistically significant differences were detected between group A and B, and between group A and
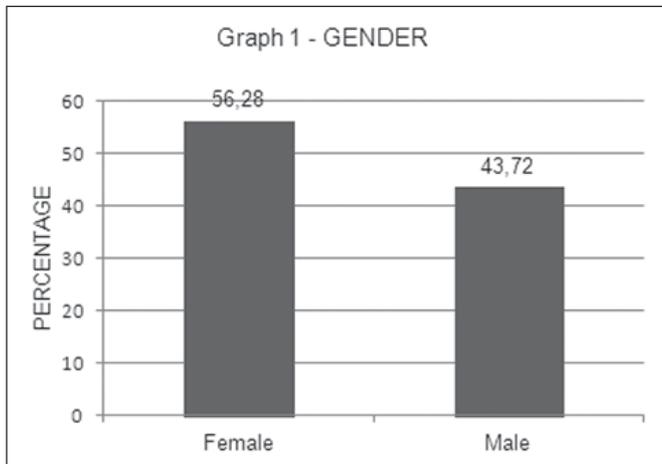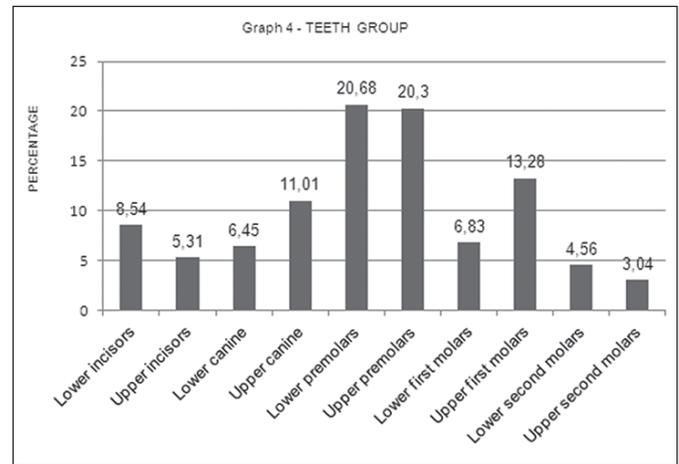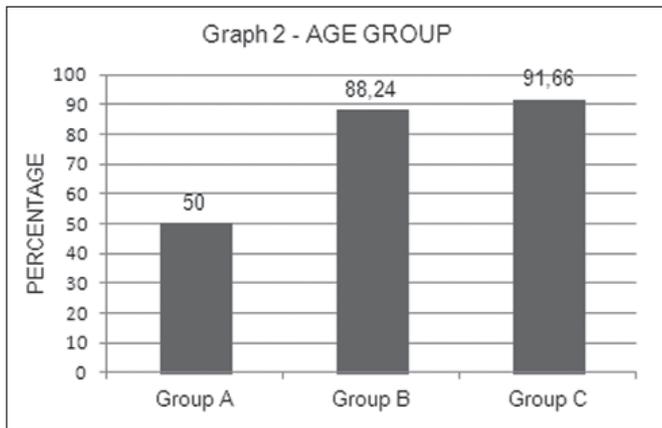
Fig. 1: gender evaluated

Fig. 2: age group

Fig. 3: gingival recession in age group

Fig. 4: tooth group
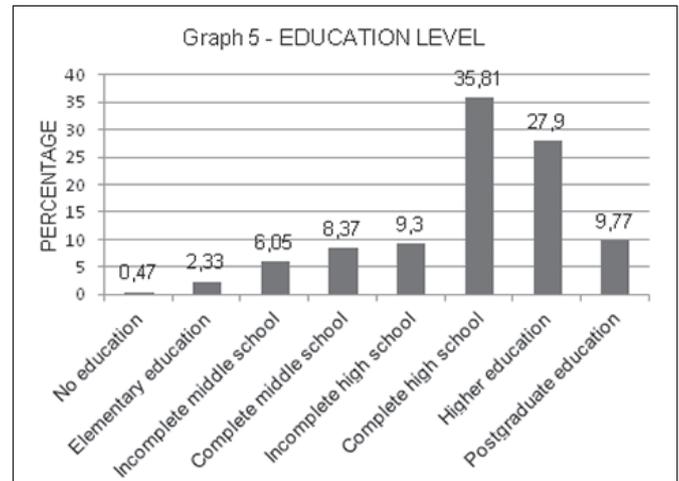
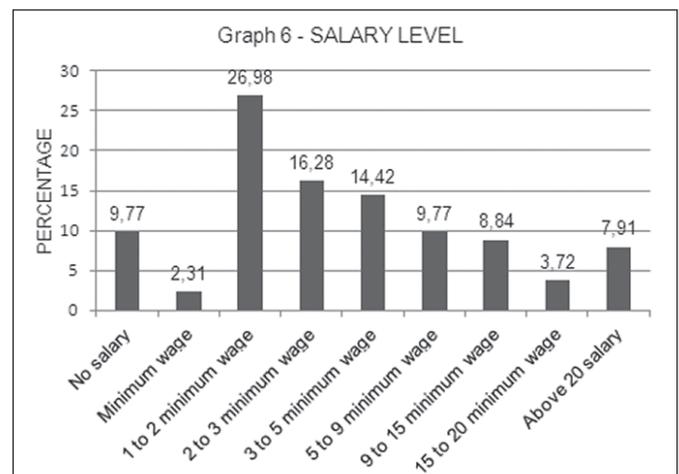**Fig. 5:** education level

Fig. 6: income

C (p = 0.000). The relative percentage for each age group is presented in Figure 3. (s) = 24.36. No significant differences could be detected between groups B and C (p = 0.458), but statistically significant differences between groups A and B, and between groups A and C (p = 0.000).

GR prevalence, according to the tooth groups is on Figure 4. (s) = 31.48. There were statistically significant differences between mandibular incisors and maxillary incisors (p = 0.047), between mandibular canines and maxillary canines (p = 0.012), but no statistically significant differences were found between mandibular premolars and maxillary premolars.

The same result was found by other authors[17] (p = 0.892) and between mandibular second molars and maxillary second molars (p = 0.206). There were statistically significant differences between mandibular first molars and maxillary

first molars (p = 0.000). There were no statistically significant differences between maxillary and mandibular teeth (p = 0.177).

GR classification according to Miller was as follows: 76.86% class I, 19.39% class II, 2.84% class III and 0.91% class IV. There were statistically significant differences between class II and III (p = 0.000), and between class III and IV (p = 0.002). There were statistically significant differences between class I and class II, between class I and class III, and class I and IV (p = 0.000).

The results for educational level are given in Figure 5. (s) = 25.27. No statistically significant differences could be found between illiteracy and elementary education (p = 0.059), between elementary education and incomplete middle level (p = 0.089), between incomplete middle level and complete middle level (p = 0.369), between complete middle level and incomplete high school (p = 0.746), or between complete high school and higher education (p = 0.146). Statistically significant differences were detected between incomplete high school and complete high school and between higher school and postgraduate education (p = 0.000).

The results for income are given in Figure 6. (s) = 15.04. No statistically significant differences could be found between 2 to 3 minimum wages and 3 to 5 minimum wages (p = 0.622), between 3 to 5 minimum wages and 5 to 9 minimum wages (p = 0.166), between 5 to 9 minimum wages and 9 to 15 minimum wages (p = 0.752), 15 to 20 minimum wages, and above 20 minimum wages (p = 0.072). There were statistically significant differences between no income and minimum wage (p = 0.012), between minimum wage and 1 to 2 minimum wages (p = 0.000), 1 to 2 minimum wages and 2 to 3 minimum wages (p = 0.017), and between 9 to15 minimum wages and 15 to 20 minimum wages (p = 0.034).

Discussion

In city of Divinópolis, 48.11% of the population is between 20 and 49 years old. According to most studies on GR frequency, there is a higher frequency of this condition in young adults and elderly[5-6,12,18-19], and that is the reason why this city and this age group were chosen in the present study. The exclusion criteria were used to prevent bias from our sample, which could compromise the reliability of the results.

The sample was separated into groups with the purpose of analyzing GR evolution and the amount of researched individuals.

Based on the literature, which considers GR a high-prevalence event, the sample of this study allowed an improved statistical treatment ensuring detection of all existing associations. Therefore, the sample of this survey was considered representative, with a 5% significance, error type I, power 99.6%, 1-error type II, allowing a lower percentage error in the collected data.

Regarding the prevalence of the patient's gender, there was no statistically significant difference between both genders (p = 0.066), which is in agreement with a previous study[12] that did not correlate gender with GR.

GR was found in all assessed age groups, with a gradual increase with age , reaching 81.40% of frequency between 20 and 49 years, which may relate age to GR.

Significant differences were found between groups A and B, and A and C, but not between groups B and C. Thus, it was found that there was a significant increase in frequency between groups A and B, and A and C, consistent with the findings of other authors[1,11-12,18]. However, this increase stabilized for groups B and C, with no statistically significant difference between these groups (p = 0.871). It may be verified that after 30 years of age the frequency of GR stabilizes.

The increase of GR prevalence in patients over 43 years is due to a long   exposure to etiological factors that cause GR[7]. However, when patients are well educated with reference to their oral hygiene, the prevalence can be minimized.

A correlation between income and prevalence of GR or between frequency of GR and educational level could not be observed. This was due to the large number of income categories/levels of education surveyed and the small number of study subjects in each category, thus failing to get enough power to obtain associations and verify statistical differences between these categories.

A better option to this could be a regrouping of the wage categories, which would lead to find significance between groups[16]. However, it was considered too risky, thereby remaining an inconclusive result in relation to income categories and GR frequency, as found by other authors[20].

Significant differences were found between first molars (p = 0.000), with a higher GR frequency in the maxillary first molars than in the mandibular first molars, which is also consistent with other findings[18].

If we sum the GR-affected teeth on this work, 52.94% are in the maxilla and 47.06% are in the mandible. These data are in agreement with those of other authors[9] who reported a higher GR prevalence in maxillary teeth, with no statistically significant difference between arches (p = 0.177).

It is interesting to notice that the sum of GR prevalence in the maxillary incisors, canines and premolars, which compound the smile line affecting the aesthetics of the smile, represents 36.62%, which explains the great importance given by patients to this type of gingival alteration.

Miller's class I[13] was the most frequent type, followed by class II, III and class IV, which are statistically significant results (p = 0.000). Similar results have been reported elsewhere[3].

In order to understand this finding, a class I frequency of 76.86% was obtained, which may be attributed to the fact that the plaque acts easily in the thin and delicate gingival tissue and in the thin alveolar bone[19]. Thus, in the cervical region of the teeth, the bone and gingiva are thinner and therefore more likely to be resorbed, leading to class I or even class II GR formation. As the bone volume increases on the alveolar ridge region and in the most apical region, it becomes less vulnerable to bacterial attack and trauma, and therefore less prone to changes[21].

In view of the results of this study, further research may

be directed to elucidate more relations of GR, such as: i) the reason behind the higher GR prevalence on premolars, ii) studies with different methodologies as used in the present study[19]; with fewer income and education level groups to be studied. We recommend this due to the many income and education level groups included in the present methodology. The patient sample size was insufficient to verify whether there is a correlation between GR and Brazilian socioeconomic factors, iii) a significant difference between groups A and B, when it comes to age are minimum, this can lead to the suspicion that GR ceases after 30 years of age, and therefore a study to that suspicion would be of great value to the scientific community.

We also recommend that before periodontal therapy or orthodontic movement, a detailed study of periodontal conditions should be performed, thereby, preventing GR. Prevention should be the focus, as adequate hygiene leads to minimal GR frequency.

Based on the results, it may concluded that there has been a gradual increase on the gingival recession frequency with age, there was no correlation between GR increase and income, due to the large number of study categories included in this work, most of the GR cases were Miller's class I, the most affected teeth were premolars with no significant difference between maxillary and mandibular teeth, no significant difference was found on the gingival recession frequency between maxillary and mandibular teeth and no gender preference was found on the patients' GR.

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