

# Prevalence of Gingival Recessions in the Aesthetic Zone of Maxilla in Bulgarian Population

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**Abstract:** *Gingival recession is a mucogingival defect and has a decisive meaning for aesthetic risk assessment in periodontal, implant and prosthetic therapy, especially in the aesthetic zone of the maxilla. The marginal gingival tissues position and outline are very important for the aesthetic smile. Gingival recession is determined as the distance of apical proliferation of gingival margin from the CEJ. It can be localized on the vestibular, palatal or approximal tooth surface. There are variations in prevalence of buccal gingival recessions in maxillary frontal segment between males and females and between different age groups. 221 participants (80 males and 141 females) are assessed for gingival recessions on the vestibular site of their maxillary frontal teeth, using the Miller's classification (1985). The descriptive statistical analysis is done by IBM SPSS Statistic version 19 software. The frequency and severity of gingival recession increase with age. There is higher frequency of gingival recessions in males compared to females. Miller's class III gingival recession was more commonly seen. The severity of gingival recessions in right maxillary frontal teeth is higher compared to the left maxillary anterior teeth. According to the prevalence of buccal gingival recessions in the maxillary frontal segment, the preoperative planning for mucogingival surgery in this aesthetic area, will be more predictable in females and younger individuals.*

**Keywords:** aesthetic zone; frontal teeth; gingival recession; maxilla; prevalence

## 1. Introduction

Gingival recession is one of many mucogingival defects that can affect all ages. According to the American Academy of Periodontology (1992), it is defined as the distance of retraction of marginal gingival tissues apically to CEJ of the tooth. Some authors consider that the term "marginal tissue recession" is more accurate than the term "gingival recession," because the marginal tissues may include also alveolar mucosa. Therefore, as a marginal tissue recession is defined the retraction of soft marginal tissues apically to the CEJ. (AAP, 1996).<sup>[6]</sup>

The most common etiological factors associated with gingival recessions are: plaque induced periodontal diseases, brushing trauma, anatomical features like fenestrations, dehiscences and abnormal teeth position, mechanical trauma, occlusal trauma, thin periodontal biotype, consequence of orthodontic treatment, iatrogenic factors associated with improperly restored marginal edges of restorations, pre-existing periodontal treatment, high mucogingival ligaments and abnormal frenulum attachments, extraction of adjacent teeth, as well as chewing of tobacco.<sup>[2]</sup>

A large number of epidemiological studies have been done on the prevalence and occurrence of gingival recession in western population than in Bulgarian population.<sup>[6,7,10]</sup> The prevalence varied from 50-90% among these populations. The aim of this study is to estimate the prevalence, severity, and extent of gingival recession in different age groups on females and males of Bulgarian population.

## 2. Literature Survey

Different classifications have been proposed to facilitate the diagnosis of gingival recessions, based on morphology of gingival lesions, their etiology, prognosis and possibility for root coverage.

### 1) Classification of Sullivan & Atkins (1968)

They use as a reference points the mucogingival line and the highest point of the recession, describing 4 classes:

- class 1 – recessions, deep over 3 mm and wide over 3 mm
- class 2 – superficial wide recessions – deep to 3 mm and wide over 3 mm
- class 3 – deep and narrow – deep over 3 mm and wide to 3 mm
- class 4 – superficial and narrow recessions – deep to 3 mm and wide to 3 mm<sup>[11]</sup>

### 2) Classification of Mlinekat all. (1973)

- "Shallow and narrow" – recessions, that are deep and wide to 3 mm
- "Deep and wide" – deep and wide over 3 mm<sup>[6]</sup>

### 3) Classification of Benque at all. (1983)

- Describe three local forms of gingival recessions according to their coverage prognosis:
- U – poor coverage prognosis – most often associated with chronic periodontal inflammation, traumatic brushing and anatomical factor
- V – fair prognosis – most often associated with occlusal trauma (bruxism, bruxomania) and known also as Stilman's cleft.
- I – good coverage prognosis<sup>[9]</sup>

### 4) Classification of Miller (1985)

Miller proposed a useful classification system for describing gingival recession defects taking into consideration the anticipated root coverage that is possible to be obtained. Its significance lies in the fact that it is useful in predicting the final amount of root coverage following a free gingival graft procedure. Four types of recession defects are categorized as follow:

- Class I - marginal tissue recession not extending to the mucogingival junction (MGJ). No loss of interdental bone or soft tissue. 100% root coverage can be anticipated.

- Class II - marginal tissue recession extends to or beyond the MGJ. No loss of interdental bone or soft tissue. 100% root coverage can be anticipated.
- Class III - marginal tissue recession extends to or beyond the MGJ. Loss of interdental bone or soft tissue is present apical to the CEJ, but coronal to the apical extent of the marginal tissue recession or there is a malpositioning of the teeth, which prevents the attempting of 100% of root coverage. Partial root coverage can be anticipated.
- Class IV - marginal tissue recession extends to or beyond the MGJ. Loss of interdental bone extends to a level apical to the extent of the marginal tissue recession and/or malpositioning of teeth is so severe that root coverage cannot be anticipated.<sup>[8]</sup>

### 5) Classification of Mahajan (2010)

- Class 1 – recession that not extend to the mucogingival line
- Class 2 – recession extends to and beyond the mucogingival line
- Class 3 – recession defect related with bone or soft tissue loss and soft tissues in the interdental area up to cervical  $\frac{1}{3}$  of the root length surface and/or malpositioning of the teeth
- Class 4 – gingival recession defect with severe bone or soft tissue loss in the interdental area more than cervical  $\frac{1}{3}$  of the root length and/or presence of severe tooth malposition<sup>[4]</sup>

### 6) Classification of Francesco Cairo и кол. (2011)

This classification is based on the assessment of clinical attachment level at both buccal and interproximal surfaces as well.

- Recession type 1 – gingival recession with no loss of interproximal attachment level The interproximal CEJ can not be clinically determined at both mesial and distal surfaces of the tooth
- Recession type 2 – gingival recession with interproximal clinical attachment level loss, that is less or equal to buccal attachment loss.
- Recession type 3 – gingival recession associated with interproximal clinical attachment level loss, that is higher than the buccal attachment loss<sup>[1]</sup>

According to one study by Toker et al. the prevalence of gingival recessions among the Turkish population is 78.2%. The results of this study show that the prevalence of gingival recessions is higher in males than in females, and that the distribution of gingival recessions increases with increasing the age.<sup>[12]</sup>

According to another study by Sarfati et al. including 2074 individuals, the prevalence of buccal gingival recessions in at least one of the examined teeth is 84.6% among the subjects in the study group. They prove that the age of the study participants is associated with the wider prevalence of gingival recessions.<sup>[10]</sup>

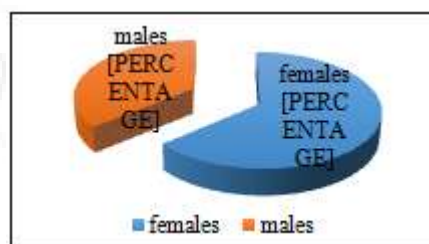
Another study by Marini et al. prove that among the study population the most prevalent are gingival recessions class I by Miller (59.15%), the second prevalent are gingival recessions class III (32.51%), followed by class IV (5.55%)

and class II (2.79%). Their results show that the distribution of class I gingival recessions, decreases with increasing the age. On the other hand, class IV gingival recessions, defined as most severe according to Miller's classification, show an increase in prevalence with increasing the age.<sup>[6]</sup>

Mythri et al. examined 710 subjects and found that the frequency of gingival recession increase with age. High frequency of gingival recession was seen in males (60.5%) compared to females (39.5%). Miller's class I gingival recession was more commonly seen.<sup>[7]</sup>

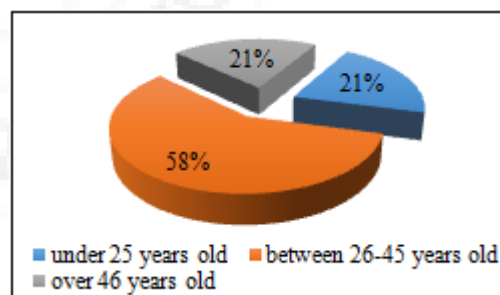
### 3. Material and Methods

The study was carried out at department of Periodontology, Dental faculty of Medical university, Varna. Into the study were included 221 participants - 80 males and 141 females (age range: 18-75 years, mean age: 37,37 years). The sex distribution shows 64% females and 36% males. (fig.1)



**Figure 1:** Sex distribution of examined individuals

The age distribution is as follows: first group - 46 patients under 25 years old (21%), second group - 128 patients between 26 and 45 years old (58%) and third one - 47 patients over 45 years (21%). The aim of this distribution range is to determine the prevalence and variations in buccal gingival recessions in different age groups, in the aesthetic zone of maxilla. (fig.2)



**Figure 2:** Age distribution of examined patients

In the test group are included only patients who respond to the following criteria:

- All participants in the study are over 18 years old
- All participants in the study have permanent dentition in the frontal sextant of the maxilla
- In all assessed maxillary anterior teeth, the hard tissues of tooth crowns are not decayed or restored in the area of CEJ

The maxillary frontal teeth that meet any of the following criteria are excluded from participating in the study:

- Deciduous maxillary frontal teeth
- Prosthetically and conservative restored maxillary frontal teeth with artificial crowns, with aesthetic restorations in

CEJ area, with wedge defects and carious lesions in the area of CEJ and other alterations that may complicate the correct determination of CEJ in these teeth

Each one of the assessed upper frontal teeth is examined at three surfaces: vestibular, mesio-vestibular and disto-vestibular and the class of the established gingival recession is determined by the Miller's classification (1985).

On the basis of the obtained results, the investigated upper frontal teeth of all study patients (in all age groups), are divided into five groups: first group - upper frontal teeth with no recessions, second group - teeth with gingival recession class I, third group - teeth with gingival recession class II, fourth group - teeth with gingival recession class III and fifth group - teeth with gingival recession class IV.

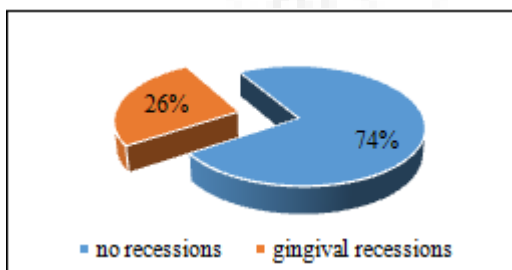
Written informed consent was taken from every participant prior to the study.

#### 4. Statistical Analysis

Statistical descriptive analysis is performed using the SPSS version 19 software package.

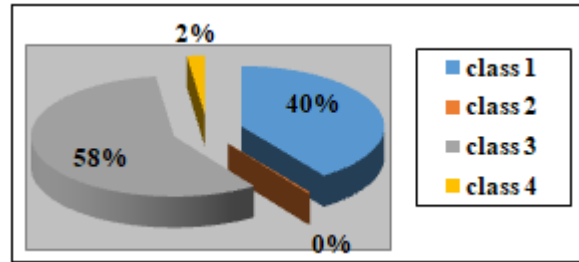
#### 5. Results

1316 maxillary frontal teeth are assessed - the number of central maxillary incisors is 441 (34%), the lateral incisors - 439 (33%), and the maxillary canines - 436 (33%). According to the obtained results, we registered presence of gingival recessions vestibular, mesiovestibular or distovestibular, only in 343 of all examined teeth (26%) and in the other 973 assessed maxillary frontal teeth (74%), gingival recessions are not recorded in the aesthetic area of the maxilla. (fig.3)



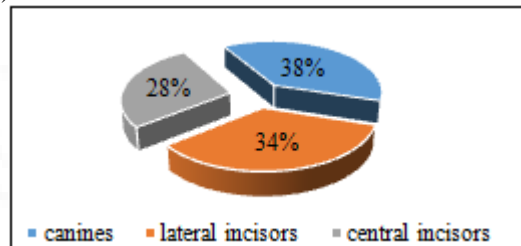
**Figure 3:** Distribution of gingival recessions vestibularly in upper frontal teeth in the aesthetic zone of maxilla in patient test group

According to the Miller's classification (1985), the gingival recessions that are established, are divided into four classes: class I - 138 of the assessed teeth (40% of all established recessions), class II - just in 1 tooth (0,1%), class III - in 197 teeth (58%) and class IV - only in 7 upper frontal teeth (2%). (fig.4)



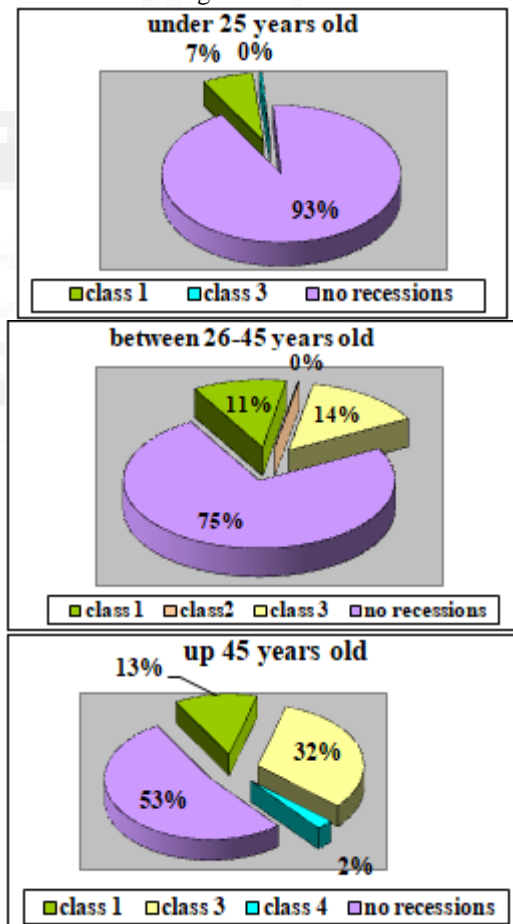
**Figure 4:** Distribution of gingival recessions in the aesthetic zone of maxilla in percentage

Most of the established gingival recessions are recorded in the group of maxillary canines - in 131 of the assessed canines (38% of all registered recessions), second in the group of lateral incisors - in 118 teeth (34%) and at least in the central incisors - 94 teeth or 27% of available recessions. (fig. 5)



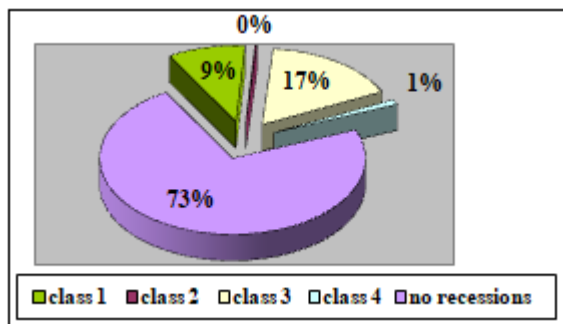
**Figure 5:** Distribution of gingival recessions in different groups of maxillary frontal teeth

In the different age groups for all participants in the study, we received the following results:



**Figure 6:** Distribution of gingival recessions in different age groups in all examined patients

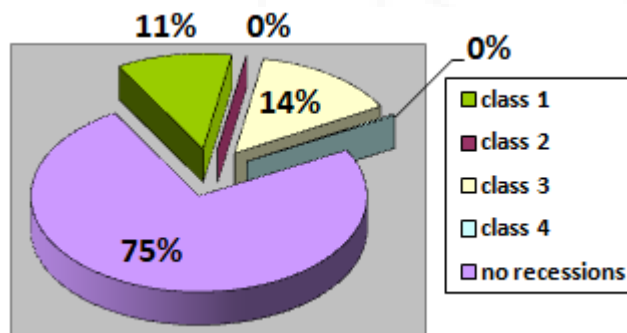
In male subjects (80 individuals), 477 upper frontal teeth are assessed, and the following results are received: class I gingival recessions - 45 teeth (9%), class II - 1 tooth (0.2%), class III - 75 teeth (17.2%) and class IV - in 4 teeth (1%).



**Figure 7:** Distribution of the prevalence of vestibular gingival recessions of the upper frontal maxillary teeth in all examined males

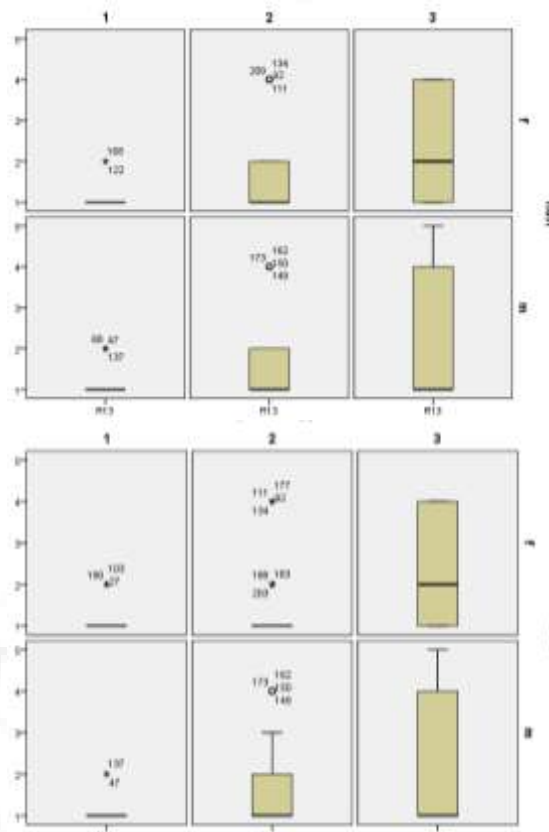
Thus, in all examined males, the prevalence of gingival recessions in the aesthetic area of the maxilla is 27%, and the gingival recession class III are the most common registered (17.2%) and only in 9% of cases class I and class II gingival recessions are presented. (fig. 7)

In females (141 participants), 839 upper frontal teeth are assessed in the aesthetic zone of maxilla, and the following results are received: class I gingival recessions - 86 teeth (11.1%), class II – no one (0%), class III - 113 teeth (14.1%) and class IV - in 2 teeth (0.2%).



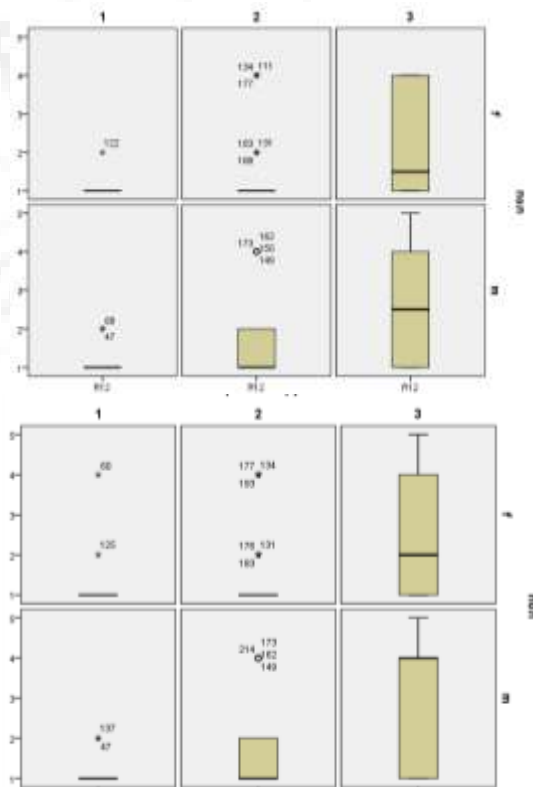
**Figure 8:** Distribution of the prevalence of vestibular gingival recessions in the upper frontal maxillary teeth in all examined females

In all examined females, the prevalence of gingival recessions in the aesthetic area of the maxilla is 25%, and again the gingival recession class III are the most common registered (14%) and in 11% of cases class I gingival recessions are presented. (fig.8)



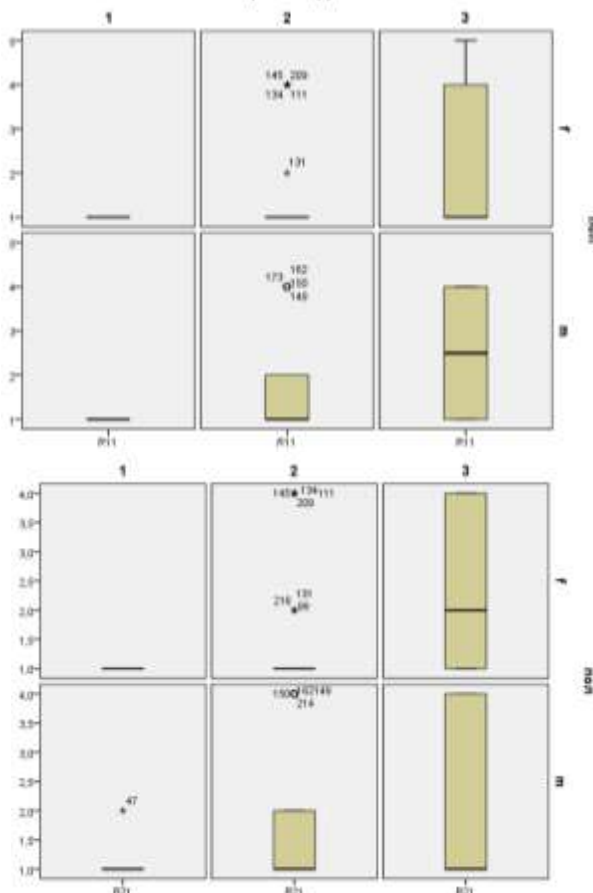
**Figure 9:** Variations of the severity of gingival recessions in teeth №13 and №23 for both sexes in different age groups

Comparing variations in the severity of gingival recessions in left and right maxillary canines no statistically significant differences were noted.



**Figure 10:** Variations of the severity of gingival recessions in teeth №12 and №22 for both sexes in different age groups Comparing variations in the severity of gingival recessions in left and right maxillary lateral incisors we note differences

only in the third age group – gingival recessions in left lateral incisors are more severe than gingival recessions in right lateral incisors.



**Figure 11:** Variations of the severity of gingival recessions in teeth №11 and №21 for both sexes in different age groups

Comparing variations in the severity of gingival recessions in left and right maxillary central incisors, again we note differences only in the third age group – in females the gingival recessions in left central incisors are more severe than in right, and in males the gingival recessions in right central incisors are more severe than in left ones.

## 6. Discussion

The results that we received in the hold study are similar to the results in the study of Toker et al., who found 78.2% prevalence of gingival recessions<sup>[12]</sup>, as well as the results of the study of Sarfati et al., who reported, prevalence of gingival recessions 84.6%.<sup>[10]</sup>

We established vestibular gingival recessions in 343 maxillary anterior teeth, and according to Miller's classification obtained the following results: class I - 40% of allestablished recessions, class II- in 0.1%, class III - 58% and class IV - 2% of the assessed teeth. Therefore, the most common prevalent are class III gingival recessions in the study group.

These results differ to a certain extent from the results of Marini et al. According to the results of their study the most prevalent among the population is the presence of gingival recessions Miller class I (59.15%), followed by gingival

recessions class III (32,51%), class IV (5.55%) and class II (2.79%). The data from our study confirmed the results of Marini et al., that the prevalence of Miller class I gingival recessions decreases as the age increasing. On the other hand, they confirmed that class IV gingival recessions, defined as the most severe according to Miller's classification, show an increase in their prevalence with increasing the age.<sup>[5]</sup> Our results also differ from the results of Mythri et al., who found that Miller's class I gingival recession was more commonly seen, but prove their results for high frequency of gingival recession in males compared to females.<sup>[7]</sup>

The results obtained in all examined males (80 individuals - totally assessed 477 maxillary frontal teeth) indicate prevalence of gingival recessions as follows: class I - 9%, class II - 0.2%, class III - 17.2% and class IV- at 1%. Therefore, in males, the incidence of gingival recessions in the aesthetic area is 27%, and the gingival recessions class III are most common.

In all examined females (141 individuals – totally assessed 839 maxillary frontal teeth), the obtained results indicate that the distribution of vestibular gingival recessions in the aesthetic zone of maxilla is 25%. In females, the prevalence of gingival recessions is as follows: class I is 11.1%, class III - 14.1% and class IV -0.2%.

Comparison of the results between both sexes shows, that the prevalence of gingival recessions class I is more common in females - 11.1%, while in males is 9% (1.23:1). On the contrary, class III gingival recessions are more common in males - 17.2%, while in females gingival class III recessions occur in 14.1% of cases (1.22:1). Class IV gingival recessions are also more prevalent in males (1%), compared to females (0,2%).

Therefore, in males, the prevalence of vestibular gingival recessions in the aesthetic zone of maxilla is more frequent and more severe than in females. These results confirm the results in other studies.<sup>[7,12]</sup>

The results of the hold study also confirm the results of previous studies about the overall distribution of gingival recessions among adults. The results from most epidemiological studies confirm that the extent, prevalence, and severity of gingival recessions are correlated with the age and increase with increasing the age of individuals..<sup>[3,5,7,10]</sup>

## 7. Conclusion

The prevalence of bucal gingival recessions in the aesthetic zone of maxilla is more frequent and more severe in males than in females. And the prevalence and severity of gingival recessions increase with increasing the age of individuals. Therefore, regarding to this clinico-morphological criteria of periodontium, the age and sex of individuals would have role in predicting and assessing the aesthetic risk in pre-operative planning of periodontal and implant therapy in the aesthetic zone of the maxilla.

## 8. Conflict of interest

The author has declared no conflict of interest.

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