

# Prevalence, Extension and Severity of the Gingival Recession in an Adult Population Sample of Sulaimani city– Iraq



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## Abstract

**Objectives:** to determine the prevalence, severity and extension of gingival recession in an adult population in Sulaimani city – Iraq.

**Materials and Methods:** 627 subjects, males and females were examined at Shorsh teaching hospital - dental center in Sulaimani city to determine the prevalence, severity and extension of gingival recession. The sample was divided into four age groups, group 1 (20 to 29 years) 232 patients, group 2 (30 to 39 years) 223 patients, group 3 (40 to 49 years) 128 patients and group 4 (above 50 years) 44 patients. A calibrated periodontal probe marked up to 15 mm was employed for measuring the amount of gingival recession from cementoenamel junction to the gingival margin on four surfaces of each tooth - mesial, buccal, distal and lingual. Miller's classification was used to evaluate the severity of the recession.

**Results:** In this study a total of 249 subjects out of 627 recorded gingival recession. Whereas, 1453 teeth out of 6776 adding up to 2340 sites displayed ( $\geq 1$  mm) gingival recession. Furthermore, the majority of older age group ( $\geq 50$  years) sample revealed gingival recession (93.2%). Statistically gingival recession among male subjects were non-significantly higher than female subjects 46% against 34.5% respectively, whereas females recorded higher number of teeth and sites affected by gingival recession than males (823 teeth against 630 teeth and 1277 sites against 1063 sites). According to Miller's classification, class one recession was most prevalent (55%) followed by class III (38.2%). According to age, Class I recessions decreased as age increased, however, Class III and Class IV recessions showed an increasing status as age increased. According to tooth type, mandibular central and lateral incisors showed the highest percentages of gingival recession (23.6% and 19.4%) respectively.

**Conclusion:** Prevalence of the gingival recession was high among the population examined in this study with a predilection for males. Gingival recession was more prevalent in higher age groups. Furthermore, mandibular central and lateral incisors were the most frequent teeth revealing recession among the total dentition.

**Keywords:** gingival recession, Miller's classification, prevalence and severity.

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## Introduction:

Gingival recession is a common and unattractive condition<sup>(1)</sup>, characterized by displacement of the gingival margin apically from the cementoenamel junction (CEJ) and exposure of the root surface to the oral environment<sup>(2)</sup>. This also creates an esthetic problem for the patient exclusively when the recession is at the anterior region. Furthermore, the recession might accompany dentine hypersensitivity and/or root caries. When a further recession occurs, tooth mobility and exfoliation might happen too. Gingival recession may also associate with other dental health problems such as tooth wear in the cervical areas as a result of the exposure of the root surface to the oral environment and an increased incidence of plaque deposition on the exposed surfaces of the roots<sup>(3)</sup>.

This condition is a serious oral health problem, and it is a multifactorial phenomenon. Several factors may play role in its development, such as periodontitis, improper/vigorous teeth brushing technique, traumatic occlusal forces, thin or absent buccal plates of bone on the facial surfaces of the teeth – dehiscence leaving the root covered by a thin nonvascularized marginal gingiva, malposed teeth in the arches and high muscle and frenal attachment exerting a direct pull on the gingival margin<sup>(4)</sup>.

Moreover, iatrogenic factors found to contribute to the occurrence of gingival recession, those factors related to orthodontic<sup>(5)</sup>, periodontal, conservative and prosthetic therapies<sup>(4)</sup>.

Gingival recession is also attributed to aging process, and it is considered an aging mechanism as its occurrence found being increasing with age<sup>(6)</sup>. Whereas, it is acknowledged that the gingival recession is likely to occurred in people with a good standard of oral hygiene<sup>(7)</sup>. Meanwhile, Chrysanthakopoulos (2014), reported that educational level and smoking are significantly associated with the presence of gingival recession among young Greek adults<sup>(8)</sup>. Despite the frequent observation in adult subjects, the prevalence, extension and severity of gingival recessions presents considerable differences between study populations. Prevalence indicates the cases or occurrences of gingival recession and its extension corresponds to the number of teeth affected by such alterations, whereas, severity denotes the amount of root surface exposed by the recession, (i.e. the linear apico-coronal height of the marginal alteration). Epidemiological studies focused on the prevalence of gingival recession worldwide have reported an extensive variation in results among different countries which is ranged from 15% to 100%<sup>(6)</sup>. This variation in the prevalence of gingival recession among various study populations is attributed to the methodology employed for sampling criterion, size as well as a type of study population undertaken in these epidemiologic surveys. However, searching online databases revealed that the number of patients suffering from gingival recession is not a trivial number, and the prevalence of gingival recession is considered very high. Moreover, our online search revealed no data on prevalence of gingival recession in Kurdistan region, therefore the aim of present study was to conduct this survey in order to determine the prevalence, extension and severity of gingival recession in an adult population in Sulaimani province – Iraq.

### Materials and Methods:

The present study was conducted in Shorsh teaching hospital - dental center in Sulaimani city (Kurdistan Region-Iraq). The study sample comprised 627 adult subjects aged more than 20 years with at least 20 natural teeth present in their mouth, this was the inclusion criteria for participating in this study. Whereas, third molars and patients with a heavy band of calculus on their teeth and teeth with heavy filling that obscure CEJs, smoker patients, and subsequently avoid proper recording of gingival recession are excluded from this study. The study sample involved patients attending different departments of Shorsh Teaching Hospital - dental center. Examination performed twice weekly from December 2013 to October 2014 by a single examiner - an expert periodontist at the department of Periodontology, School of Dentistry at the University of Sulaimani. Intra-examiner calibration was performed, and the consistency of the examiner was frequently assessed until the level of assessment was in the range of 85%.

A total of 280 males and 347 females were included in this study and divided into four age groups as follow:

Group 1 - 20 - 29 years: 232 patients

Group 2 - 30 - 39 years: 223 patients

Group 3 - 40 - 49 years: 128 patients

Group 4 – 50 years and above: 44 patients.

A periodontal probe graduated in millimeters up to 15 mm – PCC-UNC-15 (TM ) complete color coded was employed for undertaking the measurement of the gingival recession on four surfaces of each tooth, mesial, buccal, distal and lingual. A vertical linear measurement was recorded from the CEJ to the gingival margin<sup>(9)</sup> on the teeth revealing gingival recession. Miller's classification<sup>(10)</sup> was applied to measure and evaluate the amount and severity of the gingival recession. The severity of gingival recession also measured and evaluated as follow.

1- Recession less than 3 mm – simple recession

2- Recession 3 to 4mm - moderate recessions

3- Recession more than 4mm - advanced recessions.

Ethical approval was obtained from the Scientific Committee of School of Dentistry – Faculty of Medical Sciences – University of Sulaimani for conducting this survey; all subjects were informed about their participation in this study and signed a consent form after reading it carefully.

Statistical analysis: descriptive statistics (tables, means and percentages) as well as inferential statistics – SPSS version 13 (Chi Square test) was applied to present and evaluate the results of the present study.

### Results:

Table 1 demonstrates the prevalence and extension of gingival recession according to age groups; the table includes distribution of gingival recession, according to the number of subjects, teeth and sites in the four age groups. Gingival recession was observed in 249 patients out of 627 patients examined in this study, corresponding to 39.7% of the total study population. 1453 teeth out of 6776 teeth examined in this study displayed root surface exposure  $\geq 1$ mm, corresponding to almost 21.4 % of the total number of teeth evaluated adding up to 2340 sites recorded gingival recession as shown in (Table 1). Higher percentage of the total sample revealed gingival recession in the older age group ( $\geq 50$  years) (93.2%) ; however, the other groups (20-29, 30-39 and 40-49 years old) showed lower percentages of gingival recession 15.9%, 36.8% and 69.5%, respectively (Table 1). Therefore, the prevalence of gingival recession was increased with increasing age of the patient. In addition table 1 showed that increased age accompanied by an increased in mean number of teeth and sites showing gingival recession (0.6, 1.6, 4.7 and 8.2) and (0.7, 2.3, 7.6 and 15.3) respectively. Consequently elderly subjects ( $\geq 50$  years) showed a higher prevalence of gingival recession, which constituted 33.9% of the total number of teeth examined in this group.

**Table 1: Prevalence and extension of gingival recession according to age.**

Age G	Subjects	Prevalence			Extension		
		GR- No. %	Teeth	Teeth+GR No.	Mean T + GR	Site+GR No.	Mean Site + GR
20-29	232	37(15.9%)	1022	135	0.6	171	0.7
30-39	223	82(36.8%)	2270	354	1.6	523	2.3
40-49	128	89(69.5%)	2418	603	4.7	971	7.6
≥50	44	41(93.2%)	1066	361	8.2	675	15.3
<b>Total</b>	<b>627</b>	<b>249 (39.7%)</b>	<b>6776</b>	<b>1453</b>	<b>2.3</b>	<b>2340</b>	<b>3.7</b>

GR: gingival recession

Table 2 presents the prevalence and extension of gingival recession according to gender; the total sample consisted of 280 males and 347 females. The prevalence of gingival recession among male was higher than female 46% against 34.5% respectively, however, statistically the difference between the two groups didn't reach the level of significance ( $p>0.05$ ).

Similarly, there was no significant association ( $p=0.58$ ) in the mean number of sites displayed gingival recession between male and female (2.25, 2.37) respectively. Furthermore, statistical analysis of the results showed a non-significant association ( $p=0.73$ ) between male and female according to mean

number of sites affected by gingival recession (3.79, 3.68) respectively as shown in the Table (2).

Table 3 demonstrates scoring of the gingival recessions at the buccal aspect according to Miller's classification, the table showed that class I recession was the most prevalent among the other classifications that constituted (55%) followed by Class III gingival recession (38.2%) then Class II and Class IV (3.6% and 3.2%) respectively. According to age, Class I recessions decreased as age increased, however, Class III and Class IV recessions considered as the severe conditions according to Miller's classification, showed an increasing status as age increased (table 3). In age

**Table 2: Prevalence and extension of gingival recession according to gender .**

Age G	Subjects	Prevalence			Extension		
		GR- No. %	Teeth	Teeth+GR No.	Mean T + GR	Site+GR No.	Mean Site + GR
Male	280	129 (46%)#	3516	630	2.25#	1063	3.79#
Female	347	120 (34.5%)#	3260	823	2.37#	1277	3.68#
<b>Total</b>	<b>627</b>	<b>249 (39.7%)</b>	<b>6776</b>	<b>1453</b>	<b>2.3</b>	<b>2340</b>	<b>3.7</b>

# non significant ( $p > 0.05$ )**Table 3: Severity of gingival recession according to Miller's classification.**

Age Group	Gingival Recession - Miller's classification				Total
	Class I No. (%)	Class II No. (%)	Class III No. (%)	Class IV No. (%)	
20-29	33 (89.2)	1 (2.7%)	3 (8.1%)	0 (0%)	37
30-39	51 (62.2)	3 (3.7%)	27 (32.9)	1 (1.2%)	82
40-49	44 (49.4%)	4 (4.5%)	37 (41.6%)	4 (4.5%)	89
≥50	9 (22%)	1 (2.4%)	28 (68.3%)	3 (7.3%)	41
<b>Total</b>	<b>137 (55%)</b>	<b>9 (3.6%)</b>	<b>95 (38.2%)</b>	<b>8 (3.2%)</b>	<b>249</b>

groups 20-29, 30-39 and 40-49 years, class I gingival recession was more prevalent, percentages of the site showed class I gingival recession respectively were 89.2%, 62.2% and 49.4%, whereas Miller classifications III, II and IV showed a reduction in the percentages of gingival recession in these age groups (Table 3). The table also showed that in older age group ( $\geq 50$  years), class III gingival recession is more prevalent 68.3%, whereas percentage of class I gingival recession was only 22% then followed by class IV - 7.3% and class II gingival recession 2.4%.

Table 4 demonstrates the severity of gingival recession according to age groups, (gingival recession observed in all age groups). In the simple class (gingival recession less than 3mm), the prevalence decreased with increasing age of the patients (94.6%, 84.2%, 76.4%, 61%) respectively, while in moderate and advanced gingival recession (3-4mm or more than 4mm) the prevalence of gingival recession increased with increasing age of the patients (2.7%, 14.6%, 20.2%, 26.8%) for moderate and (2.7%, 1.2%, 3.4%, 12.2%) for advanced group respectively.

Figure 1 shows the distribution of gingival recession by tooth type. Mandibular central and lateral

incisors were the teeth that most frequently affected by root surface exposure (23.6% and 19.4%), followed by maxillary first molars (9.9%), while mandibular first premolar, maxillary first premolar, and mandibular second premolar reached (6.9%, 6.4% and 6%) respectively.

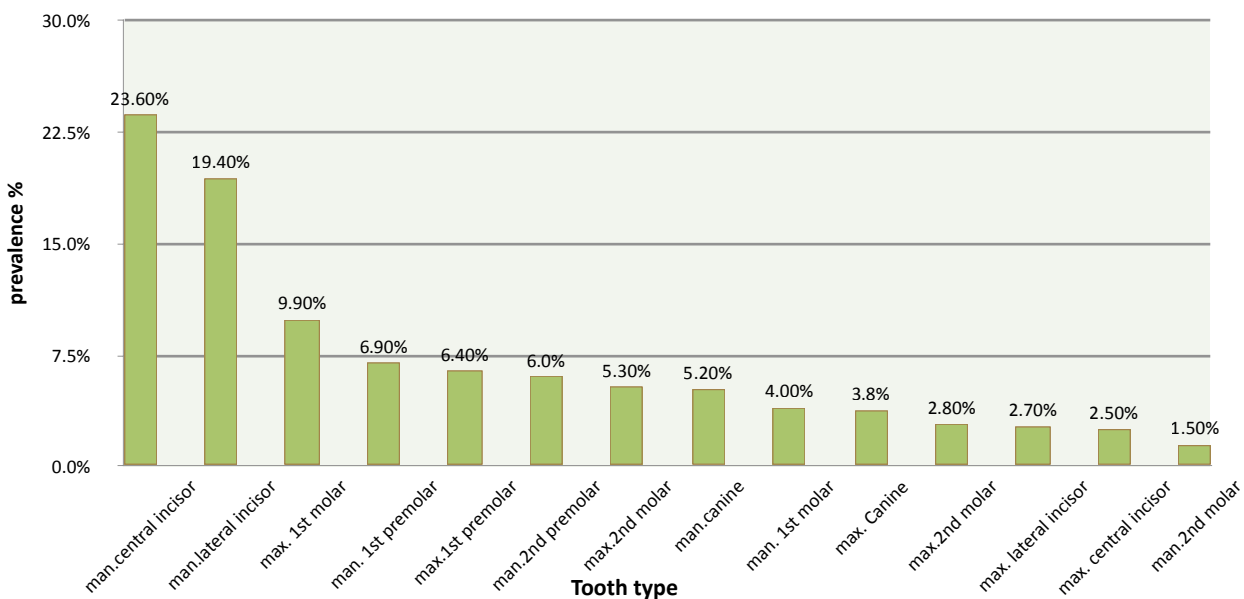
#### Discussion:

It is well known that gingival recession is a multicausal clinical status, which is not optimal to consider just one etiological factor for its occurrence, indeed several etiologic backgrounds may simultaneously play role in the incidence of this condition<sup>(11)</sup>.

The gingival recession may present a wide diversity of prevalence, severity and extension among individuals and populations. The methodology undertaken in this study was plain and straightforward aimed at determination and evaluation of the prevalence, extension and severity of the disease rather than inspecting the etiological factors for its occurrence.

**Table 4: Severity of gingival recession according to age.**

Age Group	Gingival Recession		
	less than 3mm	3-4 mm	>4 mm
	No. (%)	No. (%)	No. (%)
20-29	35 (94.6%)	1 (2.7%)	1 (2.7%)
30-39	69 (84.2%)	12 (14.6%)	1 (1.2%)
40-49	68 (76.4%)	18 (20.2%)	3 (3.4%)
$\geq 50$	25 (61%)	11 (26.8%)	5 (12.2%)



**Figure 1: Intraoral distribution of gingival recession by tooth type.**

Numerous studies were conducted worldwide to identify the prevalence and to determine the causal factors of the gingival recession. In some countries, for example: dental calculus, gingival bleeding, and gingival recession are common in US adult population<sup>(12)</sup>, this population also reported a prevalence of 78–100% gingival recession for middle-aged individuals, furthermore 22-53% of the teeth revealed carious level of recession<sup>(13)</sup>. In Finland, 68% of the adult population showed recession<sup>(14)</sup> which was higher than a record from Norway 51%<sup>(15)</sup>. A similar percentage of the gingival recession was reported for Brazilian adults<sup>(16)</sup>. Another study stated that (76%-87%) of middle-aged subjects in Germany had a gingival recession<sup>(17)</sup>. Baelum et al. (1986) examined 170 Tanzanian adults, the gingival recession, was present in (15%-40%) of surfaces examined and found more frequently in older than in younger adults<sup>(18)</sup>. Gingival recessions were further reported following the criteria suggested by Miller in 1985<sup>(10)</sup>.

These surveys sampled the study population from around the world, collecting data from different countries which correspond to multiple geographic locations, traditions and habits, racial backgrounds, educational status as well as diverse living standards and lifestyle. However, the majority of these studies reported a high prevalence of gingival recession with different scopes of severity and extension. For example, despite the huge differences in the living standard and motivational level for oral hygiene and plaque control methods and tools between people in Oslo – Norway or Finland and Tanzania, the studies reported higher prevalence of gingival recession in Norway or Finland than in Tanzania, this might explain that good oral hygiene standard and over/strong brushing might cause gingival recession.

According to the results of the present study, the prevalence of the gingival recession was overall 39.7%. Which is consistent with previous findings of the common occurrence of gingival recession in adult subjects. As observed in most epidemiological studies<sup>(10,19)</sup>, the prevalence, extension and severity of gingival recession in the current study increased with age (Table 1, Table 4), this may probably be a result of the longer exposure to the etiologic and predisposing factors<sup>(14)</sup> and associated age-related intrinsic changes, both synergistically acting on the severity and extension of the condition as well as the cumulative effects of the lesion itself<sup>(20)</sup>.

Regarding the prevalence and extension of gingival recession according to the patient's gender (table 2), statistically there was no significant association with gender, the result of current study is consistent with a previous study<sup>(21)</sup> which revealed a similar prevalence of gingival recession among males and females, this result was in conflict with a result obtained by Susin et al. (2004)<sup>(16)</sup>, their study showed significantly higher recession in males than in females.

Miller's class I was the most frequent type, followed by class III, class II and class IV, (table 3), similar results have been reported elsewhere<sup>(19)</sup>. To understand this finding, a class I frequency of 55% was

recorded, 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<sup>(22)</sup>. Thus, in the cervical region of the teeth, the bone and gingiva are thinner and therefore, more likely to be exposed to resorption leading to the development of class I or even class II gingival recession. As the bone volume increases in 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<sup>(23)</sup>.

Miller suggested the classification of gingival recessions and the predictability of the treatment established in this area<sup>(10)</sup>. The prognosis of Class I recession is quite favorable, whereas class III and IV recession are considered as the most severe with the worst prognosis, in the present study has already showed an increasingly larger prevalence in older patients. Only in one study we found all recessions to be Miller Class I<sup>(24)</sup>. The high prevalence of gingival recession in adult patients provides information to the dental professionals as to the importance of the diagnosis and knowledge of these clinical conditions. The higher prevalence and severity observed in older patients suggest the cumulative effect of the lesion, associated with the longer period of exposure to the etiologic factors, which should be identified and removed as early as possible in order to reduce or even avoid worsening of the clinical condition.

There was a higher prevalence of recession in the mandibular anterior teeth, as observed in previous investigation<sup>(19)</sup>, furthermore Gorman (1967) observed a similar prevalence on the maxilla<sup>(25)</sup>, the author who pointed at thin or absent buccal plates as an etiologic factor of gingival recession at certain locations. Moreover, the high incidence of gingival recessions in the mandibular teeth is probably related to the characteristics of the keratinized mucosa, which is narrower and probably thinner at these areas, exclusively at the mandibular incisors region compared to other regions in the oral cavity. Since a strong correlation has been observed between the quantity and quality of gingival tissue and incidence of gingival recession, areas with deficient keratinized mucosa, especially as regards the thickness, were demonstrated to be more susceptible to gingival recession. This is particularly due to insufficient amount of connective tissue available that covering alveolar bone in the area, any localized inflammatory reactions triggered at the area by different processes found to be able to affect the entire extension of the tissue, ultimately leading to gingival recession<sup>(26)</sup>.

No association were observed in the occurrence of gingival recession between the right and the left sides, which supports a previous findings by Vehkalathi (1989)<sup>(14)</sup>, This could be explained by the fact that points at personal or individual's variation in brushing technique and brushing force applied between left- or right-handed in relation to the traumatic effects of tooth brushing which accordingly the teeth most frequently affected by gingival recession. However, no agreement has been affirmed in the literature in regards to this

aspect. Contradicted reports are published about which tooth or teeth are most frequently attacks by gingival recession, some reports indicated the maxillary canines and premolars<sup>(27)</sup>, whereas others mentioned maxillary premolars and molars<sup>(20)</sup> and others indicate the mandibular central incisors and maxillary first molars<sup>(12)</sup> for a higher incidence of gingival recession.

Figure (1) demonstrates that the mandibular central incisors displayed the highest frequency of gingival recession (23.6%) in this study, followed by mandibular lateral incisors (19.6%) then subsequently by maxillary first molars and mandibular first premolar and maxillary first premolar, whereas the mandibular second premolar was the least affected site by the recession. It should be stressed that the distribution pattern of gingival recessions has been related to different etiologic factors. Gingival recession on the mandibular incisors has been primarily associated with poor oral hygiene<sup>(28)</sup>, whereas those on the premolars would be originated by traumatic tooth brushing<sup>(29)</sup>. Concerning the maxillary first molars, some authors believe that the cause would be traumatic tooth brushing whereas others stated that it would be the outcome of poor oral hygiene, demonstrated by presence of dental plaque and calculus.

In addition to all clinical implications associated with the presence of gingival recession, such alterations have been regarded as the clinical manifestation of the periodontal attachment loss and may be an important aspect in the diagnosis of susceptibility to periodontal disease<sup>(30)</sup> as gingival recession indicating and reflecting amount of attachment and alveolar bone loss which is principally a consequence of destructive periodontal lesions<sup>(31)</sup>. In certain circumstances, the recession is added to the patient's value exclusively in non-aesthetic areas for pocket depth reduction and/or total pocket elimination. It is acknowledged that the role of prevention is quite important especially in young people, including the proper use of the available means for dental plaque control, cessation of smoking and regular dental follow-up. The occurrence of gingival recession in a given population is a basic need for its prevention and control of the condition and to allows for proper planning of health centers based on data obtained on the prevalence and severity of these lesions, thus establishing proper and effective preventive programs which might control the onset and/or progression of the condition and to avoid any complex local disturbances that might develop.

Finally, a previous orthopantomography (OPG) survey by Zardawi et al (2014)<sup>(32)</sup> on 1072 panoramic images for a young and adult population revealed bone loss at up to 30% of the study population, in the same region (Sulaimani – Iraq). Today the current survey has also confirmed a high rate of gingival recession among the young and adult population in the region that is considered as a clinical manifestation of alveolar bone loss as well. Hereby we call for a suitable preventive and screening program to identify subjects particularly susceptible to early periodontitis in life, hence involving the affected subjects into an early treatment schedule.

## Conclusions:

Prevalence of gingival recession was high among the population examined in this study with a predilection for males. Gingival recession was more prevalent in higher age groups, which presented as increased number of teeth and sites revealed recession in older age groups. Class III and Class IV gingival recession increased with increasing age of the patient. Furthermore, mandibular central and lateral incisors were the most frequent teeth revealing recession among the total dentition.

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