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Evaluation of the Prevalence and Severity of Gingival Recession in Western Black Sea Region

Batı Karadeniz Bölgesinde Diş Eti Çekilmesinin Yaygınlığının ve Şiddetinin Araştırılması

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ABSTRACT

Objective: This study aims to investigate the distribution, prevalence, and severity of gingival recession (GR) by jaws, as well as its relationship with demographic data and plaque accumulation in the adult population of Turkey's Western Black Sea Region.

Materials and Methods: The study involved 634 volunteer patients. Epidemiological variables, smoking status, education level, periodontal diagnosis, systemic status, frequency of dental visits, tooth brushing frequency, and using interface cleaning materials were recorded. From 1,550 areas with GR identified in 634 patients, 311 areas with the most severe recession were examined. GR prevalence was assessed in the jaw and tooth regions.

Results: GR was found in 49.1% of participants, with 41.6% in the periodontitis group. The prevalence of GR in women was significantly higher at 56.7%. Individuals with irregular tooth brushing habits had a significantly higher prevalence of GR. The distribution of GR was notably higher in the anterior mandible (86.9%) compared to the maxilla (13.1%).

Conclusion: The study found that the anterior mandible was the most common and severe region for GR. Future studies with larger populations are needed to clarify the cause-and-effect relationship between GR and related factors.

Keywords: *Gingival recession, Mandible, Prevalence.*

ÖZET

Amaç: Bu çalışma, Türkiye'nin Batı Karadeniz Bölgesi'ndeki yetişkin popülasyonda diş eti çekilmesinin (DÇ) çenelere göre dağılımı, yaygınlığı ve şiddetinin yanı sıra demografik veriler ve plak birikimi ile ilişkisini araştırmayı amaçlamaktadır.

Gereç ve Yöntemler: Çalışmaya 634 gönüllü hasta katıldı. Epidemiyolojik değişkenler, sigara içme durumu, eğitim düzeyi, periodontal tanı, sistemik durum, diş hekimine gitme sıklığı, diş fırçalama sıklığı ve arayüz temizleme materyalleri kullanımı kaydedildi. 634 hastada belirlenen 1.550 DÇ içeren alandan, en şiddetli çekilmenin olduğu 311 alan incelendi. DÇ prevalansı çene ve diş bölgesine göre değerlendirildi.

Bulgular: DÇ katılımcıların %49,1'inde, periodontitis grubunda ise %41,6 oranında bulundu. Kadınlarda DÇ prevalansı %56,7 ile anlamlı derecede yüksekti. Düzensiz diş fırçalama alışkanlığı olan bireylerde DÇ görülme sıklığı anlamlı derecede daha yüksekti. DÇ dağılımı mandibula anteriorda (%86,9) maksillaya (%13,1) kıyasla anlamlı şekilde daha yüksekti.

Sonuç: Çalışmada DÇ'nin en sık görüldüğü ve şiddetli olduğu bölgenin anterior mandibula olduğu bulundu. DÇ ile ilgili faktörler arasındaki neden-sonuç ilişkisini açıklığa kavuşturmak için daha büyük popülasyonlarla gelecekteki çalışmalara ihtiyaç vardır.

Anahtar Kelimeler: *Diş eti çekilmesi, Mandibula, Prevalans.*

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Introduction

A beautiful smile is something that everyone desires, and it serves as one of the most fundamental forms of human communication. The harmony of a smile is influenced by the physiological structure of the teeth, their positions relative to one another and the jaws, as well as their color. Nowadays, individuals of all ages are increasingly concerned about their smiles and overall aesthetic appearance.¹

Gingival recession (GR), which occurs when the root surface is exposed as a result of the migration of the gingival margin in the apical direction towards the cemento-enamel junction (CEJ), may cause functional and esthetic concerns in individuals.^{2,3}

GR, whose development mechanism is not yet fully understood, has a multifactorial and complex etiology. In studies on etiology, predisposing anatomical risk factors such as insufficient keratinized gingival width, gingiva with thin biotype, malposed teeth, gingivitis caused by dental plaque, inappropriate tooth brushing habits, smoking, iatrogenic factors associated with inappropriate restorative, orthodontic, prosthetic and periodontal procedures come to the fore as etiologic factors associated with GR.^{4,6}

The presence of GR is often associated with poor oral hygiene and periodontal disease, as well as its treatment. With the bone loss seen in periodontitis, the junctional epithelium migrates apically, and the periodontal ligament is damaged. GR can occur as a result of this stage of periodontal disease.⁵

In many countries, research on factors influencing the occurrence of GR in young adults is scarce. Therefore, it is essential to collect more detailed data, investigate the prevalence and severity of the condition, and explore its relationship with age to develop preventive measures. This cross-sectional study primarily aims to assess the distribution, prevalence, and severity of GR in relation to the jaws, as well as its correlation with demographic data and plaque accumulation in adults in the Western Black Sea Region of Turkey. In addition, it aims to determine high-risk regions in terms of GR in the light of the collected data. Thus, it aims to raise awareness about protective and preventive practices for areas at risk in terms of GR.

Materials and Methods

This study included 634 patients who attended the Department of Periodontology at Bülent Ecevit University Faculty of Dentistry between 23.12.2023 and 23.03.2024. Patients included in the study had to

be older than 18 years and have a minimum number of teeth of 20. Participants who had undergone scaling, root planing or periodontal treatment within the last six months were excluded.

Patients were asked about epidemiological variables (age and gender), smoking status (non-smoker, smoker), educational level (primary, secondary, high school, undergraduate, graduate), periodontal diagnosis (gingivitis, periodontitis), systemic status (any disease, None), frequency of dental visits (irregular, 1 per year, 1 every six months), frequency of tooth brushing (irregular, 1 per day, 2 per day), use of manual or electric brush, use of any material for cleaning the interface, and presence or absence of clenching problems.

Clinical Examination

Intraoral clinical examinations were performed by a single blinded examiner at the Department of Periodontology, Bülent Ecevit University (R.Ç.). The following indices were recorded sequentially: Full mouth plaque score, gingival index [GI] and gingival recession [GR].^{7,8}

GR was recorded as present in cases where the cemento-enamel junction was located 1 mm or more apically.^{9,10} The presence of GR was evaluated separately for both the patient and the tooth.

The severity of the gingival recession was recorded for each individual according to the tooth with the greatest gingival recession in mm. Gingival recession was evaluated by measuring the distance from the cemento-enamel junction to the most coronal point on the gingival margin, analyzing the prevalence and scoring its severity as mild (<3 mm), moderate (3 to 4 mm), or severe (4 mm).^{11,12}

Supragingival dental plaque was visualized using a 3% erythrosine solution and assessed for presence or absence on all mesial, buccal, distal, and lingual surfaces of the teeth. The full-mouth plaque score was then calculated as a percentage based on the total tooth surfaces. Consequently, the full-mouth plaque score was evaluated on an individual patient basis.¹³

Group 1: Full mouth plaque score less than 30%.

Group 2: Full mouth plaque score between 30-60%

Group 3: Full mouth plaque score 60% and above

Measurements were taken with William's manual probe [PCP10-SE, Hu-Friedy Mfg. Co. Inc., Chicago, IL, USA] and rounded to the nearest millimeter; If the cemento-enamel junction of a tooth was

damaged by decay, abrasion, erosion, or was covered by a filling or calculus, the amount of GR was estimated by evaluating the cemento-enamel junction of adjacent teeth. Three categories were established according to the apicocoronal dimension of the root surface exposed by the gingival recession: small recessions - less than 3mm of root surface exposed; moderate recessions - 3 to 4mm of root surface exposed; advanced recessions - more than 4mm of root surface exposed to the oral environment.¹⁰ The probing depth was calculated by recording the distance between the marginal gingival margin and the pocket base as a measurement.

The clinical attachment loss was determined by measuring the distance between the cemento-enamel junction and the pocket base from the mid-buccal region of the tooth with GR with a periodontal probe. The current periodontal status of the patient was decided by considering clinical attachment loss, periodontal probing depth, radiologic bone loss, modifying and predisposing factors.¹⁴ Two separate groups were formed as, periodontitis and gingivitis. Bleeding on probing was evaluated using the Bleeding on Probing Index (BPI), and according to the BPI developed by Ainamo and Bay; Areas with bleeding on probing are expressed as (+), and areas with no bleeding on probing are expressed as (-).¹⁵

The study was approved by the Clinical Research Ethics Committee of Zonguldak Bülent Ecevit University and was conducted in accordance with the Declaration of Helsinki Principles. (13.12.2023) Each individual included in the study was informed about the study in detail and each signed an informed consent form.

Statistical Analysis

Statistical analyses were performed using SPSS 25.0 (SPSS Inc. , IL, USA). Categorical data were analyzed using the Chi-square test. P value less than 0.05 ($P < 0.05$) was considered statistically significant. G-power Calculator (version 3.1) was used for effect size and power analysis. Post-hoc power analysis was performed based on the distribution of gingival recession by gender. Accordingly, when α error was taken as 0.05, the actual power ($1 - \beta$) was found to be 0.911 with an effect size (w) of 0.131.

Results

In this study, a total of 634 patients (270 females and 364 males) aged 18-65 years living in the Western Black Sea region and 16477 teeth were evaluated. The characteristics of the patients participating in our study are detailed in Table 1. 74.8% of the patients were systemically healthy and 82.6% had regular tooth brushing habits.

Table 1. Demographic Characteristics of Study Participants.

	N
Gender (Female/Male)(%)	42,6/57,4
Age (year) Mean±Sd	37,5±13,6
Smokers (%)	33,8
Systemic disease (Yes/No)(%)	25,2/74,8
Education (%)	
<i>Primary education</i>	28,9
<i>High school</i>	32,2
<i>University</i>	36,4
<i>Master's degree</i>	2,5
Periodontal disease (Gingivitis/Periodontitis)(%)	58,4/41,6
Tooth brushing (%)	
<i>Irregular</i>	17,4
<i>1 time/day</i>	32,3
<i>>2 times/day</i>	50,3
Dental check-ups (%)	
<i>Irregular</i>	68,3
<i>1 time/year</i>	16,6
<i>1 time/6 months</i>	15,1
Interdental cleaning (Yes/No)(%)	14,8/85,2
Gingival recession (Yes/No)(%)	49,1/50,9

While 49.1% of the participants had GR, 41.6% belonged to the periodontitis group (Table 1). In our study, 1550 of 16477 teeth were extracted in 634 patients (9.4%). The distribution of the presence of recession according to demographic data, periodontal status and oral hygiene habits is presented in table 2.

When the prevalence of GR was evaluated in women, it was found to be statistically significantly higher with a rate of 56.7% (p<0.001). When this situation was evaluated in men, unlike women, the prevalence of GR was found to be statistically significantly lower (p<0.001).

When the effect of tooth brushing frequency on the prevalence of GR was evaluated, the frequency of GR was statistically significantly higher in individuals with irregular tooth brushing habits compared to the other groups (p<0.001).

The frequency of dental visits and smoking had no effect on the incidence of GR (p=0.661, 0.242, respectively), but education level, especially primary education level, had a statistically significant higher incidence of GR with a rate of 67.2% (p<0.001).

Table 2. Distribution of the Presence of Recession According to Demographic Data, Periodontal Status and Oral Hygiene Habits.

	Gingival Recession		P
	No	Yes	
<i>Gender</i>			
Female (n=270) /%	117 ^a (%43.3)	153 ^b (%56.7)	<0,001*
Male (n=364)	206 ^a (%56.6)	158 ^b (%43.4)	
<i>Interdental cleaning</i>			
No (n=540)	282 ^a (%52.2)	258 ^a (%47.8)	0,124
Yes (n=94)	41 ^a (%43.6)	53 ^a (%56.4)	
<i>Tooth brushing</i>			
Irregular (n=109)	42 ^a (%38.5)	67 ^b (%61.5)	<0,001*
1 time/day (n=204)	95 ^a (%46.6)	109 ^a (%53.4)	
>2 times/day (n=321)	186 ^a (%57.9)	135 ^b (%42.1)	
<i>Dental check-ups</i>			
Irregular (n=433)	217 ^a (%50.1)	216 ^a (%49.9)	0,661
1 time/year (n=105)	53 ^a (%50.5)	52 ^a (%49.5)	
1 time/6 months (n=96)	53 ^a (%55.2)	43 ^a (%44.8)	
<i>Smoking</i>			
Non-smokers (n=420)	224 ^a (%53.3)	196 ^a (%46.7)	0,242
<10 sticks (n=127)	59 ^a (%46.5)	68 ^a (%53.5)	
>10 sticks (n=87)	40 ^a (%46.0)	47 ^a (%54.0)	
<i>Systemic disease</i>			
No (n=474)	261 ^a (%55.1)	213 ^b (%44.9)	<0,001*
Yes (n=160)	62 ^a (%38.8)	98 ^b (%61.3)	
<i>Education</i>			
Primary education (n=183)	60 ^a (%32.8)	123 ^b (%67.2)	<0,001*
High school (n=204)	102 ^a (%50.0)	102 ^a (%50.0)	
University (n=231)	155 ^a (%67.1)	76 ^b (%32.9)	
Master's degree (n=16)	6 ^a (%37.5)	10 ^a (%62.5)	
<i>Periodontal disease</i>			
Gingivitis (n=370)	262 ^a (%70.8)	108 ^b (%29.2)	<0,001*
Periodontitis (n=264)	61 ^a (%23.1)	203 ^b (%76.9)	

* Chi-square Test: $p < 0.05$; ^{a,b}: There is a statistically significant difference between impacted groups with different top index letters in the same row.

The distribution of full-mouth plaque score according to oral hygiene habits, periodontal status and demographic data is presented in table 3. When the full mouth plaque score distribution was evaluated according to gender, 0-30% and 30-60% scores showed a similar distribution in both genders. A score of 60% or above was found to be significantly lower in women and men compared to other plaque scores ($p = 0.004$).

In individuals with regular tooth brushing frequency, the plaque score of 60% and above (14.6%) was found to be statistically significantly lower than other plaque score groups ($p < 0.001$). High plaque scores were seen at a higher rate than low plaque scores in individuals with irregular brushing habits ($p < 0.001$).

Table 3. Distribution of Plaque Score According to Demographic Data, Periodontal Status and Oral Hygiene Habits.

	Full Mouth Plaque Score			P
	%0-30	%30-60	%60 ve üzeri	
<i>Gender</i>				
Female (n=270)	78 ^a (%28.9)	120 ^a (%44.4)	72 ^b (%26.7)	0,004*
Male (n=364)	120 ^a (%33.0)	186 ^a (%51.1)	58 ^b (%15.9)	
<i>Interdental cleaning</i>				
No (n=540)	158 ^a (%29.3)	265 ^b (%49.1)	117 ^b (%21.7)	0,024*
Yes (n=94)	40 ^a (%42.6)	41 ^b (%43.6)	13 ^b (%13.8)	
<i>Tooth brushing</i>				
Irregular (n=109)	14 ^a (%12.8)	51 ^b (%46.8)	44 ^c (%40.4)	<0,001*
1 time/day (n=204)	52 ^a (%25.5)	113 ^b (%55.4)	39 ^{a,b} (%19.1)	
>2 times/day (n=321)	132 ^a (%41.1)	142 ^b (%44.2)	47 ^c (%14.6)	
<i>Dental check-ups</i>				
Irregular (n=433)	131 ^a (%30.3)	213 ^a (%49.2)	89 ^a (%20.6)	0,905
1 time/year (n=105)	33 ^a (%31.4)	50 ^a (%47.6)	22 ^a (%21.0)	
1 time/6 months (n=96)	34 ^a (%35.4)	43 ^a (%44.8)	19 ^a (%19.8)	
<i>Smoking</i>				
Non-smokers (n=420)	135 ^a (%32.1)	201 ^a (%47.9)	84 ^a (%20.0)	0,528
<10 sticks (n=127)	33 ^a (%26.0)	68 ^a (%53.5)	26 ^a (%20.5)	
>10 sticks (n=87)	30 ^a (%34.5)	37 ^a (%42.5)	20 ^a (%23.0)	
<i>Systemic disease</i>				
No (n=474)	154 ^a (%32.5)	232 ^{a,b} (%48.9)	88 ^b (%18.6)	0,101
Yes (n=160)	44 ^a (%27.5)	74 ^{a,b} (%46.3)	42 ^b (%26.3)	
<i>Education</i>				
Primary education (n=183)	45 ^a (%24.6)	92 ^{a,b} (%50.3)	46 ^b (%25.1)	0,004*
High school (n=204)	57 ^a (%27.9)	103 ^a (%50.5)	44 ^a (%21.6)	
University (n=231)	94 ^a (%40.7)	102 ^b (%44.2)	35 ^b (%15.2)	
Master's degree (n=16)	2 ^a (%12.5)	9 ^a (%56.3)	5 ^a (%31.3)	
<i>Periodontal disease</i>				
Gingivitis (n=370)	128 ^a (%34.6)	182 ^a (%49.2)	60 ^b (%16.2)	0,003*
Periodontitis (n=264)	70 ^a (%26.5)	124 ^a (%47.0)	70 ^a (%26.5)	

* Chi-square Test: $p < 0.05$; ^{a,b,c}: There is a statistically significant difference between impacted groups with different top index letters in the same row.

The distribution of the frequency and severity of GR according to tooth regions is presented in table 4. The categorical distribution of GR severity is presented in figure 1.

GR was seen in 686 teeth of 311 patients with GR: In our study, the relationship between the number of teeth with GR was also evaluated. There was a statistically significant low-level positive correlation between age and the number of teeth with GR ($p < 0.001$, $r = 0.261$).

GR in the molar region was statistically significantly lower in the mandible (40.8%) than in the maxilla (59.2%) ($p < 0.001$).

In the anterior region, GR was significantly higher

in the mandible (77.0%) than in the maxilla (23.0%) ($p < 0.001$).

The severity of GR in the molar region was significantly lower in the mandible (31.5%) than in the maxilla (68.5%) ($p < 0.001$).

The severity of GR in the anterior region was significantly higher in the mandible (86.9%) than in the maxilla (13.1%) ($p < 0.001$).

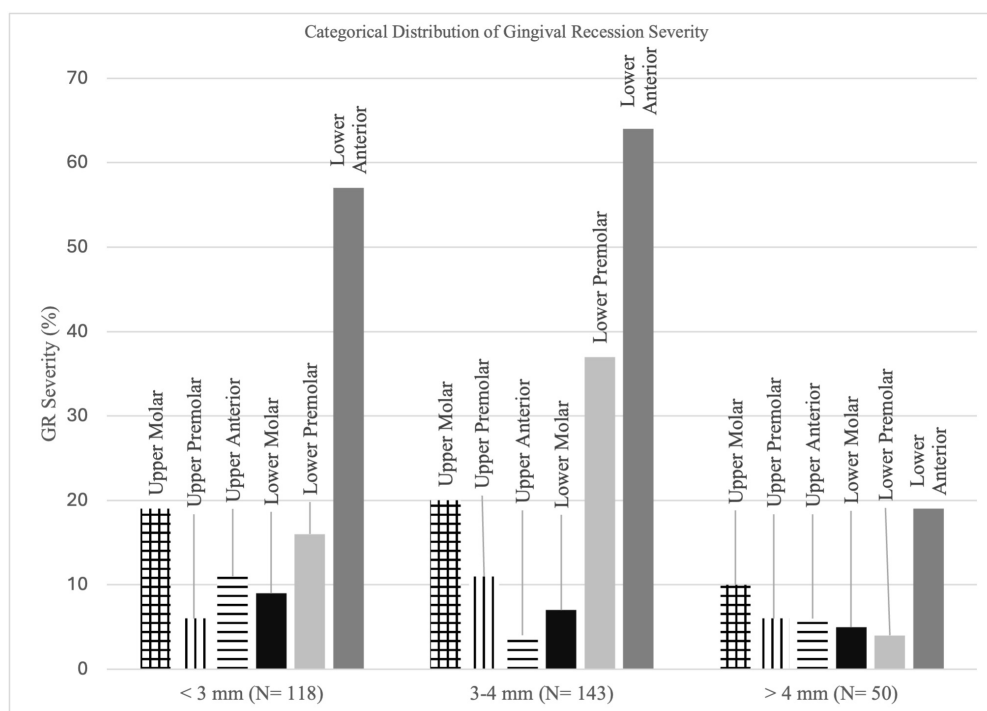
When the categorical distribution of GR is examined, moderate recession is the most common and the mandible anterior stands out as the tooth region with the most frequent recession in all three categories.

Table 4. Distribution of Gingival Recessions According to Tooth Regions.

		Maxilla	Mandible	P
GR Prevalence	Molar region (n=169)	100 ^a (%59.2)	69 ^b (%40.8)	<0,001*
	Premolar region (n=226)	89 ^a (%39.4)	137 ^a (%60.6)	
	Anterior region (n=291)	67 ^a (%23.0)	224 ^b (%77.0)	
	N=686			
GR Severity	Molar region (n=73)	50 ^a (%68.5)	23 ^b (%31.5)	<0,001*
	Premolar region (n=78)	24 ^a (%30.8)	54 ^a (%69.2)	
	Anterior region (n=160)	21 ^a (%13.1)	139 ^b (%86.9)	
	N=311			

* Chi-square Test: $p < 0.05$; ^{a,b}: There is a statistically significant difference between impacted groups with different top index letters in the same row.

Fig. 1. Categorical Distribution of Gingival Recession Severity.



Discussion

Our study was designed to examine the frequency and severity of GR caused by various etiologic causes in individuals in the Western Black Sea region and its distribution according to the teeth and tooth regions in the mouth.

In this study, similar results were obtained from the study by Eltas et al., with the incidence of GR being 49.1%.¹⁶ Our study showed a similar incidence of GR to the study conducted by Yaylı et al., which investigated the incidence of GR and related factors in 140 people.¹⁷

Susin et al. conducted a study involving 1,460 individuals to investigate the epidemiology and risk factors associated with GR, discovering a non-linear positive correlation between age and the occurrence of GR.¹⁸ In our study, a positive correlation was found between GR and age. This relationship between age and the occurrence of GR may probably occur due to longer-term exposure to factors that cause GR. The relationship between increasing age and GR also depends on the cumulative effects of GR and both local and systemic changes of the individual.¹⁹

Chrysanthakopoulos, in his study on the prevalence of GR in 1430 young adults, found that GR was more common in the male group.¹² In the study conducted by Susin et al., they concluded that GR was more common in the male group.¹⁸ In our study, there was no significant difference in GR changes between male and female groups. However, Kozłowska et al. found a higher incidence of IO in females in their study of 455 students, which examined the effects of dental plaque and hygienic factors on GR.²⁰ However, conflicting results are obtained in the literature for this variable.²¹ This may be attributed to mechanical trauma to the gums, as women tend to be more motivated to maintain oral hygiene and brush their teeth more regularly.²²

In our study, 42.1% of the individuals who brushed their teeth two or more times a day had significantly lower GR, and these results showed similar results to the study by Chrysanthakopoulos ($p < 0.001$).²³ According to their systematic review of 17 studies, Rajapakse et al. concluded that only two studies demonstrated a relationship between the frequency of tooth brushing and its effects. A positive relationship was found in 8 of these studies. These studies confirm the need for training in the proper use of tools used for oral care and interface cleaning.²⁴

Although there is disagreement about the etiology of GR, the apical migration of the gingival margin may point to a local inflammatory response caused by physical, chemical, or bacterial attacks. This condition is classified into two main groups: predisposing factors, which are often described as predisposing factors in the region, and accelerating factors, which are responsible for the onset of the disorder and triggering GR.²⁵

Past studies have linked the use of tobacco products to the occurrence of GR. These studies demonstrate that tobacco use is viewed as a key risk factor for the onset of more aggressive and destructive types of periodontal disease.^{21,26} Muller et al. investigated the effects of smoking on GR in 61 young adult patients aged between 19 and 30. They found that smoking had no effect on the occurrence of GR. In our study, similar to the study by Muller et al., it was found that smoking did not have any effect on GR.²⁷ In contrary to our study, Chrysanthakopoulos concluded that smoking was associated with GR in his cross-sectional study.²³

Although research findings are inconsistent, there is considerable literature on the connection between tobacco use and the onset and progression of periodontal disease, including aggressive and destructive forms, alveolar bone loss, and insufficient host responses to periodontal treatment. Yet, the harmful effects of tobacco remain poorly understood.²⁸

Gingival inflammation and dental plaque accumulation are the most important etiologic factors in the occurrence of GR.²¹ In our study, 29.2% of patients with gingivitis had GR, while 76.9% of the periodontitis group had GR.

Microbial dental plaque is the most common factor in the etiology of GR.²⁹ GR may occur on the interproximal or vestibular surfaces of teeth as a result of tissue loss due to microbial dental plaque, bone resorption in periodontal diseases, destruction of periodontal ligaments and migration of the gingival margin apically. The occurrence of GR can contribute to greater plaque accumulation because of the exposed root surface. There is a positive two-way relationship between GR and the accumulation of plaque.³⁰

Eltas et al. investigated the prevalence, severity and etiology of GR in 687 patients in Malatya and found that the most common tooth with GR was the lower incisor. Our research found that GR was primarily

present in the lower incisors, which aligns with the results reported by Eltas et al.¹⁶

Susin et al. studied the correlation between GR and socioeconomic and educational status and determined that there was no relationship between these variables and GR. In our study, the effect of educational level on the incidence of GR was significant. GR was seen with a high rate of 67.2% in the patient group with primary school graduation.¹⁸

The primary limitation of our study is that GR severity was assessed by recording one patient-level recession severity score according to the tooth with the greatest length (mm) of GR.³¹

Conclusions

The results of our study showed that the most common and most severe dental site of GR was the mandibular anterior. GR is characterized as a multifactorial condition, almost invariably caused by the interaction of several different factors. In addition to the demographic data mentioned in our study, there are many different related factors that were not included in the study. Larger population studies could be conducted to investigate and understand the causal relationship between GR and related factors further. Likewise, similar studies with larger samples could explore the connections between GR and its associated factors. The fact that the prevalence of GR is higher in the mandibular anterior region proves the need for studies specific to this region, evaluating the relationship between GR and etiological factors in the lower anterior region.

Prospective studies that incorporate GR-related factors and offer comprehensive classifications of GR are important to improve our understanding of how the severity of GR relates to demographic data and treatment approaches for its prevention.

The high prevalence and severity of recession in the lower anterior region in our study reveal the need to evaluate the factors associated with gingival recession in this region in future studies.

Ethical Approval

The necessary ethical approval for this study was obtained from the Non-Interventional Clinical Research Ethics Committee of Zonguldak Bülent Ecevit University (2023/24).

Conflict of interest

None of the authors of this article has any relationship, connection or financial interest in the subject matter or material discussed in the article.

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Authorship Contributions

Idea/Concept: B.A.Ö, R.Ç Design: B.A.Ö, R.Ç Control/Supervision: B.A.Ö, R.Ç Literature Review: B.A.Ö, R.Ç Data Collection and/or Processing: B.A.Ö, R.Ç Analysis and/or Interpretation: B.A.Ö, R.Ç Writing the Article: B.A.Ö, R.Ç Critical Review: B.A.Ö, R.Ç

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