



RESEARCH ARTICLE

GINGIVAL RECESSION IN RELATION TO MUCOGINGIVAL DEFORMITIES AND OTHER PREDISPOSING FACTORS AFFECT FEMALES IN LOWER ESTHETIC ZONE

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Article Info:



Article History:

Received: 3 August 2023

Reviewed: 10 September 2023

Accepted: 18 October 2023

Published: 15 November 2023

Cite this article:

Al-Hajri MM, Al-Kadasi BA, Al-Wesabi MA, Aldeen HMS, Al-Rai S. Gingival recession in relation to mucogingival deformities and other predisposing factors affect females in lower esthetic zone. Universal Journal of Pharmaceutical Research 2022; 7(5):63-67.
<https://doi.org/10.22270/ujpr.v7i5.844>

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Abstract

Background: Gingival recession (GR) is one of the most common esthetic problems affecting the middle and older aged peoples. GR can lead to many changes as root caries, hypersensitivity, erosions, abrasions, plaque retention and aesthetic dissatisfaction. This study aimed to evaluate the prevalence of gingival recession in relation to mucogingival deformities in lower esthetic zone. **Methods:** A cross-sectional study was done on a sample of 290 females. The participants were interviewed for personal habits and examined for intraoral distribution of gingival recession and its various predisposing factors.

Results: The prevalence of gingival recession in lower anterior teeth was 234, 80.69%. Around half of the participants had Millers' class I GR (n=146, 49%), thin gingival phenotype (n=168, 56.9%), mucosal and gingival labial frenum attachment (n=132, 44.7%, n=148, 50.2%). Most of the participants had a sufficient attached gingiva (n=246, 83.4%) and normal vestibular depth (n=278, 94.2%). GR were statistically significant with vestibular depth, gingival biotype and attached gingiva ($P \leq 0.05$).

Conclusion: Gingival recession in lower aesthetics zone was high in females especially Miller class I gingival recession due to thin gingival phenotypes. Most of Yemeni females have adequate attached gingiva, normal vestibular depth with a frequent mucosallabial frenum in lower anterior teeth.

Keywords: Esthetic, gingival recession, mucogingival deformities.

INTRODUCTION

Gingival recession (GR) is one of the most common esthetic problems affecting the middle and older aged peoples¹. GR can lead to many clinical changes as root caries, tooth hypersensitivity, erosions, abrasions, plaque retention and aesthetic dissatisfaction². GR may be localized or generalized^{3,4}. There are many classifications of GR; however, Miller's classification (1985) is still the most commonly used until now⁵. Plaque, calculus, poor and inadequate tooth brushing, iatrogenic factors (as prosthetic or orthodontic treatment) and anatomical factors or muco-gingival deformities are the most etiological factors of GR^{6,7}. Armitage's in 1999 classified the mucogingival deformities as developmental or acquired and conditional deformities⁸. Recently in 2018, mucogingival deformities were classified as: gingival

recession, low vestibular depth, lack of keratinized gingiva, aberrant frenum position, abnormal gingival color and gingival excess⁹. Insufficient attached gingiva cannot maintain gingival health in patients with poor oral hygiene. Many studies mentioned the importance of keratinized tissue and attached gingiva in maintaining periodontal health with optimal plaque control¹⁰⁻¹⁴. Gingival biotype or phenotype was classified into thin and thick phenotype¹¹. Thin gingival biotype was most prominent in females when compared to males¹². Gingiva of anterior teeth are at greater risk of recession especially when it has a thin periodontal phenotype and less or absence of attached gingiva¹³. Gingival phenotype could be evaluated by many methods invasive and noninvasive. These methods include visual evaluation, needles injection, probe transparency, histological sections, transgingival

probing, cephalometric radiographs, ultrasonic devices and CBCT¹⁴.

GR is an issue that has its clinical importance in dental field. Many studies had evaluated the prevalence and predisposing factors of GR^{15,17,18}. There are different factors that play role in gingival recession as age, plaque, tobacco consumption, trauma from occlusion, aggressive tooth brushing, high frenal attachment, mal tooth position, excessive tooth movement by orthodontic forces, improper designed partial denture, bad restorations and calculus^{16,20}. Several studies showed different sites of GR with increase in the lower incisors area^{17,19}.

Early detection and diagnosis of GR prevent tooth loss in future. Prevention of tooth loss depends mainly on periodic survey of the prevalence and risk factors that lead to the GR. Up to our knowledge, there is no study showed the GR prevalence and its predisposing factors in lower esthetic zone in Yemeni females which is important for esthetic and health. Hence, this study aims to evaluate the prevalence of gingival recession in relation to mucogingival deformities in lower esthetic zone and its predisposing factors in Yemeni females.

METHODS

Study subjects

A cross sectional study was done on patients attended the department of oral medicine, oral diagnosis, periodontology and Oral radiology, Faculty of Dentistry, Sana'a University. A study was conducted over a period of two years (March 2017-March 2019).

Sample size

The sample size for this study was estimated by using G*power 3.1.2.9 program with 0.3 effect size and 95% power gave a sample of 290 females in the age group between 17 and 60 years.

Data collection

The study was designed following STROBE guidelines and conducted in adherence to Declaration of Helsinki. The study protocol was approved by the Ethical Committee of the Faculty of Medicine and Health Sciences, Sana a University, Yemen. The study was explained to the patients and informed consents were obtained. Inclusion criteria include all females aged from 17-60 year-old attended to Dental Teaching Clinic, Sana'a University. While exclusion criteria include females who had fixed or partial prostheses and/or orthodontic appliance which could be causative factors for GR. A single calibrated examiner [HS] filled the questionnaire of demographic data by interviewing the participants. This questionnaire includes the following data: age, level of education, smoking habit, khat chewing habit, oral hygiene practices, medical and dental history. All females were clinically examined under adequate illumination using front surface mouth mirror, curved sharp sickle explorer (standard explorer), and William's graduated periodontal probe. Measuring gingival recessions (the distance of recession is measured from the cemento-enamel junction to gingival margin) on the labial, mesial, distal and lingual surfaces of lower anterior teeth as well as measuring gingival recession according

to the Miller's classification of marginal tissue recession²¹. In addition, gingival index, plaque index and pocket depth were evaluated in order to determine the diagnosis of periodontal diseases according to the periodontal diseases classification in 1999⁸. Tension and rolling test was used to confirm the adequacy of the attached gingiva width.

Gingival phenotypes were assessed on the basis of visual method by showing probe transgingival probing method with no.15 K-file was pierced at a 90° angle at three points i.e. distal, mesial and mid-facial. Thick biotype when gingival thickness more than 1.5 mm while thin biotype is less than 1.5 mm. Position of lower labial frenum (mucosal or gingival or papillary, papillary penetrating), and vestibular depth (normal or shallow) were recorded¹⁶. Kappa scores higher than 0.9 were attained for intra-examine calibration exercises for identifying periodontal clinical parameters.

Statistical analysis

Data analysis was performed for the collected data by using Chi-square test and Phi and Cramer's V Coefficient. Data were entered and analyzed using SPSS Statistics version 22.0, IBM United States Software.

RESULTS

The overall study sample was 290 female patients. Most of the sample have GR in the lower anterior teeth (n=234, 80.69%), while the rest of participants were GR free patients (n=56, 19.31%). Most of the participants (n=160, 55.0%) were at the age group of 20-35 year-old. Regular tooth brushing was reported by most of the study sample (n=202, 68.5%). A high percentage of the study sample were non-smoker and non-khat chewer and free from systemic diseases (n=254, 86.1%, n=180, 61.0%, n=261, 88.5%, respectively). Characteristics of the study sample are shown in Table 1. Millers' class I GR was founded in about half of the sample (n=146, 49%), the second most prevalent type of recession was Millers' class III (n=60, 20.3%). Thin gingival phenotype was founded in about half of participants (n=168, 56.9%). Most of the participants had a sufficient attached gingiva (n=246, 83.4%). Characteristics of mucogingival area are shown in Table 2. Majority of teeth had a gingival and mucosal lower labial frenum attachment. Most of the teeth have normal vestibular depth, thin gingival biotype and sufficient attached gingiva as shown in Table 3. GR were statistically significant with vestibular depth, gingival biotype and attached gingiva ($p \leq 0.05$). However, GR was not statistically significant with lower labial frenum attachment. Relationship between GR and gingival soft tissue is described in Table 4.

DISCUSSION

GR can be localized or generalized and can be associated with one or more surfaces¹. Mandibular anterior teeth are more affected by GR than maxillary anterior teeth as observed in previous investigations¹³. Mandibular keratinized mucosa was lesser than

maxillary keratinized mucosa, this strong correlation has been observed between lower incisors and GR¹². The concept of multiple predisposing factors in the etiology of the GR was supported by many longitudinal studies²². The early diagnosis of the etiological factors of GR may help in prevention and

treatment needs. For this reason, this study aims to evaluate the prevalence and predisposing factors of GR in lower esthetic zone in Yemeni females. In this study, it was found that the prevalence of GR in the study was 80.69%, and these findings are consistent with the previous studies Checchi *et al.*,²³ and Albandar *et al.*,¹⁷.

Table 1: Frequency of associated factors with GR.

Variables		Frequency (%)
Age	< 20 years	24(8.2)
	20-35 years	160(55.0)
	35-50	100(34.4)
	>50	6(2.1)
Frequency of tooth brushing	Regular	202(68.5)
	Irregular	88(29.8)
Smoking	Yes	36(12.2)
	No	254(86.1)
Khat chewing	Yes	110(37.3)
	No	180(61.0)
	None	261(88.5)
Systemic disease	Diabetes mellitus	6(2.0)
	Hypertension	16(5.4)
	Hypertension and Diabetic	7(2.4)

Table 2: Characteristics of mucogingival area.

Variables		Frequency (%)
Gingival recession by Miller	0	66(22.4)
	Class I	146(49.5)
	Class II	15(5.1)
	Class III	60(20.3)
	Class IV	3(1.0)
Lower labial frenum attachment	Mucosal	132(44.7)
	Gingival	148(50.2)
	Papillary	10(3.4)
Vestibular depth	Shallow	12(4.1)
	Normal	278(94.2)
Gingival phenotype	Thick	122(41.4)
	Thin	168(56.9)
Attached gingiva (mm)	Sufficient	246(83.4)
	Insufficient	44(14.9)

Most of GR was Millers' class I GR which was founded in about half of the sample (n=146, 49%), the second most prevalent type of recession was Millers' class III (n=60, 20.3%) similar to Myrthi *et al.*,¹⁵ in contrast to Sarfati *et al.*,¹⁶ study, who finds that the majority of cases has Miller's class I, II. GR is less common in young adults although its frequency increases with age.

In this study, most affected females (n=160, 55.0%) were at the age group of 20-35 year-old, and these findings are consistent with the previous studies Albandar *et al.*,¹⁷ and Ravipudi *et al.*,⁷. Most of them were regular tooth brushing (n=202, 68.5%) and non-smoker and non-khat chewer (n=254, 86.1%, n=180, 61.0%; respectively).

Table 3: Distribution of gingival soft tissue characteristics according to the tooth type.

Gingival soft tissue characteristics		Tooth											
		Right central		Left central		Right lateral		left lateral		Right canine		Left canine	
		F	%	F	%	F	%	F	%	F	%	F	%
Lower labial frenum attachment	Mucosal	22	45.8	22	45.8	22	45.8	22	44.9	22	45.8	22	44.9
	Gingival	25	52.1	25	52.1	24	50.0	25	51.0	24	50.0	25	51.0
	Papillary	1	2.1	1	2.1	2	4.2	2	4.1	2	4.2	2	4.1
	Papillary penetrating	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Vestibular depth	Shallow	2	4.2	2	4.2	2	4.2	2	4.1	2	4.2	2	4.1
	Normal	46	95.8	46	95.8	46	95.8	47	95.9	46	95.8	47	95.9
Gingival biotype	Thick	20	41.7	20	41.7	20	41.7	21	42.9	20	41.7	21	42.9
	Thin	28	58.3	28	58.3	28	58.3	28	57.1	28	58.3	28	57.1
Attached gingiva (mm)	Sufficient	36	75.0	41	85.4	42	87.5	45	91.8	42	87.5	40	81.6
	Insufficient	12	25.0	7	14.6	6	12.5	4	8.2	6	12.5	9	18.4

In the present study, about half of the cases (n=168, 56.9%) had thin gingival pheno-type at all teeth examined, whereas the majority of the cases (n=246, 83.4%) had a sufficient attached gingival width. There is a significant ($p<0.05$) association between the adequacy of the attached gingiva and GR which was similar to the findings of Wennström *et al.*,²⁵.

In contrary, Stoner and Mazdyasna²⁶ and Nguyen-Hieu *et al.*,²⁷ found that lack of an adequate zone of attached gingiva result in increased incidence of GR so it is supposed that the thin gingival biotype of Yemeni participants is the strongest risk factor for GR in lower aesthetics zone.

Table 4: Relationship between GR and gingival soft tissue.

Gingival soft tissue characteristics		Gingival recession				p-value
		Yes		No		
		F	%	F	%	
Vestibular depth	Positive	0	0.0	12	100.0	0.011
	Negative	99	35.6	179	64.4	
Gingival biotype	Thick	50	41.0	72	59.0	0.036
	Thin	49	29.2	119	70.8	
Attached gingiva (mm)	Sufficient	96	39.0	150	61.0	0.00
	Insufficient	3	6.8	41	93.2	
Lower labial frenum attachment	Mucosal	48	36.4	84	63.6	0.756
	Gingival	48	32.4	100	67.6	
	Papillary	3	30.0	7	70.0	
	Papillary penetrating	0	0.0	0	0.0	

Majority of teeth had gingival and mucosal lower labial frenum attachment and most of the teeth have normal vestibular depth, thin gingival biotype and sufficient attached gingiva. GR may be related to different etiologic factors that were not reported in this study as malpositioning of teeth, prominent roots, thin labial alveolar bone, and trauma form toothbrushing^{7,30}. There is a non significant association between type of frenal attachment and prevalence of GR ($P<0.05$) which is opposite to studies conducted by Toker and Ozdemir²⁸ and Mathur *et al.*,²⁹. However, this is similar to studies conducted by Tenenbaum³¹ and Nguyen-Hieu *et al.*,²⁷ who proposed that GR is not associated with the high frenal attachment. This is could be because of low number of papillary lower labial frenum.

Limitation of this study: Small sample size, observational design and no clinical treatment and other risk for confounding.

CONCLUSION

The results of this study showed the high prevalence of gingival recession in lower esthetics zone especially Miller class I gingival recession due to thin gingival phenotypes. Most of Yemeni females have adequate attached gingiva, normal vestibular depth and mucosal and gingival labial frenum attachment.

ACKNOWLEDGEMENTS

The authors thank all dental staff at Sana`a university for facilitating the examination process of the patients, and the dental patients for their participation in the study.

AUTHORS' CONTRIBUTIONS

Al-Hajri MM: conceived the ideas. **Al-Kadasi BA:** writing original draft, designed the study, literature searches. **Al-Wesabi MA:** conceptualization, methodology. **Aldeen HMS:** formal analysis. **Al-Rai S:** research design, data collection. All Authors read and approved the manuscript.

DATA AVAILABILITY

The data and material are available from the corresponding author on reasonable request.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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