



Detection of Loss of Clinically Detectable Mucogingival Junction Due to Chronic Periodontitis in a given Population

Aneesa C P ¹, Amitha Ramesh Bhat ², Karthika Nair ³, Ivaturi Meghana ⁴, Rahul Bhandary ⁵,
Dr Smitha Shetty ⁶

1. UG Student, A B Shetty Memorial Institute of Dental Sciences, NITTE deemed to be University, Mangaluru, Karnataka.
2. Professor, HOD Department of Periodontology, A B Shetty Memorial Institute of Dental Sciences, NITTE deemed to be University, Mangaluru, Karnataka
3. PG, Department of Periodontology, AB Shetty Memorial Institute of Dental Sciences, NITTE deemed to be University Mangaluru, Karnataka.
4. PG, Department of Periodontology, AB Shetty Memorial Institute of Dental Sciences, NITTE deemed to be University, Mangaluru, Karnataka.
5. Professor, Department of Periodontology, AB Shetty Memorial Institute of Dental Sciences, NITTE deemed to be University, Mangaluru, Karnataka.
6. Reader, Department of Periodontology, AB Shetty Memorial Institute of Dental Sciences, NITTE deemed to be University, Mangaluru, Karnataka.

Abstract

Background: The mucogingival junction (MGJ) is one of the important anatomical elements that determines the apical termination of attached gingiva, with the notable exception of the palatal side. Like other organs and tissues in our body, genetics determines its exact location. Its loss is attributed to certain anatomical abnormalities, such as inappropriate tooth eruption or high frenal attachments, as well as illnesses like periodontitis. The current study aimed to assess the frequency of clinically noticeable mucogingival junction (MGJ) loss on the buccal side of the dentate alveolar process. **Results:** The study found a significant association between age and the presence of mucogingival junction (MGJ). Specifically, 21% of patients who were 40 years old or younger had clinically detectable mucogingival junction (MGJ), while 37.5% of patients between the ages of 41 and 45 had clinically detectable mucogingival junction (MGJ). In a comparable manner, it was observed that 29 (25.9%), 13 (11.6%), and 4 (3.6%) of the subjects exhibited clinically detectable mucogingival junction in the age groups of 46-50 years, 50-55 years, and above 55 years, respectively. **Conclusion:** The absence of the mucogingival junction (MGJ) during embryonic development has been linked to the emergence of teeth from the vestibule and anomalous frenal/muscular connections. In our study it was seen that the width of attached gingiva and mucogingival junction was adequate in age group of less than 45 years and inadequate in age group of more than 45 years and it was statistically significant.

Keywords: Alveolar mucosa, attached gingiva, chronic periodontitis, tension test, Mucogingival junction (MGJ), Periodontium

Address for correspondence: Dr. Karthika Nair, A B Shetty Memorial Institute of Dental Sciences, NITTE deemed to be university, Mangaluru, Karnataka. Email: karthikanair2297@gmail.com

Date of Acceptance: 16/09/2023

Introduction

Periodontitis, which results from a polymicrobial biofilm at the biofilm-gingival interface, is the pathological manifestation of

the host's defense mechanism against bacterial assault. The section of the gingiva that is securely linked to the underlying tooth and bone and has a stippled surface appears to have been officially characterized for the first time by

Orban in 1948. The robust and durable palatal mucosa and gingiva on the palatal surface of the maxilla merge unnoticeably [1-3]. The robust and resilient palatal mucosa seamlessly combines with the palatal surface of gingiva in the maxilla. The gingiva that is attached is keratinized, which helps the periodontium resist external damage, stabilize the gingival margin against frictional forces, and dissipate physiological forces applied to the gingival tissues by the muscular fibers of the alveolar mucosa [4-5]. A mucogingival junction (MGJ) is an anatomical characteristic on the buccal and oral intraoral mucosa, with the exception of the palate mucosa. Clinically, mucogingival junction (MGJ) is detected by the rolling probe method, lugol's iodine solution histochemical staining, tension test, and visual method [6-8]. The mucogingival junction (MGJ) serves as the boundary between the alveolar process, whose growth is encouraged by forming teeth, and the basal bone of the jaws, which is defined genetically [6]. Loss of tissue up to and beyond mucogingival junction (MGJ) [8] is caused by extensive recession brought on by periodontitis and reduced periodontium as a result. The risk that the gingival margin may regress due to either chronic periodontal disease or stress from brushing increases as the width of the band of connected gingiva is examined decreases [9]. Because of this, in the absence of the connected gingiva, the alveolar mucosa will produce mucosal or marginal tissue in the lack of a distinct mucogingival junction (MGJ) [10,11]. Regardless of the health of the teeth, there are currently no published research examining the incidence of mucogingival junction (MGJ) insufficiency around the buccal locations. The purpose of the current study is to assess whether chronic periodontitis in a specific population causes loss of clinically discernible mucogingival junction.

NECESSITY OF THE STUDY

to determine in a specific group the loss of clinically detectable mucogingival junction (MGJ) caused by chronic periodontitis.

AIM

to assess the frequency of clinically noticeable mucogingival junction (MGJ) loss on the buccal side of the dentate alveolar process.

OBJECTIVES

to investigate the frequency of clinically detectable mucogingival junction (MGJ) loss in a population of chronic periodontitis patients.

Materials and Methods

Materials utilised include a periodontal probe and a mouth mirror.

Inclusion standards

The age range taken into consideration was 40 to 60 years, and subjects with gingival recession linked to local causes were included.

Exclusion standards

individuals reporting systemic conditions including uncontrolled diabetes, thyroid issues, and individuals who are physically or intellectually challenged. Traumatic injuries (toothbrush injuries), atypical habits, teeth that are positioned incorrectly, severe abrasions, and abnormal frenal attachments.

METHODOLOGY

The subjects for the study (n=112) were patients at the A B Shetty Memorial Institute of Dental Sciences in Derlakkatte, Bangalore's outpatient periodontology department.

Subjects underwent a clinical examination in dental chairs with the suitable lighting, mouth mirror, and periodontal probe to establish whether or not they have mucogingival junction (MGJ).

Method employed:

Test for tension Stretching the lip or cheek in an outward, downward/upward, or lateral direction is how it is done. The gingival margin is then scrutinized for any free gingiva movement [6]. Any movement of the free gingival border during the stretching of the lips or cheeks is regarded as positive evidence of insufficiently connected gingiva and the lack of the mucogingival junction (MGJ). Oral prophylaxis will be beneficial to all of the trial participants.

ANALYSIS OF STATISTICS

Descriptive statistics will be used for the analysis. For demographic data, the chi square test and Fischer's exact test will be used. The analysis will be performed using SPSS version 23.0, a statistical program. Significant will be defined as p 0.05 or higher.

Results

The investigation was carried out in the periodontology outpatient clinic. 112 people in total participated in the study.

Table-1: Gender

		Frequency	Percent
	Male	43	38.4
	Female	69	61.6
	Total	112	100.0

Out of the 112 participants included in the study, 69 were female patients, making up about 61.6% of the total, and the remaining 43 were male patients, making up approximately 38.45% of the total (Table 1). This indicates that more female subjects participated in the study. (Table 1).

Table-2: Grade

		Frequency	Percent
	Grade I	85	75.9
	Grade II	25	22.3
	Grade III	2	1.8
	Total	112	100.0

Table 2 shows that 85 (75.9%), 25 (22.3%), and 2 (1.8%) shows grade I, grade II and grade III respectively.

Table-3: Tension

		Frequency	Percent
	Adequate	84	75.0
	Inadequate	28	25.0
	Total	112	100.0

According to the aforementioned table's findings, the breadth of attached gingiva was sufficient in 84 persons and insufficient in 28 individuals, or 75% and 25%, respectively (table 3).

Table-4: Tension Vs Grade

			grade			Total
			Grade I ^a	Grade II	Grade III	
tension	Adequate	Count	84	0	0	84
		%	98.8%	0.0%	0.0%	75.0%
	Inadequate	Count	1	25	2	28
		%	1.2%	100.0%	100.0%	25.0%
Total		Count	85	25	2	112
		%	100.0%	100.0%	100.0%	100.0%

a. X2=106.729 p<0.001 vhs

According to the aforementioned table, Grade I tension testing is performed on 84 people who

have adequate gingiva, while Grade I testing is performed on 25 (100%) and 2 (100%) of the 28 people who have inadequate gingiva, respectively. As a result, 85 are classified as Grade I, 25 as Grade II, and 2 as Grade III, which comprises associated gingiva that is both adequate and inadequate (Table 4).

Table-5: Tension Vs Gender

			gender		Total
			Male ^a	Female	
tension	Adequate	Count	35	49	84
		%	81.4%	71.0%	75.0%
	Inadequate	Count	8	20	28
		%	18.6%	29.0%	25.0%
Total		Count	43	69	112
		%	100.0%	100.0%	100.0%

a. X2=1.523 p=0.217 ns

The table presented in this study displays the distribution of attached gingiva in relation to gender. The results indicate that among the male participants, 81.4% exhibited an adequate amount of attached gingiva while 18.6% had inadequate attached gingiva. Similarly, among the female participants, 75.0% had an adequate amount of attached gingiva while 25.0% had inadequate attached gingiva (Table 5).

Table-6: Age group

		Frequency	Percent
	<=40	24	21.4
	41 - 45	42	37.5
	46 - 50	29	25.9
	50 - 55	13	11.6
	>55	4	3.6
	Total	112	100.0

The study found a significant association between age and the presence of mucogingival junction (MGJ). Specifically, 21% of patients who were 40 years old or younger had clinically detectable mucogingival junction (MGJ), while 37.5% of patients between the ages of 41 and 45 had clinically detectable mucogingival junction (MGJ). In a comparable manner, it was observed that 29 (25.9%), 13 (11.6%), and 4 (3.6%) of the subjects exhibited clinically detectable mucogingival junction in the age groups of 46-50 years, 50-55 years, and above 55 years, respectively (Table 6).

Table-6: Age group

			Age group					Total
			<=40 ^a	41 - 45	46 - 50	50 - 55	>55	
tension	Adequate	Count	23	29	23	7	2	84
		%	95.8%	69.0%	79.3%	53.8%	50.0%	75.0%
	Inadequate	Count	1	13	6	6	2	28
		%	4.2%	31.0%	20.7%	46.2%	50.0%	25.0%
Total		Count	24	42	29	13	4	112
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

a. X²=11.072 p=0.026 sig

The study demonstrated a correlation between age and mucogingival junction (MGJ) status. Specifically, 21% of patients aged 40 years - 60 years exhibited clinically detectable mucogingival junction (MGJ), with 95.8% of these patients having sufficient attached gingiva width and 4.2% having insufficient attached gingiva. In contrast, 37.5% of patients aged 41-45 years exhibited clinically detectable mucogingival junction (MGJ), with 69.0% of these patients having adequate attached gingiva width and 31.0% having inadequate attached gingiva. In a comparable manner, 29 individuals (25.9%) exhibited clinically detectable mucogingival junction at the age range of 46-50 years. Among these, 23 individuals (79.3%) had sufficient width of attached gingiva while 6 individuals (20.7%) had insufficient width of attached gingiva. The study observed a cohort of participants within the age range of 50-55 years, wherein 53.8% of the individuals exhibited adequate attached gingiva while 46.2% demonstrated insufficient width of attached gingiva. The total number of participants considered in the analysis was 13. In the sample population of individuals aged 55 years and above, half of them (50.0%) exhibited sufficient width of attached gingiva, while the other half (50.0%) displayed insufficient width of attached gingiva. The study reveals that 84 participants exhibit satisfactory levels of attached gingiva width, while 28 participants exhibit insufficient levels of attached gingiva width (Table 7).

Discussion

The objective of this research was to identify dental structures that may not exhibit the usual anatomical characteristic of mucogingival junction (MGJ). The study posited the clinical detectability of mucogingival junction (MGJ) in all teeth and assessed its presence as a normative morphological feature across all teeth. The mucogingival junction (MGJ) has been recognized as a vital anatomical

characteristic for assessing the extent of attached gingiva and as a significant clinical indicator. The presence of a sufficient amount of connected gingiva is associated with an elevated level of resilience to stress and unfavorable circumstances. Furthermore, it functions as a pivotal diagnostic indicator for evaluating the potential efficacy of periodontal therapy [12].

Of the various etiological factors proposed, gingival recession has been demonstrated to be the predominant one. The present investigation revealed that among the sample population of 112 patients, 84 exhibited adequate attached gingiva, whereas the remaining 28 patients demonstrated insufficient gingival attachment.

Wennstrom et al identified that on multiple initial undertakings that extended beyond mucogingival junction (MGJ). To investigate gingival regeneration and the potential correlation between the lack of attached gingiva and other related concerns, the researcher excised the keratinized gingiva beyond the mucogingival junction (MGJ). The individual administered Schiller's iodine solution to the buccal mucosa for the purpose of ascertaining the mucogingival junction (MGJ). To access the tooth located at the alveolar bone crest level, the practitioner initiated the procedure by creating an incision approximately 1 mm apical to the mucogingival junction (MGJ) and directed the knife in a coronal orientation. The periosteum was preserved while uniform incisions were made on the lingual aspect to excise the entire gingival tissue and associated connective tissue. This can be likened to a surgical excision of an mucogingival junction (MGJ) [13-15].

Whilst there may be a correlation between the presence of connected gingiva and the detection of mucogingival junction (MGJ), the objective of this study was to quantify the width of the attached gingiva.

A limitation of this study is its lack of generalizability to a broader population. The distinct advantages of each methodology

employed in the present analysis for ascertaining the presence of mucogingival junction (MGJ) were not duly considered. The findings of this investigation may serve as an initial reference for evaluating the effectiveness of periodontal treatment and as a significant diagnostic marker.

Conclusion

The mucogingival junction (MGJ) is a commonly observed anatomical characteristic, and its absence is frequently associated with pathological conditions. The absence of the mucogingival junction (MGJ) during embryonic development has been linked to the emergence of teeth from the vestibule and anomalous frenal/muscular connections. In our study it was seen that the width of attached gingiva and mucogingival junction was adequate in age group of less than 45 years and inadequate in age group of more than 45 years and it was statistically significant.

Conflict of Interest: None

Source of support: Nil

Ethical Clearance: Obtained

References

1. Orban B clinical & histologic study of the surface characteristics of the gingiva. Oral surg oral med oral pathology 1948;1:827-41
2. American Academy of periodontology. Glossary of periodontal terms. Chicago, Illinois, USA: American academy of periodontology;2001
3. Miyasato M, Crigger M, Egelberg J gingival condition in areas of minimal & appreciable width of keratinised gingiva. J clin periodontal 1977;4;200 ~9
4. Lang Npaloe H The relationship between width of keratinised gingiva & gingival health. J periodontol 1972;43;623-7
5. Vincent jw, Machen Jb, Levin MP. Assessment of attached gingival using the tension test & clinical measurements. J periodontol 1976;47;412-4
6. Guglielmoni P, Promsudthi A, Tatakis DN, L intra &inter examiner reproducibility in keratinized tissue width assessment with 3 methods for mucogingival junction determination. J periodontol 2001;72:134-9
7. pietrokovski J, Massler M. Ridge remodelling after tooth extraction in rats. J dent Res 1967;46;222-31
8. Dodwad v etiology and severity of gingival recession among young individuals in Belgium district in India. Annal Dent univ malaya 2001;8;1-6
9. Ainamo A. Influence of age on the location of the maxillary mucogingival junction. J Periodontal Res. 1978; 13:189-93.
10. Bowers GM. A study of the width of attached gingiva. J Periodontol. 1963; 34:201-9.
11. Ainamo J, Löe H. Anatomical characteristics of gingiva. A clinical and microscopic study of the free and attached gingiva. J Periodontol. 1966; 37:5-13.
12. Bowers GM. A study of the width of attached gingiva. J Periodontol. 1963;34(3):201-9. DOI: 10.1902/jop.1963.34.3.201
13. Wennström JL. Lack of association between width of attached gingiva and development of soft tissue recession. A 5-year longitudinal study. J Clin Periodontol. 1987; 14:181-4.
14. Wennström J. Regeneration of gingiva following surgical excision. A clinical study. J Clin Periodontol. 1983; 10:287-97.
15. Wennström J, Lindhe J. Role of attached gingiva for maintenance of periodontal health. Healing following excisional and grafting procedures in dogs. J Clin Periodontol. 1983; :206-21.