

AN EPIDEMIOLOGIC STUDY TO DETERMINE THE WIDTH OF LINGUAL ATTACHED GINGIVA, PRESENCE OF LINGUAL RESSION AND PATIENT'S AWARENESS

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ABSTRACT:

Aim: The aim of this study is to evaluate the average width of lingual attached gingiva. In addition, the objectives were to check prevalence and awareness, among study population, about lingual gingival recession and the willingness to get it treated. Additionally the width of attached gingiva, labially in incisor and premolar region would also be validated.

Materials and methods: Ninety patients above 18 years having all teeth present were included in the study. Lugol's iodine (2%) was applied on lingual and labial alveolar mucosa and mean score of width of attached gingiva were recorded. Awareness regarding lingual gingival recession and the desire to get it treated, were also assessed via response to a questionnaire format.

Results: The mean width of lingual attached gingiva varied with each tooth found to be maximum with mandibular first molar (5.24 ± 1.2) and least with mandibular central incisor (1.67 ± 0.79). Lingual gingival recession was seen in 47% of total study population and mostly with mandibular incisors and least with mandibular premolars.

Conclusion: This data can serve as a guide in diagnosis and treatment planning and in selecting the procedures to re-establish the zones of attached gingiva by designing surgical procedures to conserve maximum attached gingiva on the lingual of mandibular teeth.

Keywords: Width of attached gingiva, Gingival recession, Hypersensitivity

INTRODUCTION:

Mucogingival junction (MGJ) is defined as a scalloped line separating the gingiva from the alveolar mucosa which represents the apical extent of the gingival dimension.^[1] Development and maintenance of healthy attached gingiva, which forms the major bulk of this dimension, is beneficial to oral environment and longevity of the dentition. Assessment of apico-coronal gingival dimensions and thickness of keratinized tissue is therefore essential for decision making in periodontal

treatment planning. With the introduction of mucogingival surgery and free graft procedures, dental profession has the capability of altering the width of attached gingiva. But the requirement of this alteration is based on many factors of which existing width of attached gingiva is of prime concern. Previous studies have established baseline information on facial and buccal width of attached gingiva.^[2,3] However, only one study had been published which dealt

with the measurement of attached gingiva on the mandibular lingual side.^[4]

In context to the significance of presence of attached gingiva, a general consensus is that if the tooth in question is to be restored, the presence of certain amount of attached gingiva favours long term survival of that tooth.^[5] This statement is primarily referred for labial attached gingiva, however this hypothesis should apply equally to the lingual attached gingiva as well.

The width of attached gingiva on the facial aspect differs in different areas of the mouth.^[2,3,6] It is generally greatest in the incisor region (3.5-4.5mm in maxilla, 3.3-3.9mm in mandible), narrower in the posterior segments (1.9mm in maxillary and 1.8mm in mandibular first premolar). Since decades these values are been followed as a standard. However, there is a possibility that these values might be different based on geographical location, ethnicity or evolution.

Gingival recession (GR) is defined as apical migration of gingival margin exposing the root surface. It is more prevalent in males and its severity increases with age.^[7] Prevalence of labial gingival recession has found to be around 60%, as has been evaluated in different study population.^[8,9,10] Similarly, prevalence of lingual gingival recession was found to be in range of 25-52%.^[8,10] In spite of the high prevalence, management of lingual recession is not addressed in the literature. Indications for the management of labial/buccal

gingival recession, such as esthetics, root hypersensitivity, risk of root caries, inadequate plaque control etc, are commonly listed. However apart from esthetics, all other indications should be considered equally important for lingual recession as well. Wide array of treatment options are available for labial recession, might be because patients are aware and concerned about labial gingival recession. However there has been no study regarding awareness about presence of lingual gingival recession, complaints related to it and willingness to get it treated.

In the light of the above facts and questions the aim of the present study was to evaluate the average width of lingual attached gingiva. In addition, the objectives were to check prevalence and awareness, among study population, about lingual gingival recession and the willingness to get it treated. Another objective was to validate the width of attached gingiva labially in incisor and premolar region.

MATERIALS AND METHODS:

This cross-sectional clinical study was performed on a study population of 90 patients, who were randomly selected from the Department of Periodontology and Implantology, MGV's KBH Dental College and hospital, Nashik, Maharashtra, India.

All patients above 18 years of age and having all teeth present were open for inclusion as a part of study population. However, presence of abundant supra-

gingival calculus on lingual side, patients with systemic conditions like diabetes, pregnancy or immunocompromised patients, were excluded from the study. Also, patients with gingival enlargement and/or history of any previous periodontal therapy were excluded.

Ethical approval was obtained from the institutional ethical committee, MGV Dental College and Hospital Nasik, India. Informed consent was obtained from every unit of study sample. Gingival recession, when present, was noted on each tooth lingually in mandibular arch using a UNC-15 probe.

After measuring gingival recession, 2% of Lugol's iodine solution was applied to patient's lingual and labial alveolar mucosa, more specifically in mucogingival junction area, (Fig.1). The solution was applied until there was a sharp demarcation between keratinised tissue and alveolar mucosa as needed. Alveolar mucosa gives an iodo-positive reaction while keratinized tissue, because of low glycogen content, gives an iodo-negative reaction. After demarcation, the width of attached gingiva was measured (by using "UNC-15 probe", from the base of sulcus to the line of demarcation) on every tooth on lingual side of all mandibular teeth as well as on labial side of central incisor and first premolars. The measurements were recorded to the nearest millimetre marking.

To assess the awareness regarding lingual gingival recession and the desire to get it treated, following questions

were asked to every individual. Do you know that lingually gingiva has shifted apically? Are you aware of it? Do you feel anything different on lingual side or any different sensation on touching by tongue? Do you feel sensitivity to cold or hot? (Hypersensitivity). Would you like to do any treatment for it?

All the data was filtered and tabulated for statistical analysis. Means and standard deviation was calculated for all the numerical readings. Response to the questionnaire and other findings of significance was determined on percentage basis.

RESULTS:

Demographic data:

Demographic and clinical characteristics of the study groups are displayed in Table-1. There were total 58 male and 32 female participants with their mean age of 30.15 and 33.86 respectively. Of these 90 individuals, 39 peoples were having periodontitis (i.e. with gingival recession) and gingivitis and 12 individuals were healthy.

Lingual Width of Attached Gingiva:

The overall width of lingual attached gingiva for the age groups 18-30, 31-45, 45-60 years were recorded (Table 2). Number of teeth with lingual recession and mean of lingual gingival recession were also recorded for these age groups shown in Table-3.

The mean width of or lingual attached gingiva varied with each tooth. It was

found to be maximum with mandibular first molar (5.24 ± 1.2) followed by mandibular second molar, second premolar, third molar in the decreasing order. Starting from first premolar the width of gingiva decreases to lateral incisor and it is least with central incisor (1.67 ± 0.79) (Graph-1).

Lingual Gingival Recession:

Number of teeth with lingual gingival recession and its extent varied for each tooth. Maximum number of teeth with lingual gingival recession was seen with mandibular incisors and least with mandibular premolars (excluding third molars). (Table:-3)

The scores for mean lingual gingival recession was maximum for mandibular incisors and mandibular canines and it was almost equal for mandibular molars and mandibular canines.

Questionnaire Response:

Of the total study population, 47% of patients had presence of one or more teeth with lingual gingival recession (Fig.-2A). Among this group, only 7% of the respondents were aware of lingual gingival recession (Fig-2B). Of the total study population 36% of the respondents reported different sensation on lingual side of mandibular teeth on touching tongue (Fig-2C). Respondents were asked about the hypersensitivity of teeth to cold or heat in mandibular region. Out of total respondents, 53% complaints of hypersensitivity in mandibular teeth

(Fig.-2D) and 80% of these individuals were having hypersensitivity to cold as shown in (Fig.-2E). Among the respondents 37% of them were willing to be get treated (Fig.-2F).

Labial/Buccal Attached Gingiva:

The mean width of attached gingiva was also measured labially. It was maximum with maxillary central incisors (3.9 ± 1.2) followed by mandibular central incisor region (2.27 ± 0.85) and least with mandibular premolars (1.2 ± 0.8).

DISCUSSION:

In formulating the treatment plan for patients, status of the available attached gingiva and presence of gingival recession has always gained significance. But the focus has always been on labial gingiva. The repercussions of the absence of width of attached gingiva &/or the indications for root coverage applies to lingual aspect also. Yet the significance of available lingual attached gingiva or presence of the lingual gingival recessions in terms of prevalence, awareness or treatment options has always been deserted.

Different methods for determining the location of mucogingival junction are visual method:-MGJ assessed as a scalloped line separating gingiva from alveolar mucosa, functional method in which MGJ is assessed as the line between movable and immovable tissue. In the present study, tissue mobility was determined by running a horizontal positioned periodontal probe from the

vestibule towards the gingival margin using light pressure and visual method after histochemical staining in which MGJ assessed visually after staining the mucogingival complex with iodine solution. Lugol's iodine (2%) solution was used in the present study. It is a solution of elemental iodine and potassium iodide in water.

In a cross sectional study, Voigt et al.^[4]evaluated the lingual width of attached gingiva and found that, the largest width was in mandibular first and second molar area with a mean height of 4.7mm. This was followed by third molar (3mm), second bicuspid (2.5mm), first bicuspid (2mm), cuspid, lateral incisor & central incisor (1.9mm). In addition to this mean width of attached gingiva in mandibular arch was found to be largest on first molar (5mm) and second molar (4.3mm) teeth region on lingual side. The bicuspid (3-4mm) had the next largest width of attached gingiva followed by third molar (2.5-3mm) and cuspids (2.3mm). The smallest width was found on the central incisor (1.6mm) and lateral incisor (1.9mm). In the present study the labial width of attached gingiva was found to be 3.18-3.23 and 2.17-2.27 in maxillary and mandibular central incisor region respectively which are lower than standard values which are given in literature. The average widths in premolar region in maxillary and mandibular region are 2.27-3.2 and 2.6-2.62 respectively. These values are closely similar to as what given in literature.^[2,3,6]

The recognition of lingual width of attached gingiva is as much important as labial width is. It allows periodontal surgeon to design surgical procedure so as to conserve maximum amount of attached gingiva lingually in mandibular arch. It allows prosthodontists to limit the margins of dentures lingually. The significance of recognizing labial width of attached gingiva gives the idea about variations in labial width in Indian sub-population.

A study done by Abdullah A. et al. 2011[8] found prevalence of GR to be 60.5% of total study population. It was found to be significantly higher in females (33.6%) as compared to males (26.9%). The most significant differences of prevailed recessions were detected in buccal/labial & palatal/lingual (44.5%) and the upper & lower teeth (34.6%), respectively, ($P < 0.05$).

Palenstein et al. in 1998[10] estimated the prevalence and severity of gingival recession in Tanzanian adults age range from 20-64 years. They found that in the 20-34 years age group recession occurred $\geq 32\%$ of the buccal $\geq 25\%$ of the lingual, and $\geq 13\%$ of the approximal surfaces. These percentages increased to $\geq 64\%$, $\geq 52\%$ and $\geq 48\%$ respectively, in the 45-64 years age group. In the 20-34 years age group, lingual surfaces of mandibular incisors and canines followed by buccal surfaces of these teeth were the sites most severely affected with gingival recession. With increasing age, all sites became gradually more severely affected, particularly the

buccal and lingual surfaces of the maxillary first molar. The lingual surfaces of mandibular incisors exhibited on an average 1.3 mm, 2.4 mm and 3.2 mm recession in the 20-34 years, 35-44 years and 45-64 years age group, respectively.

In the present study the prevalence of gingival recession was found in 47% of total sample population and it was maximum with mandibular central incisors on lingual side. 36% of these respondents were feeling different sensation on touching tongue.

The total number of subjects having gingival recession, 37% of the population were willing to do the treatment. This signifies that so many people are aware and alert regarding the treatment and thus there is a direct need to focus on introducing and practicing surgical procedures for root coverage of gingival recession on lingual side of mandibular region.

Nicolia XW in 2013^[11] assessed the prevalence of dentin hypersensitivity associated with erosive tooth wear and

gingival recession. Total 3187 adults were enrolled of which 41.9 % of patients reported pain on tooth stimulation.

Rees JS in 2004^[12] assessed to establish the prevalence of sensitivity of teeth associated with buccal gingival recession. 152 (2.8%) patients were diagnosed as having hypersensitivity. In the present study, total 47% of total sample population having gingival recession had hypersensitivity, of which, 80% had sensitivity to cold.

CONCLUSION:

This data can serve as a guide in diagnosis and treatment planning and in selecting the procedures to re-establish the zones of attached gingiva. The recognition of widths of lingual attached gingiva would allow the periodontal surgeon to design surgical procedures to conserve maximum attached gingiva on the lingual of mandibular teeth.

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TABLES:

Table 1: Demographic data representing the number of males and females included for different age groups and their periodontal status.

		Male	Female	Total
Age (yrs) (Mean + SD)		30.15 (9.42)	33.86 (10.96)	31.31(10.1)
Gender	18-30	36	14	50
	31-45	14	11	25
	46-60	8	7	15
	Total	58	32	90
Periodontal status	Healthy	7	5	12
	Gingivitis	26	13	39
	Periodontitis	25	14	39
	Total	58	32	90

Table 2: Mean Width of lingual attached gingiva in millimetres by age groups.

Tooth number	Width of lingual attached gingiva			
	All	18-30 yrs	31-45 yrs	46-60 yrs
48	3.03 (±0.71)	4.54 (±1.09)	4 (±1.06)	4.88(±1.05)
47	4.27 (±1.22)	6.48 (±1.32)	6 (±1.15)	5.93 (±1.23)
46	5.37 (±1.51)	7.26 (±1.6)	6.95 (±0.95)	7.31 (±1.49)

45	3.6 (±0.9)	5.52 (±1.09)	5.5 (±0.85)	5.62 (±0.88)
44	3.18 (±0.79)	5 (±0.85)	5.18 (±0.85)	5.12 (±0.8)
43	2.29 (±0.5)	3.94 (±0.81)	4.04 (±0.89)	4.06 (±0.85)
42	1.84 (±0.45)	3 (±0.67)	3.4 (±0.9)	3.31 (±0.7)
41	1.67 (±0.79)	2.82 (±0.66)	2.9 (±0.68)	2.87 (±0.8)
31	1.75 (±0.57)	2.96 (±0.75)	2.81 (±0.73)	2.81 (±0.75)
32	1.9 (±0.44)	3.24 (±0.79)	3.18 (±0.79)	2.87 (±0.88)
33	2.37 (±0.63)	4.08 (±0.87)	4.27 (±0.98)	3.87 (±1.08)
34	3.04 (±0.98)	5.1 (±0.93)	5.18 (±0.95)	4.62 (±1.14)
35	3.83 (±0.21)	5.98 (±1.07)	5.59 (±0.9)	5.68 (±1.25)
36	5.28 (±1.3)	7.4 (±1.27)	7.18 (±1.14)	6.68 (±1.49)
37	4.37 (±1.24)	6.56 (±1.51)	6.27 (±1.16)	5.87 (±1.5)
38	2.53 (±0.55)	4.48 (±1.0)	4.23 (±0.75)	4.3 (±1.25)

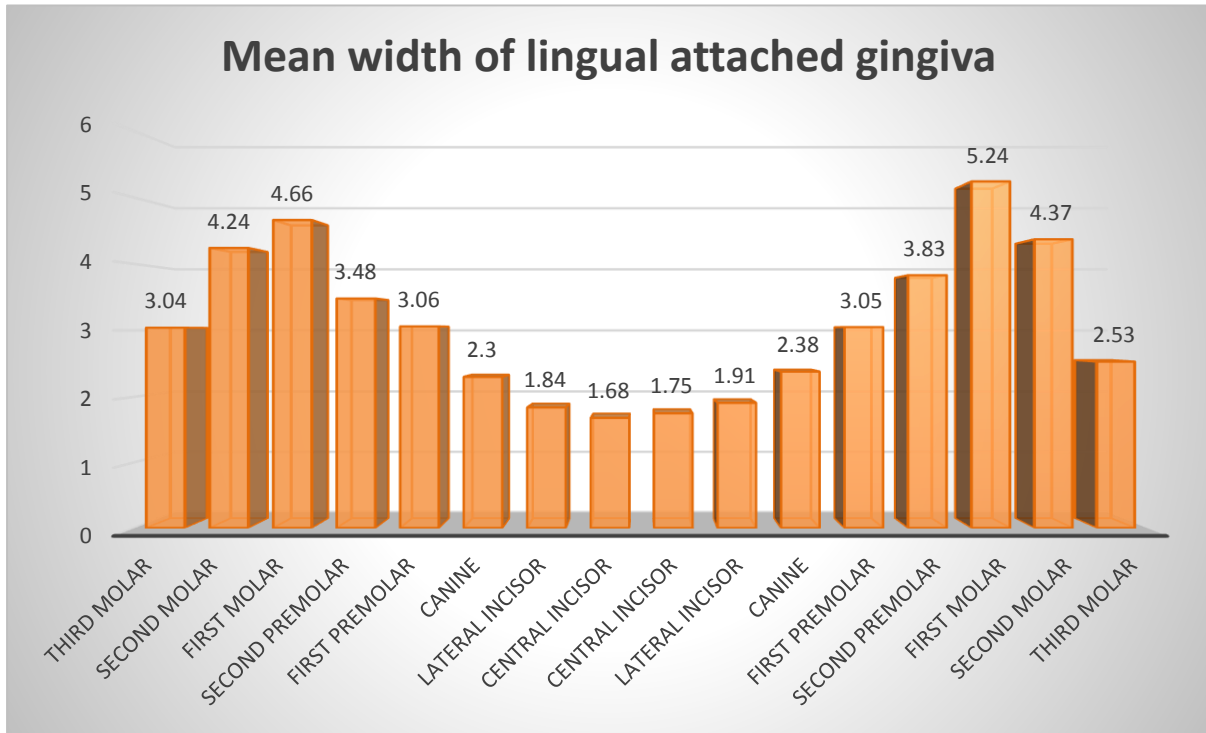
Table 3-Total number of teeth with gingival recession and mean of gingival recession in millimetres for age groups including male and female.

Tooth Number	Number of teeth with lingual recession							
	All		18-30 yrs		31-45 yrs		46-60 yrs	
	No. of teeth	Recession in mm	No. of teeth	Recession in mm	No. of teeth	Recession in mm	No. of teeth	Recession in mm
48	0	0						
47	4	1.25 (±0.5)	1	1	3	1.33 (±0.57)		
46	3	1.33 (±0.57)	1	1	2	1.5 (±0.7)		
45	1	2			1	2		
44	2	2			2	2		
43	11	1.54 (±1.21)	3	1.33 (±0.57)	5	2	3	1
42	17	2.05 (±0.96)	7	1.85 (±1.06)	7	2.42	3	1.67 (±0.57)
41	23	2.17 (±1.15)	8	1.75 (±0.7)	9	2.11 (±0.97)	6	2.83 (±1.3)
31	22	2.13 (±1.03)	8	1.75 (±0.7)	8	2.25 (±1.26)	6	2.5 (±0.54)
32	18	1.78 (±0.73)	6	1.67 (±0.51)	8	1.75 (±1.48)	4	2
33	12	1.33 (±0.77)	3	1	5	1.8 (±1.03)	4	1
34	5	2.2 (±0.83)			3	1.67 (±1.09)	2	3
35	4	1.75 (±0.5)			4	1.75 (±0.5)		
36	3	2.33 (±0.57)			3	2.33 (±0.57)		
37	3	2			3	2		
38	0	0						

mm- millimeters

GRAPH:

Graph 1:- Bar graph showing mean width of lingual attached gingiva.



FIGURES:



Fig.1:- measuring mean width of lingual attached gingiva lingually after application of lugol's iodine using unc 15 probe.

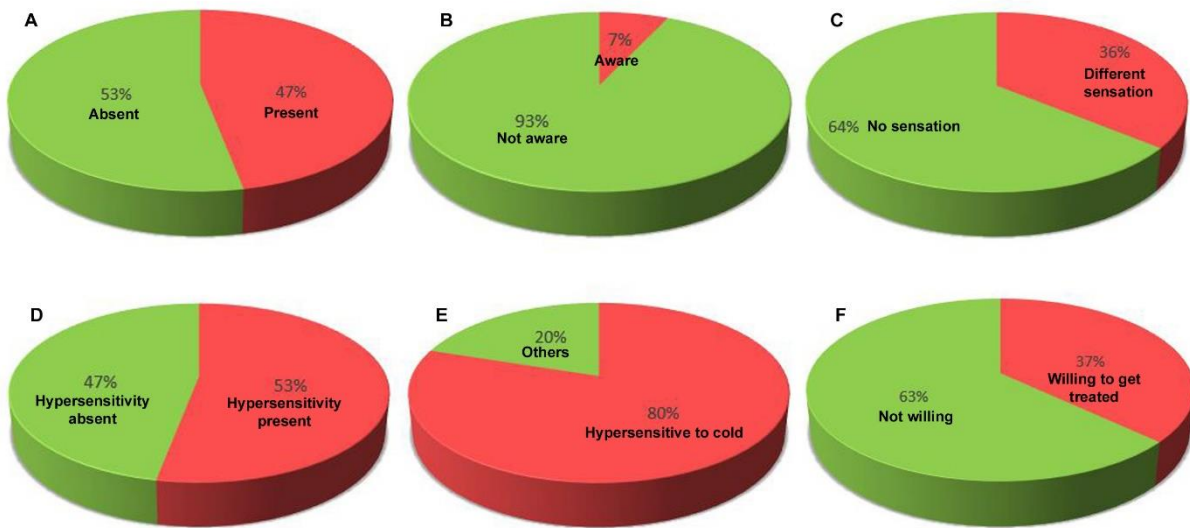


Fig.2:- pie diagram showing percentage of a) gingival recession, b) awareness of lingual gingival recession c) different sensation on mandibular teeth on lingual side, d) presence of hypersensitivity e) hypersensitivity to cold and f) willing it to get treated.