



Does the Width of Attached Gingiva Affect Oral Hygiene & Periodontal Health???

KEYWORDS

Width of attached gingiva, mucogingival junction, oral hygiene & periodontal health.

Dr. Maya S. Indurkar

Prof., HOD & PG Guide, department of periodontology, Govt. Dental College And Hospital, Aurangabad, Maharashtra, 431001

Dr. Pallavi S. Bhailume

Post Graduate student, department of periodontology, Govt. Dental College And Hospital, Aurangabad, Maharashtra, 431001

ABSTRACT *AIM: Attached gingiva is important for maintaining periodontium in a healthy state. The purpose of the present study was to evaluate the relationship between width of attached gingiva with oral hygiene status & periodontal status in different age groups.*

MATERIALS AND METHOD: 100 subjects were examined. Visual & functional method were used to locate mucogingival junction and the width of attached gingiva was measured. Simplified oral hygiene index, Plaque index were used to assess oral hygiene status. Russel's Periodontal index was used to assess gingival and periodontal status of an individual.

RESULTS: It was seen that the width of attached gingiva increases with age, it was greater in males than in females and there was a broader zone of attached gingiva in the maxilla than in the mandible. The width of attached gingiva was less in subjects with poor oral hygiene & this was statistically significant. Plaque index was less when width of attached gingiva was more & this was statistically significant. In terminal periodontal disease the width of attached gingiva was less and this relationship was statistically significant.

CONCLUSION: It was concluded that plaque index was high when width of attached gingiva was less. There is a direct correlation between width of attached gingiva and oral hygiene status, when width of attached gingiva was more, oral hygiene was good. Periodontal index was high, when width of attached gingiva was less, showing the importance of attached gingiva in periodontal health.

INTRODUCTION

Oral mucosa consists of three zones namely the gingiva and hard palate, termed the masticatory mucosa dorsum of the tongue (specialized mucosa) and the oral mucous membrane (lining

mucosa). Orban¹ first described the term attached gingiva as that part of the gingiva that is firmly attached to the underlying tooth and bone and is stippled on the surface.¹

Macroscopically, gingiva is divided into marginal, attached and interdental areas.²

The width of attached gingiva is the distance between the mucogingival junction to projection of the external surface of the bottom of the sulcus or the periodontal pocket.²

Attached gingiva is important for maintaining periodontium in a healthy state because it enhances plaque removal around the gingival margin. It improves esthetics, it reduces inflammation around restored teeth. Gingival margin binds better around teeth and implants with adequate width of attached gingiva.²

AIM:

To evaluate the relationship between width of attached gingiva with oral hygiene status & periodontal status in different age groups.

MATERIALS & METHOD:

This study was conducted in Outpatient Department of Periodontology, Government Dental College & Hospital, Aurangabad, study was conducted in 100 subjects (42 fe-

males & 58 males) of 15 to 65 years age group.

Based on the age of the patient, they were categorized into three groups:

Group I: 15–30 years

Group II: 31–45 years

Group III: Greater than 45 years

After getting informed consent, patient's data was collected by clinical examination. Mouth mirror and William's graduated probe were used to record the data. Visual & functional methods were used to locate mucogingival junction as shown in figure 1.



Figure 1. Visual methods to locate mucogingival junction

Visual method assessment is based on the color difference between the gingiva and alveolar.¹ In the functional method, mucogingival junction is assessed as a borderline between the movable and immovable tissue wherein tissue mobility is determined by running a periodontal probe po-

sitioned horizontally from the vestibule toward the gingival margin with light pressure.³

Measurement of attached gingiva was carried out with the help of William's graduated probe as shown in figure 2. The distance from crest of marginal gingiva to mucogingival junction was measured & was subtracted with probing depth in mid buccal region to get width of attached gingiva on the buccal side of all teeth.



Figure 2. Measurement of attached gingiva with the help of William's graduated probe.

Table 1 Width of attached gingiva in different age groups.

| WIDTH OF ATTACHED GINGIVA IN mm | | | | | | | | | |
|---------------------------------|----|-----------|--------|----------|-------|------------|--------|----------|-------|
| | | MAXILLARY | | | | MANDIBULAR | | | |
| AGE GROUP | N | INCISOR | CANINE | PREMOLAR | MOLAR | INCISOR | CANINE | PREMOLAR | MOLAR |
| 15-30 YEARS | 49 | 3.93 | 2.99 | 2.01 | 2.61 | 2.55 | 2.21 | 1.80 | 2.20 |
| 31-45YEARS | 31 | 4.25 | 3.36 | 2.29 | 2.67 | 2.71 | 2.26 | 1.81 | 2.21 |
| GREATER THAN 45YEARS | 20 | 4.40 | 3.41 | 2.58 | 2.7 | 2.93 | 2.21 | 2.15 | 2.32 |

The width of attached gingival increases with age as shown in table no. 1& this was statistically significant by z test.(P< 0.0001)

Table 2 Width of attached gingiva in females & males.

| WIDTH OF ATTACHED GINGIVA IN mm | | | | | | | | | |
|---------------------------------|----|-----------|--------|----------|-------|------------|--------|----------|-------|
| | | MAXILLARY | | | | MANDIBULAR | | | |
| SEX | N | INCISOR | CANINE | PREMOLAR | MOLAR | INCISOR | CANINE | PREMOLAR | MOLAR |
| FEMALE | 48 | 3.90 | 2.97 | 2.10 | 2.39 | 2.59 | 2.07 | 1.72 | 2.03 |
| MALE | 52 | 4.36 | 3.48 | 2.44 | 2.82 | 2.61 | 2.17 | 1.83 | 2.16 |

The width of attached gingiva was greater in males than females as shown in table no. 2 but this difference was not statistically significant by z test. (Z=0.22;P> 0.05)

Table 3 Width of attached gingiva in maxillary & mandible tooth.

| WIDTH OF ATTACHED GINGIVA IN mm | | | | | | | |
|---------------------------------|--------|----------|-------|------------|--------|----------|-------|
| MAXILLARY | | | | MANDIBULAR | | | |
| INCISOR | CANINE | PREMOLAR | MOLAR | INCISOR | CANINE | PREMOLAR | MOLAR |
| 4.12 | 3.18 | 2.21 | 2.65 | 2.68 | 2.23 | 1.87 | 2.23 |

The width of attached gingiva varied with tooth. In the maxilla, the greatest width of attached gingiva was found in incisors, followed by canine and molar & was least in premolar. In the mandible, the broadest zone of attached gingiva was found over incisors followed by molar and canine & was least in premolar. All subjects had a generally broader zone of attached gingiva in the maxilla than in the mandible.

Table 4 Correlation between Width of attached gingiva and Simplified oral hygiene index By Greene And Vermilion(1964).

| WIDTH OF ATTACHED GINGIVA IN mm | | | | | | | | | |
|---------------------------------|----|-----------|--------|----------|-------|------------|--------|----------|-------|
| | | MAXILLARY | | | | MANDIBULAR | | | |
| OHI | N | INCISOR | CANINE | PREMOLAR | MOLAR | INCISOR | CANINE | PREMOLAR | MOLAR |
| GOOD | 28 | 3.93 | 3.06 | 2.09 | 2.74 | 2.67 | 2.15 | 1.89 | 2.21 |
| FAIR | 64 | 4.25 | 3.36 | 2.29 | 2.75 | 2.83 | 2.40 | 1.90 | 2.35 |
| POOR | 8 | 3.85 | 2.04 | 1.79 | 1.58 | 1.66 | 1.20 | 1.45 | 1.41 |

Simplified oral hygiene index given by Greene and Vermilion (1964), Plaque index by Silness and Loe (1967) were used to assess oral hygiene status.

Russel's Periodontal index (1956) was used to assess gingival and periodontal status of an individual.

All data collected were subjected to statistical analysis.

RESULTS:

The results of 100 subjects those who were participated in the study were evaluated. The co-relation between width of attached gingiva and Oral Hygiene status, Plaque Index, Periodontal index were studied.

Based upon scoring criteria of Simplified OHI index, the subjects were divided in three groups – Good, Fair and Poor. Table no.4 shows the oral hygiene status of the subjects and width of attached gingiva. The width of at-

tached gingiva was less in subjects with poor oral hygiene as compared to subjects with fair and good oral hygiene & this was statistically significant by linear regression test. ($r=0.302$; $p=0.003$)

Table 5 Correlation between width of attached gingiva and Plaque index by Silness and Loe (1967).

| WIDTH OF ATTACHED GINGIVA IN mm | | | | | | | | | |
|---------------------------------|-----------|---------|--------|----------|-------|------------|--------|----------|-------|
| | MAXILLARY | | | | | MANDIBULAR | | | |
| PI | N | INCISOR | CANINE | PREMOLAR | MOLAR | INCISOR | CANINE | PREMOLAR | MOLAR |
| GOOD | 2 | 4.25 | 3.27 | 2.3 | 3.12 | 3 | 3 | 2 | 2.5 |
| FAIR | 77 | 4.18 | 3.25 | 2.26 | 2.74 | 2.82 | 2.27 | 1.88 | 2.33 |
| POOR | 21 | 3.89 | 2.85 | 2 | 2.29 | 2.14 | 2.05 | 1.78 | 1.85 |

Based upon scoring criteria of plaque index, the subjects were divided in three groups-Good, Fair and Poor. Table no. 5 shows plaque index is less when width of attached gingiva is more & this was statistically significant by linear regression test. ($r=0.397$; $p=0.003$)

Table 6 Correlation between width of attached gingiva and Russel's Periodontal index.(1956)

| WIDTH OF ATTACHED GINGIVA IN mm | | | | | | | | | |
|---|-----------|---------|--------|----------|-------|------------|--------|----------|-------|
| | MAXILLARY | | | | | MANDIBULAR | | | |
| CLINICAL CONDITION | N | INCISOR | CANINE | PREMOLAR | MOLAR | INCISOR | CANINE | PREMOLAR | MOLAR |
| CLINICALLY NORMAL SUPPORTIVE TISSUES | 24 | 3.90 | 2.83 | 2.12 | 2.63 | 2.55 | 2.22 | 1.73 | 2.19 |
| SIMPLE GINGIVITIS | 35 | 4.25 | 3.29 | 2.26 | 2.90 | 2.95 | 2.52 | 2.24 | 2.41 |
| BEGINNING DESTRUCTIVE PERIODONTAL DISEASE | 24 | 4.34 | 3.67 | 2.29 | 2.75 | 2.91 | 2.26 | 1.63 | 2.38 |
| ESTABLISHED DESTRUCTIVE PERIODONTAL DISEASE | 16 | 4.07 | 2.92 | 2.09 | 1.94 | 1.89 | 1.54 | 1.57 | 1.67 |
| TERMINAL DISEASE | 1 | 3.5 | 1.5 | 2.25 | 1.5 | 2 | 0.5 | 2 | 1.25 |

Based upon scoring criteria of Russel's periodontal index, subjects were divided into 5 groups-clinically normal supportive tissues, simple gingivitis, beginning destructive periodontal disease, established destructive periodontal disease & terminal disease. Table no. 6 shows that in terminal disease the width of attached gingiva is less. And this relationship was statistically significant by linear regression. ($r=0.295$; $p=0.003$)

DISCUSSION:

The attached gingiva is firm, resilient and tightly bound to the underlying periosteum of alveolar bone. The facial aspect of the attached gingiva extends to the relatively loose and movable alveolar mucosa and is demarcated by the mucogingival junction². The width of the attached gingiva is an important clinical parameter. It has been suggested that an "adequate" width of attached and/or keratinized gingiva is necessary for the maintenance of gingival health.

The present study measured attached gingiva with the help of a periodontal probe similar to Tenenbaum⁶.

There are many studies done on the width of attached gingiva. One of the most often study quoted on width is by Bowers³ GM in 1963 and Ainamo⁴ in 1976. The width of the attached gingiva on the facial aspect differs in different areas of the mouth. It is generally greatest in the incisor region (3.5 to 4.5 mm in maxilla, 3.3 to 3.9 mm in mandible) and narrower in the posterior segments (1.9 mm in maxillary and 1.8 mm in mandibular first premolars)⁴. In the present study the width of attached gingiva in maxil-

lary incisor was 4.12mm, in maxillary canine was 3.18mm, in maxillary premolar was 2.21mm, maxillary molar was 2.65mm, in mandibular incisor was 2.8mm, in mandibular canine was 2.23mm, in mandibular premolar was 1.87mm & in mandibular molar was 2.23mm. Thus the present study found greatest width of attached gingiva in maxillary incisors & least width in mandibular premolars similar to previous study done by Ainamo⁴ & Bowers³.

According to Ainamo⁴ and Vincent⁶, the width of attached gingiva increases with age similar to our study. According to Bowers, the mean width of attached gingiva for individual teeth are approximately the same for male and female in contrast to our study where we found greater width of attached gingiva in males than in females.

Lang & Loe (1972) reported that plaque-free areas with less than 2 mm of keratinized gingiva were inflamed despite effective oral hygiene and concluded that 2 mm or more of keratinized gingiva (which corresponds to 1 mm or more of attached gingiva) is necessary to maintain gingival health. However, Bowers (1963), Miyasato et al. (1977), Dorfman et al. (1980), and De Trey & Bernimoulin (1980) observed that the tissue could remain clinically healthy with less than 1 mm of attached gingiva⁵.

As per present study when width of attached gingiva was less, there was poor oral hygiene. There was statistically significant correlation between width of attached gingiva and simplified oral hygiene index & plaque index. HENRI TENENBAUM(1982)⁶ found no statistically significant corre-

lation between oral hygiene index, plaque index & width of attached gingiva in contrast to our study .

Table no.6 shows, the width of attached gingiva was less in subjects having terminal periodontal disease. And this relationship was statistically significant. The width of attached gingiva was less in group of subjects having clinically healthy periodontal tissue as compared to subjects having mild gingivitis or beginning of periodontal disease. The probable reason for this contrasting result is- clinically healthy periodontal tissue group involved more younger subjects as compared to other two groups where width of attached gingiva was less.

Conclusion

Width of attached gingiva varies in different areas of the mouth with the maxillary incisors having the greatest width (4.12mm)& least width (1.8mm) with mandibular premolars. Males had a greater width of attached gingiva than females. As age increases, width of attached gingiva also increases.

It is found that plaque index was high when width of attached gingiva was less. There is a direct correlation between width of attached gingiva and oral hygiene status, when width of attached gingiva was more, oral hygiene was good. Periodontal index was high, when width of attached gingiva was less, showing the importance of attached gingiva in periodontal health.

REFERENCE

- 1.Orban B. Clinical and histologic study of the surface characteristics of the gingiva. *Oral Surg Oral Med Oral Pathol.* 1948 1:827-41.
- 2.Fiorellini JP, Kim DM, Ishikawa SO. The gingiva. In: Newman MG, Takei H, Klokkevold PR, Carranza F A, editors. *Carranza's Clinical Periodontology.* 10th ed. Missouri: Saunders Publishers 2006.
- 3.Bowers GM. A study of the width of the attached gingiva. *J Periodontology,* 1963; 34:210-13.
- 4.Ainamo J, Talar A. The increase with age of the width of attached gingiva. *J Periodontol Res* 1976; 11:182-88.
- 5.HenriTenenbaum.A clinical study comparing the width of attached gingiva and the prevalence of gingival.J *ClinPeriodontol.* 1982 Jan;9(1):86-92
- 6.Vincent JW, Machen JB, Levin MP.Assessment of attached gingiva using the tension test and clinical measurements.*J Periodontology* 1976; 47(7): 412-14.
- 7.Goldman, H. M. *Periodontia.* Third Edition.C. V. Mosby Co, St. Louis, Mo, 1953.
- 8.Hilming F, Jervoe P. Surgical extension of vestibular depth. On the results in various regions of the mouth in periodontal patients. *Tandlaegebladet.* 1970 74:329-43.