

Research Article

## Assessment of Gingival Thickness with Regard to Age, Gender and Location in the Dental Arch– A Clinical Study

Aishwarya J, Dr. Radhika Arjunker

*Saveetha Dental College, Chennai*

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### ABSTRACT

**Aim:** Assessment of gingival thickness with regard to age, gender and its location in the dental arch. **Objective:** To assess the variance in the gingival thickness in patients who are reporting to the dental clinic in relation to their age, gender and dental arch location. **Background:** The measurement of the gingival thickness and the assessment of the periodontal status helps in the better treatment planning for aesthetic surgeries and mucogingival problems to achieve optimum therapeutic outcomes. Subjects reporting to the dental clinic are divided into three groups based on their age group (i) (18-24 yrs), group (ii) from (25-40 yrs), group (iii) (> 40 yrs) and into two subgroups male and female based on their gender. The gingival thickness will be measured by transgingival probing (TGP) using an endodontic reamer by anaesthetising the facial gingiva, in the anterior teeth region of both the arches. **Result:** The gingival thickness of the patients in varying age groups was found to be increasing with the increasing age, and it was thicker in males when compared with the females. And the thickness was higher in maxillary arch than the mandibular arch. **Conclusion:** The knowledge about the gingival thickness is essential in planning the appropriate treatment for the patients and also it may improve the quality of the treatment and predict its outcome.

**key words:** age, gingival thickness, gender, transgingival probing

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### INTRODUCTION

The gingiva is that portion of the oral mucous membrane which, in a complete post-eruptive dentition of a healthy individual surrounds and is attached to the teeth and the alveolar processes. Normally, there is considerable variation in both width and thickness of the gingiva, a fact that gives rise to the assumption that numerous gingival biotypes might exist in any adult population<sup>1</sup>. It has been long known that the clinical appearance of healthy gingiva differs from subject to subject and even among different tooth types. Many features are genetically determined; others seem to be influenced by tooth size, shape and position and biological phenomena such as gender, growth and age. Some authors have discussed earlier about the importance of 'thick versus thin' gingiva in restorative treatment planning and their different pathological responses when subjected to inflammatory, traumatic, or surgical insults. Thick gingival tissue is probably the representation most associated with periodontal health in which the tissue is dense in appearance with a fairly large zone of attachment and relatively thick underlying osseous forms. The gingival topography is relatively flat with the suggestion of a thick underlying bony architecture. Thin gingival tissue tends to be delicate, friable and almost translucent in appearance with a minimal zone of attached gingiva. The osseous architecture associated with this gingival tissue type is characterized by fenestration and dehiscence<sup>2</sup>. Various studies have concluded that Gingival thickness (GT) plays a vital role in development of

mucogingival problems, flap management during regenerative surgical procedures and also a significant predictor of the clinical outcome of root coverage procedures<sup>3,4,5</sup>. If gingival tissues are different for thick and thin tissue biotypes, it seems logical that these distinctions would significantly influence periodontal therapy, orthodontic tooth movement and implant site preparation<sup>2</sup>. Hence the assessment of GT is gaining a large momentum as far as treatment planning in mucogingival therapy is concerned.

In recent years, the dimension of different parts of masticatory mucosa, especially gingival thickness has become the subject of considerable interest<sup>6</sup>. In several clinical situations, information on GT is highly desirable. For example, a thin and delicate gingiva might be prone to developing recession after traumatic, inflammatory or surgical injuries<sup>7</sup>. The aim of this research is to find the gingival thickness of various age groups and gender and also the thickness of the two arches separately

### MATERIALS AND METHODS

This study was approved by the scientific review board of Saveetha Dental College and the research was also conducted at the same college, Chennai. The research was carried out after getting an informed consent from the patients and also they were informed and explained about the research and its objectives. Patients were selected for the research based on the following inclusion and exclusion criteria. The criteria is all the patients at the age



Figure 1: Insertion with caliper

Table 1: Dental arch

Dental arch		Group	Age	Mean $\pm$ standard deviation (mm)
GT maxillary arch	-	(i)	18 - 24 yrs	0.46 $\pm$ 0.25
		(ii)	25 - 40 yrs	0.44 $\pm$ 0.27
		(III)	Above 40 yrs	0.85 $\pm$ 0.46
		Total		0.57 $\pm$ 0.37
GT-mandibular arch	-	(i)	18 - 24 yrs	0.30 $\pm$ 0.14
		(ii)	25 - 40 yrs	0.40 $\pm$ 0.24
		(III)	Above 40 yrs	0.77 $\pm$ 0.46
		Total		0.48 $\pm$ 0.36

Table 2: Gender Standard Deviation

Gender	Age	Mean $\pm$ standard deviation (mm)
GT maxillary arch	Male	0.75 $\pm$ 0.37
	Female	0.29 $\pm$ 0.13
GT-mandibular arch	Male	0.61 $\pm$ 0.39
	Female	0.29 $\pm$ 0.15

of 18 and above without any problems in the gingiva, without deep pockets, without any lesion, infection or inflammation in the gingiva, with all anterior teeth present in maxillary and mandibular arch are selected. A total of 33 patients were included in this research who are further divided into three age groups: group (i) 18-24 years, group (ii) 24-40 years and group (iii) above 40 years. Gingival thickness was measured by transgingival probing (TGP) method, anesthetizing the facial gingiva with lidocaine topical spray, in the maxillary and mandibular arch of the anterior region. After anesthetizing the region, an endodontic reamer with the silicon stopper is inserted into the gingiva and the thickness is measured with the help of a caliper [Fig 1]. The oral hygiene index simplified (OHI-S)(8) and the pocket depth of the patients was also calculated. Measurement error is minimized, by the fact that examination of all patients was performed by the same examiner.

#### Statistical analysis

The collected data was analysed with SPSS 16.0 version. To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and for continuous variables the mean and S.D were used. To find the significant difference between the

bivariate samples in independent groups (Male & Female) unpaired sample t-test was used. For the multivariate analysis (Age groups) the one way ANOVA with Tukey's Post-Hoc test was used. To assess the relationship between the variables Pearson's Correlation was used. In all the above statistical tools the probability value .05 is considered as significant level.

## RESULTS

Totally 33 patients out of which 20 males and 13 females. They were divided into three age groups (i) in 18-24 years – 8 males and 2 females. (ii) 25-40 years age group 5 males and 8 females (iii) in  $\geq$  40 years age group -7 males and 3 females. The gingival thickness of the maxillary and mandibular arch among the different age groups is given in table 1. And the overall gingival thickness for the maxillary and mandibular arch for males and females is given in table 2.

The gingival thickness for the three age groups when compared with each other, and the significant difference were found in between the age groups (i) and (iii) , and groups(ii) and (iii) and the P value is 0.38 and 0.019 respectively for the maxillary arch . And for the mandibular arch the significant difference were found in between the age groups (i) and (iii), and group (ii) and (iii) and the P value was 0.005 and 0.019 respectively.

The gingival thickness of the maxillary arch is comparatively greater than the mandibular arch. The gingival thickness was more in males when compared with the females in the maxillary arch ( $p=0.014$ ) and in the mandibular arch ( $p=0.004$ )

The subjects mean OHI was calculated. The mean OHI-S value for the different age groups was (i) 18-24 was  $2.24 \pm 0.83$ (ii) 25-40 was  $2.54 \pm 1.16$  (iii) $>40$  years was  $3.10 \pm 1.33$  And the overall OHI-S for males is  $2.30 \pm 0.81$  and for females is  $3.11 \pm 1.43$ . The mean pocket depth among the various age groups were (i) 18-24 is  $2.058 \pm 0.52$ mm. (ii) 25-80 is  $1.84 \pm 0.47$ mm(iii) $>40$  years is.  $2.22 \pm 0.89$ mm. The overall mean value for pocket depth for males  $1.88 \pm 0.42$  and for females it is  $2.24 \pm 0.85$ mm. There was no significant difference in the OHI-S and pocket depth values among the various age groups and among the males and females.

## DISCUSSION

Soft tissue thickness in the periodontium, called gingival thickness, is an essential factor that has influence on a periodontal biotype assessment. Invasive and non-invasive methods are utilized in its examination. a measurement of thickness of gingiva and the oral mucosa are most commonly carried out using a periodontal probe under local anesthesia (9,10) or by more precise method of transgingival probing, using an injection needle or an endodontic tool with a silicone limiter (BS– bone sounding)<sup>11,12</sup>.

Knowledge of gingival thickness or biotype is a vital tool in patient and technique selection for gingival augmentation procedures and is important from an epidemiological point of view as well. Variation in gingival thickness is related to different periodontal

'biotypes', different forms of upper anterior teeth and degree of inflammation. Thick, flat gingiva responds to irritation with enlargement and thin and delicate keratinized tissue may result in loss of attachment. To desirably predict postoperative outcomes, accurate pre operative/pre prosthetic diagnosis of the dimensions of the periodontium becomes necessary<sup>13</sup>.

According to Rakhi et al<sup>14</sup> study gender wise comparison showed that the female subjects had thinner gingiva than males at the midbuccal region. At interdental papillary region, female subjects had significantly thicker gingiva than males. On comparing the GTH dental arch wise by both the methods, maxillary arch showed a thicker gingiva at midbuccal site as compared to the mandibular arch whereas at interdental papillary region, maxillary arch showed a thinner gingiva as compared to the mandibular arch but their results were contrary to the studies of Savitha B et al<sup>6</sup> and Muller<sup>15</sup> in which the GT has been reported to be thinner in female subjects than male subjects at both the sites. And also they found the gingiva to be thinner in the maxilla than in the mandible at both the sites as assessed by TGP method.

Rajashri kolte et al<sup>16</sup> in his study The results indicated that there was an increase in width of attached gingiva in both maxillary and mandibular arches, with the increasing age groups, which was more in the maxillary compared to mandibular arches. Also the width of the attached gingiva was found to be more in males as compared to females. The thickness of the gingiva was found to be more in younger age group and reduced with the increasing age. This study reveals that there is variation in the gingival thickness with respect to age, gender and the arch location. The gingival thickness is more in males when compared to the females, and across the different age groups when compared, the gingival thickness increases with increasing age but this is contrary to the literature<sup>15</sup> wherein the gingival thickness reduces with the increasing age. However Waraaswapati et al<sup>10</sup> studies says that the palatal gingival thickness increases with increasing age but his results cannot attributed to the current study because the findings of the facial gingiva cannot be compared with that of the palatal gingiva. However the difference in the result in our study can be because of the improper distribution of the subjects of the three age groups and unequal male and female ratio within the groups. The thickness also varies with respect to the different arch. The gingival thickness is more in maxillary arch when compared to that of the mandibular arch. The OHI-Sand pocket depth values were not significant.

## CONCLUSION

The knowledge about the gingival thickness is essential in planning the appropriate treatment for the patients and also it may improve the quality of the treatment and predict the outcomes of various mucogingival surgical procedures

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