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Research Article

THICK OR THIN – VISUAL VS DIRECT ASSESSMENT OF GINGIVAL BIOTYPE

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ABSTRACT

Aim: To assess and compare the facial gingival biotype of maxillary anterior teeth using visual and direct methods.

Materials and methods: 100 systemically healthy subjects aged 20-40 years were included in the study. Two methods were used to evaluate thickness of the gingiva: visual method by periodontal probe and direct method with endodontic reamer (size 20) under local anesthesia. The gingival biotype was considered thin if it measured ≤ 1.0 mm and thick if it measured > 1.0 mm. Results of the study were subjected to statistical analysis.

Results: Thick biotype was found to be in older aged subjects as compared to younger ones. Females showed thin gingival biotype as compared to males.

Conclusion: There was a positive correlation between biotype and age. Males had thicker gingival biotype compared to females. Hence we concluded that measurements from visual method by periodontal probe and direct method by endodontic reamer was comparable.

INTRODUCTION

Gingival biotype refers to the quality of the soft tissue profile surrounding the teeth. From the factors that may determine successful treatment, gingival biotype is a great cause of concern, as it has significant impact on the outcome of periodontal surgery and implant placement. Different types of biotypes respond differently to disease process and to surgical and restorative treatments.[1] The term gingival biotype has been used to describe the thickness of the gingiva in the faciopalatal/faciolingual dimension.[2] It has been suggested that a direct correlation exists between gingival biotype and the susceptibility to gingival recession following surgical and restorative procedures. Therefore, an accurate diagnosis of gingival tissue biotype is of utmost importance in devising an appropriate treatment plan and achieving a predictable esthetic outcome. Reduced gingival thickness is one of the factors that can cause periodontal attachment loss and marginal tissue recession in a patient, which is a major concern for periodontal disease progression.[3]

The term periodontal biotype categorized the gingiva into "thick-flat" and "thin scalloped" biotypes (Seibert and Lindhe, 1989).[4] Gingival anatomy was divided into "pronounced scalloped" and the "flat" biotype (Ochsenbein and Ross, 1969). Thick gingival biotype usually depicts broad zone of keratinized tissue with flat gingival contour which indicates thick underlying bony architecture and is more resilient to any inflammation or trauma. On the other side, thin gingival biotype is related with a thin band of the keratinized tissue and scalloped gingival contour which suggests thin bony architecture and is more sensitive to any inflammation or trauma. Inflammation of the periodontium results in increased pocket formation in thick biotype and gingival recession in thin tissues.[1] Peri-implant tissue biotype was found to be significantly associated with facial marginal mucosal level (Nisapakultorn *et al*, 2010). Also, patients with a thin biotype had less papilla fill and had increased risk of peri-implant facial mucosal recession.[5]

In general, gingival biotype can be evaluated by either: direct visual assessment only, visual assessment with the aid of a periodontal probe and direct measurements. While gingival biotype can only be identified as either thick or thin with visual assessment methods, true gingival thickness can be recorded using direct measurements. Nevertheless, there has not yet been an objective classification to determine the gingival tissue thickness of different biotypes. The purpose of this study was to evaluate the reliability of visually assessing the facial

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gingival biotype of maxillary anterior teeth in comparison with direct measurements.

MATERIALS AND METHODS

Study design

A total of 100 systemically healthy subjects (60 males and 40 females) aged 20-40 years were included in the study. Subjects presenting all maxillary anterior teeth, subjects having good oral hygiene without any clinical signs of gingival inflammation or attachment loss were included.

Subjects with crown restorations or fillings that involved the incisal edge on the maxillary anterior teeth, pregnant or lactating women, subjects taking any medications with any known effect on periodontal soft tissues were excluded. A detailed case history of the subjects participating in the study was recorded. Signed informed consent was taken prior to the start of the study. Oral hygiene instructions were given and scaling and root planing was completed for all the subjects. The thickness of gingival biotype for each of the subjects was determined by using periodontal probe for visual method and #20 endodontic reamer for direct method under local anesthesia (measured midbuccally halfway between gingival margin and mucogingival junction).

Armamentarium

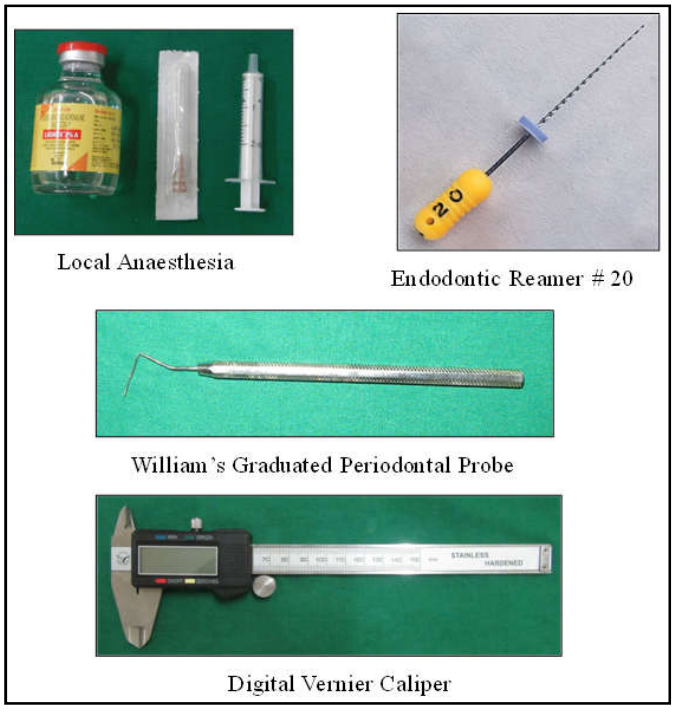


Figure 1 showing local anesthetics vial, syringe, #20 endodontic reamer, William's graduated periodontal probe and digital vernier caliper.

Clinical evaluation

Visual method: The evaluation of gingival biotype was based on the transparency of periodontal probe. Measurements were made with a calibrated and standardized periodontal probe (William's Graduated Periodontal Probe) through the gingival margin while probing the sulcus at the midfacial aspect of maxillary anteriors. If the outline of the underlying periodontal probe could be seen through the gingiva, it was categorized as thin; if not, it was categorized as thick gingival biotype.

Direct method: #20 endodontic reamer with stopper was inserted midbuccally halfway between gingival margin and mucogingival junction under local anesthesia (0.2% Lignocaine hydrochloride with 1:80000 adrenaline) and the length of the reamer was measured by digital Vernier caliper. The digital readings ≤1mm were categorized as thin; and >1mm were categorized as thick gingival biotype.

Methods of assessment

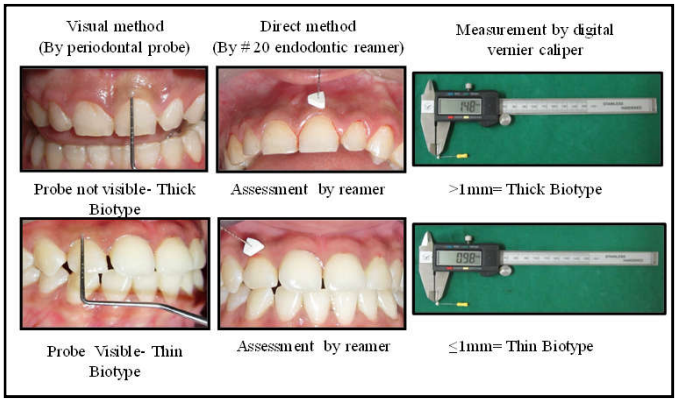


Figure 2 showing both the methods for assessment of gingival biotype by periodontal probe, and endodontic reamer and digital vernier caliper.

Statistical Analysis

Data obtained was compiled on a MS Office Excel Sheet (v 2010) and subjected to statistical analysis using Statistical package for social sciences (SPSS v 22.0, IBM).

The comparison of thickness of gingiva/ gingival biotype in males and females by visual method was done by using Chi-square test. Correlation of gender versus thickness by direct method was analysed by Spearman's correlation coefficient. The comparison of thickness of gingiva/ gingival biotype in younger and older subjects by visual method was done by using Chi-square test. The comparison of mean thickness of gingiva/ gingival biotype in younger and older subjects by direct method was done by using independent sample 't' test.

For all the statistical tests, $p<0.01$ was considered to be statistically significant.

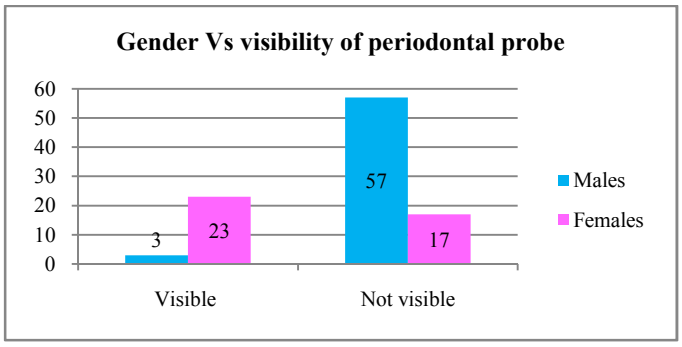
RESULTS

When the gingival biotype was compared among the age groups, thick biotype was maximum in 30-39 years of age and minimum in 20-29 years of age. Among the female subjects, maximum females showed thin biotype. Results of the study are summarized in Tables 1–4.

Table 1 Comparison of gender versus visibility of periodontal probe

		periodontal probe			p value of chi square test
		Visible/thin	Not visible/ thick	Total	
sex coded	Males	3	57	60	0.000
	Females	23	17	40	
	Total	26	74	100	

Gender Vs visibility of periodontal probe

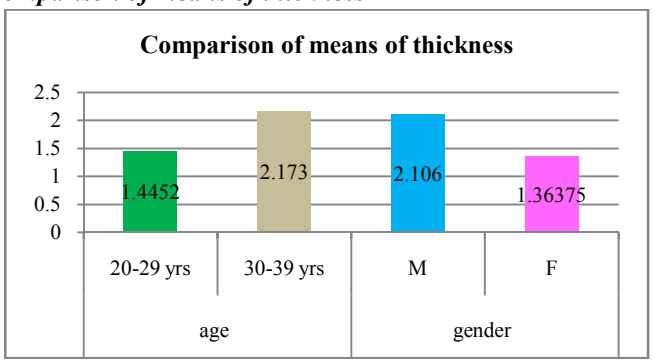


There was a statistically highly significant difference as periodontal probe was not visible/thick in a majority of males (57) and in majority of females probe was visible/thin (23) with $p<0.01$.

Graph 1 Gender Vs visibility of periodontal probe

There was a statistically highly significant difference between the means of gingival thickness as measured by endo reamer with higher values in older age.

Comparison of means of thickness



There was a statistically highly significant difference between the means of gingival thickness as measured by endo reamer with higher values in older and in males.

Graph 3 Comparison of means of thickness

Table 2 Comparison of age versus visibility of periodontal probe

		periodontal probe			p value of chi square test
		Visible/thin	Not visible/thick	Total	
age coded	20-29 yrs	27	23	50	0.000
	30-39 yrs	0	50	50	
	Total	27	73	100	

There was a statistically highly significant difference as majority of younger subjects had thin gingiva (27) and majority of older subjects had thick gingiva (50) with $p<0.01$.

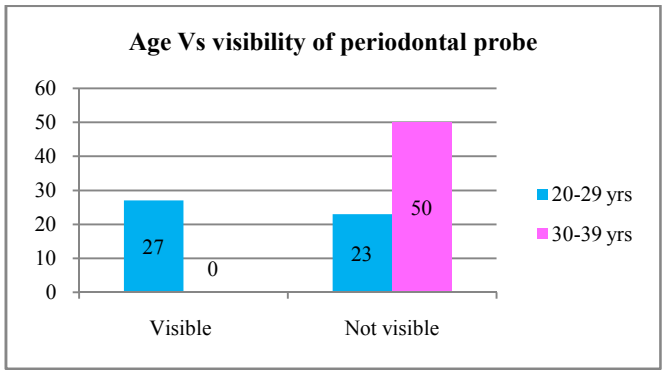
DISCUSSION

Gingival biotype refers to the quality of the soft tissue profile surrounding the teeth.

Table 3 Comparison of mean thickness using endodontic reamer among genders

	sex coded	N	Mean	Std. Deviation	Std. Error Mean	Independent Samples Test
endodontic reamer	M	60	2.106000	.4053632	.0523322	0.000
	F	40	1.363750	.5136131	.0812094	

Age Vs visibility of periodontal probe



There was a statistically highly significant difference between the means of gingival thickness as measured by endo reamer with higher values in males.

Graph 2 Age Vs visibility of periodontal probe

From the factors that may determine successful treatment, gingival biotype is a great cause of concern, as it has significant impact on the outcome of periodontal surgery and implant placement. Different types of biotypes respond differently to disease process and to surgical and restorative treatments. The thicker biotype prevents mucosal recession, hides the restorative margins and camouflages the titanium implant shadows. It also aids in biological seal around implants, thus reducing the crestal bone resorption. The level of gingival thickness before regenerative surgery was found to be a predicting factor for further recession.[6]

Thick biotypes include flat soft tissue and bony architecture, denser and more fibrotic soft tissue with large amount of attached masticatory mucosa. It is more resistant to any acute trauma and respond to disease by pocket formation and infra bony defect. The gingival thickness affects the treatment outcome possibly because of the difference in the amount of blood supply to the underlying bone and susceptibility to

Table 4 Comparison of mean thickness using endodontic reamer among young versus older age

	age coded	N	Mean	Std. Deviation	Std. Error Mean	Independent Samples Test
endodontic reamer	20-29 yrs	50	1.445200	.5713366	.0807992	0.000
	30-39 yrs	50	2.173000	.2845781	.0402454	

resorption. Also, thin biotype in female patients might be one of the probable risk factors for high prevalence of chronic periodontitis in females. [7]

In the present study, there was a statistically highly significant difference as periodontal probe was not visible/thick in majority of males (57) and in majority of females probe was visible/thin (23) and majority of older subjects had thick gingival biotype (50) as compared to younger subjects (27) ($p<0.01$). These results were similar to a study conducted in which it was reported that using a probe test to complement a visual inspection, seems to be a reliable and objective method for the evaluation of the gingival biotype, and further studies might be necessary for improving the use of this probe test (Kan *et al,* 2010[2] and Manjunath RG *et al*, 2015[3]). Also there was a statistically highly significant difference between the means of gingival thickness as measured by endo reamer with higher values in males and in older age subjects, The results of which were in accordance with another study (Vandana and Savitha, 2005 and Cuny-Houchmand M, 2013[7]).

CONCLUSION

There was a high positive correlation noted between biotype and age. Also, males displayed thicker biotype in all age groups compared to females. So, from the present study, it was concluded that measurements from visual method and direct method are comparable.

However, long term studies with larger sample size need to be undertaken for a definitive conclusion.

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