

Prevalence of Gingival Biotype and Its Relationship to Dental Malocclusion

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ABSTRACT

Background: The gingival biotype is one of the key elements from aesthetic treatment perspective. Many methods were proposed to measure tissue thickness. These include direct measurements, probe transparency (TRAN), ultrasonic devices, and most recently, cone-beam computed tomography (CBCT). Hence this study was conducted to determine the association between gingival biotype and the factors affecting the gingival biotype like malocclusion, age, gender & smoking.

Materials & Methods: This is a cross-sectional study consisting of 200 subjects which were selected from in department of dentistry, S.P. Medical College, Bikaner. Participation was purely voluntary and written informed consent was obtained from the participants. The study included 100 males and 100 females. Based on the dental occlusion the subjects were classified by the angle's classification of malocclusion & smoking habits.

Results: Our study showed that the mean age of patients was 27.78 years. Probe transparency present slightly higher in males as compared to female, but probe transparency absent is higher in females as compared to males. In class I malocclusion the probe transparency was absent in more subjects as compared to class II & III malocclusion. Probe transparency was absent in more in non-smokers as compared to current & former smokers.

Conclusion: The outcome depends on gingival complex, tooth morphology, contact points, hard and soft tissue considerations, periodontal bioform, and biotype. Therefore an accurate diagnosis of gingival tissue biotype is of utmost importance in forming an appropriate treatment plan to achieve a predictable treatment outcome.

Keywords: Gingival Biotypes, Smokers, Angle Classification, Probe Transparency.


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INTRODUCTION

The morphologic characteristic of gingiva depends on the underlying bone architecture and is influenced primarily by factors such as tooth position, type of periodontium, tooth form and design of cemento-enamel junction. The clinical appearance of healthy marginal periodontium has been shown to be different between individuals and among different tooth-types. Gingival and periodontal health is a basic requisite for maintaining an esthetic gingival morphology. Tissue biotype is a critical factor that influence the esthetic treatment outcomes. According to Ochsenbein and Ross, there were two main types of gingival morphology, namely the scalloped and thin or flat and thick gingiva. They proposed that the contour of the gingival closely followed the contour of the underlying alveolar bone.¹ The term "periodontal biotype" was later introduced by Seibert and Lindhe to categorize the gingiva into "thick-flat" and "thin-scalloped" biotypes.² Claffey and Shanley defined the thin tissue biotype as a gingival thickness of <1.5 mm, and the thick tissue biotype was referred to as having a tissue thickness ≥ 2 mm (measurements of 1.6 to 1.9 mm were not accounted for).³

Thin gingival tissue tends to be delicate and almost translucent in appearance. The tissue appears friable with a minimal zone of attached gingiva. The soft tissue is highly accentuated and often suggestive of thin or minimal bone over the labial roots. Surgical evaluation often reveals thin labial bone with the possible presence of fenestration and dehiscence. It reacts to insults and disease with gingival recession. Thick gingival tissue is probably the image most associated with periodontal health. The tissue is dense in appearance with a fairly large zone of attachment. The gingival topography is relatively flat with the suggestion of a thick underlying bony architecture. Surgical evaluation of these areas often reveals relatively thick underlying osseous forms. This type of tissue is resistant to acute trauma and reacts to disease with pocket formation and infrabony defect formation.⁴

Many methods were proposed to measure tissue thickness. These include direct measurements,⁵ probe transparency (TRAN),⁶ ultrasonic devices,⁷ and most recently, cone-beam computed tomography (CBCT). In the probe transparency method the gingival biotype is considered thin if the outline of the probe is

shown through the gingival margin from the sulcus. This method was found to be highly reproducible with 85% of intra-examiner repeatability for gingival thickness assessment in a clinical trial of 100 periodontally healthy subjects. Thus it was validated as a simple, rapid and minimally invasive method.⁸

Hence this study was conducted to determine the association between gingival biotype and the factors affecting the gingival biotype like malocclusion, age, gender & smoking.

MATERIALS & METHODS

This is a cross-sectional study consisting of 200 subjects which were selected from in department of dentistry, S.P. Medical College, Bikaner. Participation was purely voluntary and written informed consent was obtained from the participants.

Inclusion Criteria

- Subjects who were between age group 18-60 years.
- Clinically healthy patients.
- Presence of all maxillary anterior teeth.

Exclusion Criteria

- Subjects with crowns or extensive restoration on maxillary anteriors.
- Pregnant or lactating females.
- Subjects on certain medication with their effect on periodontal soft tissues.
- Subjects who required antibiotic premedication prior to dental examination.
- Subjects who had moderate to severe gingival inflammation.

Collection of Data

The study included 100 males and 100 females. Based on the dental occlusion the subjects were classified by the angle's classification of malocclusion as follows:

- Angle's class 1- Mesio Buccal cusp of maxillary permanent 1st molar occludes in the buccal groove of mandibular 1st permanent molar.
- Angle's class 2- Distobuccal cusp of the upper 1st permanent molar occludes in the buccal groove of lower 1st permanent molar.
- Angle's class 3- Mesio Buccal cusp of the maxillary 1st permanent molar occluding in the interdental space between the mandibular 1st and 2nd molar.

Subjects were also classified into 3 groups (current, former and never smoked) based on their smoking habit.

- Current smoker- have smoked ≥ 100 cigarettes in their lifetime and currently smoked.
- Former smoker- have smoked ≥ 100 cigarettes in their lifetime and do not currently smoked.
- Non-smoker- have not smoked ≥ 100 cigarettes in their lifetime and do not currently smoked.

Table 1: Mean age of Subjects

| AGE | |
|---------|-------|
| N | 200 |
| Mean | 27.78 |
| Median | 26.00 |
| Minimum | 18 |
| Maximum | 65 |

Table 2: Probe Transparency Gender

| | | | Gender | | Total |
|--------------------|---------|-----------------|--------|--------|--------|
| | | | F | M | |
| Probe Transparency | Absent | Count | 235 | 206 | 441 |
| | | % Within Gender | 58.75% | 51.5% | 55.1% |
| | Present | Count | 165 | 194 | 359 |
| | | % Within Gender | 41.25% | 48.5% | 44.9% |
| Total | | Count | 400 | 400 | 800 |
| | | % Within Gender | 100.0% | 100.0% | 100.0% |

Table 3: Probe Transparency Malocclusion

| | | | Malocclusion | | | Total |
|--------------------|---------|-----------------------|--------------|--------|--------|--------|
| Probe Transparency | Absent | Count | 243 | 113 | 88 | 444 |
| | | % Within Malocclusion | 53.3% | 54.3% | 64.7% | 55.5% |
| | Present | Count | 213 | 95 | 48 | 356 |
| | | % Within Malocclusion | 46.7% | 45.7% | 35.3% | 44.5% |
| Total | | Count | 456 | 208 | 136 | 800 |
| | | % Within Malocclusion | 100.0% | 100.0% | 100.0% | 100.0% |

Table 4: Probe Transparency Smoker

| | | | Smoker | | | Total |
|--------------------|---------|-----------------|--------|---------------|----------------|--------|
| | | | Absent | Former Smoker | Current Smoker | |
| Probe Transparency | Absent | Count | 288 | 91 | 94 | 473 |
| | | % Within Smoker | 57.6% | 73.4% | 53.4% | 59.1% |
| | Present | Count | 212 | 33 | 82 | 327 |
| | | % Within Smoker | 42.4% | 26.6% | 46.6% | 40.9% |
| Total | | Count | 500 | 124 | 176 | 800 |
| | | % Within Smoker | 100.0% | 100.0% | 100.0% | 100.0% |

RESULTS

Mean age of patients was 27.78 years (table 1). Probe transparency present slightly higher in males as compared to female, but probe transparency absent is higher in females as compared to males. In class I malocclusion the probe transparency was absent in more subjects as compared to class II & III malocclusion. Probe transparency was absent is more in non-smokers as compared to current & former smokers (table 2-4).

DISCUSSION

In a present study the sample population of 200 healthy patients with a mean age of 27.78 years. The gingival biotype plays an important role in harmonizing ideal esthetics, function and long term prognosis. Clinical appearance of healthy periodontium differs from subject to subject and even among different tooth types. Various factors influence the form of gingival tissue around the natural tooth or fixed prosthesis, in that, aging is one of the factor which affect the biotype. Kolte et al.⁹ younger age group had significantly thicker gingiva but less width than that of the older age group, Vandana et al.¹⁰ showed younger age group had significantly thicker gingiva than that of the older age group, Bhatia M et al.¹¹ in the older age group, more prevalence of thinner biotype was seen compared to thicker biotype. Waraaswapati et al. (2001)¹² had findings that are contrary to the above observations, thickness of palatal masticatory mucosa increases with the increasing age group. Probe test was developed to obtain a simple and reliable method for identifying gingival biotypes in patients. Probe transparency present in 41.25% in females & 40.5% in males. In our results show the thickness of gingival, 58.75% in female & 59.5% in males. Gender plays a vital role in the gingival biotype as the thickness of gingiva varies according to gender which has been reported to be thinner in females as compared to males; and thickness seems to be a significant predictor of clinical outcome of certain procedures in periodontal surgery and other factors. Thus the thickness is discussed here in literature to be further studied. Vandana et al.¹⁰ showed the Female volunteers had significantly thinner masticatory mucosa than males. Bhatia M et al.¹¹ also observed the Females have more number of thin biotype. Probe transparency present 40.9% malocclusion cases in our study. The results suggest that gingival biotype is essential, especially prior to orthodontic tooth movement because it defines the soft and hard tissues surrounding teeth. KH Zawawi et al.¹³ found that no significant association between type of gingival biotype and dental malocclusions. Cuny-Houchmand M et al.¹⁴ observed that the percent of agreement between classifications based on the global view of both the maxilla and mandible and the classification based on the individual mandibular or maxillary anterior teeth was not statistically significant and found that simple visual inspection is not effective for the identification of gingival biotype. Further the study suggested that a difference of biotype between the maxilla and the mandible in the same patient is conceivable. The present study showed only 59.1% smokers have thick gingival biotypes. The study suggest with Zawawi et al.¹³ showed Thin gingival biotype was found more prevalent among females & non-smokers. So far many studies have been conducted to assess the association between gingival biotype & dental anatomy but there is scarcity of literature on association of gingival biotype with gender, smoking status and different type of malocclusion.

CONCLUSION

We concluded that gingival biotype is one of the key elements from aesthetic treatment perspective. The outcome depends on gingival complex, tooth morphology, contact points, hard and soft tissue considerations, periodontal bioform, and biotype. Therefore an accurate diagnosis of gingival tissue biotype is of utmost importance in forming an appropriate treatment plan to achieve a predictable treatment outcome.

REFERENCES

1. Ochsenbein, C., Ross, S. A reevaluation of osseous surgery. *DentClin North Am.* 1969;13:87-102.
2. Seibert JL, Lindhe J. Esthetics and periodontal therapy. In: Lindhe J, ed. *Textbook of Clinical Periodontology*. 2nd ed. Copenhagen, Denmark: Munksgaard; 1989:477-514.
3. Claffey N, Shanley D. Relationship of gingival thickness and bleeding to loss of probing attachment in shallow sites following nonsurgical periodontal therapy. *J ClinPeriodontol*1986;13:654-57.
4. Chawla K, Grover H.S. Gingival Biotype : When Thin Is Not In. *J PeriodontolMed Clin Pract.*2014;01:255-263.
5. Greenberg J, Laster L, Listgarten MA. Transgingival probing as a potential estimator of alveolar bone level.*JPeriodontol*1976;47:514-17.
6. Kan JY, Rungcharassaeng K, Umez K, Kois JC. Dimensions of peri-implant mucosa: An evaluation of maxillary anterior single implants in humans. *J Periodontol* 2003;74:557-562.
7. Muller HP, Heinecke A, Schaller N, Eger T. Masticatory mucosa in subjects with different periodontal phenotypes. *J ClinPeriodontol* 2000;27:621-626.
8. Barriviera M, Duarte WR et al. A new method to assess and measure palatal masticatory mucosa by cone-beam computerized tomography. *J ClinPeriodontol* 2009;36:564-568.
9. Kolte R, Kolte A, Mahajan A. Assessment of gingival thickness with regards to age, gender and arch location. *Journal of Indian Society of Periodontology* -2014;18(4):478-481.
10. Vandana K, Savitha B. Thickness of gingiva in association with age, gender and dental arch location. *Journal of Clinical Periodontology*. 2005;32(7):828-830.
11. Bhatia M, Shetty S, Gupta I, Chaudhary A. Prevalence of Different Gingival Biotypes in Individuals with Varying Forms of Maxillary Central Incisors - A Survey. *J Res Adv Dent.* 2014;3(2s):142-148.
12. Wara-aswapati N, Pitiphat W, Chandrapho N, Rattanayatikul C, Karimbux N. Thickness of Palatal Masticatory Mucosa Associated With Age. *Journal of Periodontology*. 2001;72(10):1407-1412.
13. Zawawi KH, Al-Harathi SM, Al-Zahrani MS. Prevalence of gingival biotype and its relationship to dental malocclusion. *Saudi Med J.* 2012;33:671-675.
14. Cuny-Houchmand M. Gingival Biotype Assesment: Visual Inspection Relevance And Maxillary Versus Mandibular Comparison. *TODENTJ.* 2013;7(1):1-6.

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