Effect of Gingival Biotype on the Progression of Periodontal Disease

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Abstract

Background: The causes that interfere with the outcome of dental treatment is gingival biotype Scalloped –thin and flat-thick are the types of gingival biotypes. Periodontal diseases progress differently in response to plaque associated inflammation. While periodontal pocket may be the result in flat thick gingival biotype , gingival recession may be the result of scalloped and thin gingival biotype. With this background this study aimed at evaluating the relation between gingival biotype and the progression of periodontal diseases .

Materials and Methods: Sixty systemically healthy subjects between 30-50years of age, diagnosed with chronic periodontitis who visited outpatient department of Manipal college of dental sciences, Mangalore, India, took part in the study. The subjects were explained about the study, and written consent was obtained. A thorough dental examination with a comprehensive survey of maxillary central incisors and lateral incisors was performed to assess the following clinical parameters: Bleeding on probing, probing pocket depth, loss of attachment, gingival thickness and gingival recession . The collected data was subjected to statistical analysis.

Results: The mean Gingival thickness for the central incisor, lateral incisor, and canine were 1.11 mm, 1.01 mm, and 0.82 mm, respectively. ANOVA test was done to compare the gingival thickness between the incisors which was statistically significant with a value < 0.001. The Posthoc Tukey tests comparing gingival recession showed a mean difference of 1.324* and was statistically significant with a p value of < 0.001. Comparison of probing pocket depth showed a mean difference of 0.882* which again was statistically significant with a p value of < 0.001.

Key Words: *Width of keratinized gingiva(WKG), gingival thickness (GT), Probing pocket depth(PPD)*

Introduction

The facio-palatal dimension of the gingiva is very importanat during the progression of periodontal disease as well as its management . [1,2] The response of periodontal tissue to any kind of trauma and the overall health of the dentition depends on the associated tissue biotype. [3]

The treatment planning for any patient is based on careful clinical examination,radiographic evaluation and assessment of the type of biotype. Hence, it is important to know the type of biotype in the general

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population and its relationship with the progression of periodontal disease. With this background, the study was aimed to assess gingival biotype and its reponse to periodontal inflammation.

Materials and Method

The study comprised of 60 male patients between 30 and 50 years of age (mean age 32 ± 2.02 years). The patients were explained about the study and the study commenced only after taking their informed consent and was approved by the Institutional Review Board. Systemically healthy subjects who were willing to be part of the study were . Smokers, mouthbreathers,denture wearers and subjects with missing maxilarry incisors were excluded from the study.

Probing pocket depth, width of keratinized gingiva(WKG), gingival thickness (GT), and recession if present were recorded . The measurements were recorded on three sites on the facial aspect and the highest valve was recorded on the facial surfaces of maxillary central and lateral incisors using periodontal probe for PPD and WKG and an endodontic reamer with a rubber stop was used to measure the gingival thickness under local anesthesia (2% lidocaine HCl with 1:100,000 epinephrine). Errors were avoided as a single clinician conducted the examination. The gingiva was considered thin if the measurement was ≤ 1.0 mm and thick if it measured > 1.0 mm as described previously by Kan et al[4] All the measurements were subjected to statistical analysis.

Statistical Analysis

The data collected was subjected to statistical analysis. The ANOVA test was done to compare the gingival thickness, Posthoc Tukey was used to compare gingival recession and chi- square test for probing pocket depth among all the four incisors.

Results

The average age of the selected sample was 32 ± 2.02 year. Of the 240 teeth examined, It was observed that gingival thickness was highest in maxillary lateral incisors with the mean value of 2.45 followed by central incisors with a mean value of 2.29. Gingival recession was seen on 126 sites , out of which 64 sites observed were maxillar central incisors and 62 were maxillary lateral incisors. The lateral incisors have comparatively thicker Gingival biotype had recession with mean value of 0.86 and central incisors having recession with mean value of 1.2 , which shows a positive correlation between thin gingival biotype and Gingival recession. The Posthoc Tukey tests comparing gingival recession showed a mean difference of 1.324* and was statistically significant with a p value of < 0.001. Comparing probing pocket depth showed a mean difference of 0.882* which again was statistically significant with a p value of < 0.001. The p value for the ANOVA test done to compare the gingival thickness between the incisors was < 0.001, that is the results were statistically significant.

BIOTYPE						
		N	**Mean**	**Std. Deviation**	**H**	**P**
m	11	60	2.1833	0.89711		
	12	60	2.4583	1.28647		
	21	60	2.6667	1.31699		
	22	60	3.0000	1.76116	7.50	0.06
mb	11	60	2.0217	.93303		
	12	60	1.9133	.96717		
	21	60	2.2467	1.27883		
	22	60	2.4150	1.41323	4.10	0.25
d	11	60	2.5917	1.28713		
	12	60	2.2000	1.26625		
	21	60	2.3583	1.13156		
	22	60	2.8667	1.59413	6.42	0.09

POCKET DEPTH						
		N	**Mean**	**Std. Deviation**	**H**	**P**
pdm	11	6	3.00	1.549		
	12	6	2.50	1.225		
	21	8	2.50	1.069		
	22	9	3.11	1.167	1.968	0.579
pdmb	11	7	2.29	1.254		
	12	10	1.80	1.229		
	21	9	2.00	1.225	2.125	0.547
	22	9	2.11	1.167		
pdd	11	10	3.00	1.155		
	12	7	2.43	1.134	2.106	0.551
	21	6	2.67	1.211		
	22	6	2.50	1.225		

RECESSION						
		N	Mean	Std. Deviation	H	P
Recession M	11	12	0.875	0.711		
	12	8	0.625	0.354		
	21	9	0.567	0.374		
	22	7	0.643	0.627	1.925	0.588
Recession MB	11	10	1.050	0.896		
	12	13	0.769	0.388		
	21	13	0.654	0.555		
	22	11	0.818	0.681	1.878	0.598
Recession D	11	11	0.727	0.467		
	12	13	0.731	0.525		
	21	9	0.667	0.559		
	22	10	0.650	0.530	0.600	0.896

DESCRIPTIVES						
		N	Mean	Std. Deviation	F	P
m	M	240	2.577	1.375		
	MB	240	2.149	1.175		
	D	240	2.504	1.346	7.424	0.001
pd	M	29	2.793	1.207		
	MB	35	2.029	1.175		
	D	29	2.690	1.137	4.083	0.020
Recession	M	36	0.697	0.548		
	MB	47	0.809	0.630		
	D	43	0.698	0.502	0.568	0.568

MULTIPLE COMPARISONS TURKEY HSD				
Dependent Variable	**(I) CLASS**	**(J) CLASS**	**Mean Difference (I-J)**	**Sig.**
m	M	MB	0.428	0.001
		D	0.073	0.813
	MB	D	-0.355	0.008
pdm	M	MB	0.765	0.029
		D	0.103	0.940
	MB	D	-0.661	0.069
Recession M	M	MB	-0.111	0.649
		D	0.000	1.000
	MB	D	0.111	0.623

DESCRIPTIVES M						
Group		**N**	**Mean**	**Std. Deviation**	**F**	**P**
11	M	60	2.1833	0.89711		
	MB	60	1.3750	0.90209		
	D	60	1.8333	1.09570	10.49	<0.001 VHS
12	M	60	2.4583	1.28647		
	MB	60	2.0300	1.11299		
	D	60	2.5833	1.50470	2.94	0.06
21	M	60	2.6667	1.31699		
	MB	60	2.6583	1.12932		
	D	60	2.6167	1.23976	0.03	0.97
22	M	60	3.0000	1.76116		
	MB	60	2.5333	1.10801		
	D	60	2.9833	1.27547	2.12	0.12

MULTIPLE COMPARISONS DEPENDENT VARIABLE: M TURKEY HSD				
groupo	**(I) CLASS**	**(J) CLASS**	**Mean Difference (I-J)**	**Sig.**
11	M	MB	0.80833	0.000
		D	0.35000	0.121
	MB	D	-0.45833	0.028
12	M	MB	0.42833	0.176
		D	-0.12500	0.861
	MB	D	-0.55333	0.057
21	M	MB	0.00833	0.999
		D	0.05000	0.973
	MB	D	0.04167	0.981
22	M	MB	0.46667	0.168
		D	0.01667	0.998
	MB	D	-0.45000	0.190

Discussion

Gingival dimensions and progression of periodontal disease show considerable site and size variability. It has been observed that thick biotypes which consists of denser and more fibrotic soft tissues are more resisitant to tissue trauma responding to the disease by pocket formation . Thin biotypes are less resistant to trauma,there by responding to disease by gingival recession[4].

In this study the mean Gingival thickness for the incisors was 1.91 mm which was in accordance with the results from the previous studies. [5,6,7]. Significant difference between thin gingival biotype and the presence of gingival recession was observed in this study. This was in accordance with the study conducted by Lee etal[8].

Tim De Rouck et al in their study showed that males have thick gingival biotype and broader

keratinized tissue compared to females who had thin gingival biotype and narrow zone of keratinized tissue[9].

Anu Kuriakose etal in their study showed that palatal mucosa was thin for females compared to males , palatal mucosa was thinner for younger age group compared to older age group[10].

Few previous studies have indicated that males have greater GT than females[11,12,13]; but in this study only males have been included which could be one of the limitations of the study.

Conclusion

The examination of gingival biotype is necessary for successful planning and for the out come of periodontal treatment. Patients with thin gingival biotype were found to be more prone to gingival recession and ones with thick gingival biotype were more prone for periodontal pocket formation.Thus the treatment plan for thin gingival biotype requires gingival augmentation to increase the thickness so as to avoid gingival recession.

Add Conflict of Interest - NIL

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