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Correlation between Blood Groups and Gingival Biotype in Maxillary Anteriors – An Epidemiological Study

Ivaturi Sri Sai Meghana [1], Amitha Ramesh [2], Pavithra J [3], Biju Thomas [4]

1. PG, Department of Periodontics, A B Shetty Memorial Institute of Dental Sciences, Deralakatte -575018
2. Professor, Department of Periodontics, A B Shetty Memorial Institute of Dental Sciences, Deralakatte -575018
3. PG, Department of Periodontics, A B Shetty Memorial Institute of Dental Sciences, Deralakatte -575018
4. Prof & HOD, Department of Periodontics, A B Shetty Memorial Institute of Dental Sciences, Deralakatte -575018

Abstract

Background: *Measurements of soft and hard tissue are critical parameters that help anticipate the outcome of periodontal and restorative therapy. A clear understanding about the gingival thickness/biotype is of paramount importance in determining diagnostic and prognostic phase of treatment. There have been numerous studies on inter and intra-individual variability of gingival biotype in recent days. The focus of this study was to determine the correlation between various blood groups and gingival biotype.* ***Methods:*** *A questionnaire-based study performed in Department of Periodontics in 40 subjects between the age group of 20-80 years for a period of two months. Patients willing to participate in the study with a minimum complement of 20 teeth were included. Blood group for every patient was recorded by questionnaire method and gingival biotype in maxillary anterior was assessed.* ***Results:*** *The results showed that 53.3% of O +ve blood group patients had thicker gingival biotype followed by and 80% of A +ve blood group patients had thin gingival biotype, followed by B +ve and AB +ve blood groups with results showing 40% and 33.3% respectively. Since A -ve and O -ve blood groups are rare, the results obtained were not statistically significant.* ***Conclusion:*** *A difference in gingival thickness was appreciated in different blood groups with predominance of thick biotype in O blood group and thin biotype in A blood group. This study can provide an insight about the significance of blood groups in determining the gingival biotype.*

Keywords*: Gingival biotype; blood groups; attached gingiva; gingival thickness*

Address for correspondence: Prof (Dr) Amitha Ramesh, Professor, Department of Periodontics, A B Shetty Memorial Institute of Dental Sciences, Deralakatte -575018. Email: amitharamesh71@yahoo.in

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Introduction

Muller H. coined the term "gingival or periodontal phenotype" to discuss the widespread clinical findings of significant difference in the thickness and width of keratinized facial tissue.[2] Seibert and Lindhe later used the concept of "periodontal biotype" to describe the thickness of the gingiva in a bucco-lingual (thick or thin) dimension. [3] The term "gingival biotype" or "morphotype" has indeed been renamed. [4]

Measurements of soft and hard tissue are critical parameters that help anticipate the outcome of periodontal and restorative therapy.[1] The long-term success of aesthetic restorations depends on several parameters, such as the gingival biotype, the gingival tissue architecture, and the form of the anterior teeth out of which the gingival biotype plays a significant role.[5] It is therefore necessary to gain knowledge of the prevalence of the gingival biotype in the general population and its relationship with other standard therapeutic parameters. [6]

Gingival biotype can be referred as the quality of soft tissues present surrounding the tooth. The anatomy of gingival contour was first described by Oschenbein and Ross in the year 1969. [7] Ochsenbein and Miller addressed the value of "thick vs. thin" gingiva in restorative therapy. A gingival thickness of > 1.5 mm is defined as thick biotype and a gingival thickness of < 1.5mm as thin biotype. [8] Research has shown that 85% of population had thick gingival biotype while thin gingival biotype is present in only 15% of the population. [9] Often periodontal health has more association with thick gingival biotype.

Because the thickness of the gingival and bone tissues determines the therapeutic efficacy and resorption sensitivity, the tissue biotype must be analyzed before the start of therapy, likely due to the disparity in the extent of blood flow to the underlying bone.[10] With the increase in the amount of literature on the subject it is proven that, under similar clinical conditions, different gingival/periodontal biotypes respond differently. [5] Hence this study focuses to evaluate the nature of gingival biotype based on different blood groups in the general population.

Conditions like dental caries [11], salivary gland tumors [12], Oral cancer [13] are found to have positive correlation with different blood groups. Although all the human beings share the same blood system, there exists difference in the types of blood system like A blood group present among the Eskimos, B in Chinese and Indians, O in Americans, Canadian Indians Argentina, Columbia.[14] Figuring out the relation between different blood types and dental diseases dates back to 1930. Landsteiner was one of the earlier researchers to discover the existence of serologic differences on the presence of agglutinogen as agglutinogen A, agglutinogen B, neither A nor B (i.e., O) or both A and B (AB). [15] This discovery led to a series of serologic, genetic and immunochemical studies that are still being researched on till date.

Materials and Methods

The current questionnaire study was conducted in the Department of Periodontics, A B Shetty Memorial Institute of Dental Sciences, Mangalore between the age groups of 20-80 years for a period of two months. The study population included 40 patients selected by simple random stratified technique. This is a survey based on a questionnaire in which demographic data was collected along with the blood group. The purpose of the study was explained, and a written informed consent was received before the start of the study.

Inclusion Criteria

Subjects with a minimum complement of 20 teeth between the age groups of 20-80 years and who were willing to participate in the study were included.

Exclusion Criteria

Patients receiving periodontal therapy in the past six months, who were under hormonal therapy, medications like NSAIDS or any drugs known to influence periodontal tissues over the past six months were not considered.

Demographic information such as name, age, sex, address and medical history was elicited. Blood group was also recorded from all the patients by questionnaire method. Patients were categorized based on the blood group and gingival biotype was evaluated. Clinical examination of gingival biotype was performed both through visual examination and probe translucency test. The data was collected and statistically analysed.

Gingival Biotype Assessment

After delivery of topical and/or local anaesthesia that was deposited at the depth of the vestibule, gingival thickness measurements were taken to prevent any unintentional increase in gingival thickness at the gingival biotype assessment site. Visual examination and probe translucency were used in our survey to identify the gingival biotype**.**

Visual Examination

The gingival biotype is examined appropriately according to the morphology of the gingiva around the tooth through simple visual examination. The gingival biotype was referred thick if the gingiva was dense and fibrotic and if it was delicate, friable and almost translucent, considered thin.[16] The evaluation of gingival biotype was assessed for every patient by one calibrated investigator to avoid any bias in the results.

Probe Translucency Test

The gingival tissue thickness was directly measured by positioning a periodontal probe through the sulcus in the middle facial area and assessing the transparency of the probe.[17] If the

tip of the probe is visible through the overlying gingiva, it is considered as thin gingival biotype. [18]

Statistical Analysis

Analysis was done by descriptive statistics. The Chi square employed to determine gingival biotype distribution of various age groups and genders. Pearson's correlation coefficient was used to correlate the gingival biotypes with different blood groups. A statistical package SPSS version 23.0 was used for analysis. P<0.05 was considered as statistically significant.

Results

In the present survey of 40 patients, the mean age of most of the subjects was 20-40 years (82.5%) [Figure- 1]

In the present survey of 40 patients, most of the patients had O +ve (37.5%) blood group, a smaller percentage had A-ve (2.5%) and O-ve (2.5%) blood groups. [Figure- 2]

High percentage of thick gingival biotype was found in the mean age of 20-40 years (45%).

Gender differentiation was seen as males (55%) had higher percentage of thick biotype as compared to females. X^2= 2.779; p= 0.249 which is non-significant [Table-1]

High percentage of thick gingival biotype was found in O +ve blood group (53.3%) while higher percentage of thin gingival biotype was found in A +ve blood group (80%) as compared to other blood groups, followed by B +ve and AB +ve blood groups with results showing 40% and 33.3% respectively. Since A-ve and O-ve blood groups are rare, the results obtained were not statistically significant. [19] X^2=6.061; p=0.3 which is non-significant. [Table-2]

Figure 1: Inter- Age & Gender Distribution

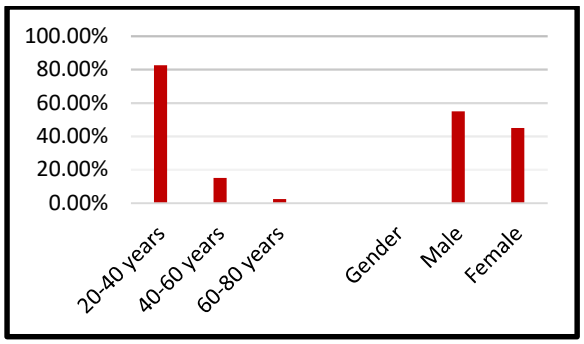

Figure 2: Distribution of Blood Groups

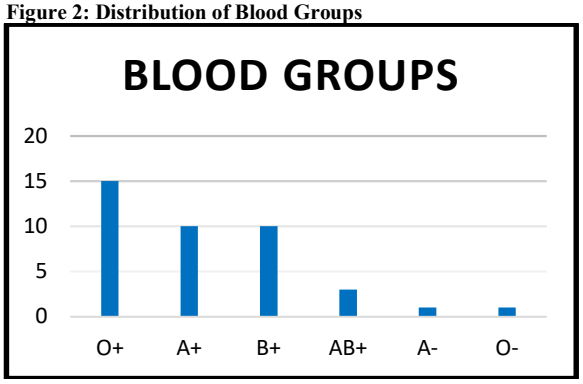

Table 1: Distribution of gingival biotype through both visual examination & transluency test

		Total
Thick	Count	18
	%	45.0%
Thin	Count	22
	%	55.0%
Total	Count	40
	%	100.0%

Table 2: Correlation of different groups with gingival biotype through both visual examination and translucency test

		Blood groups						
		O +ve	O -ve	A +ve	A -ve	B +ve	AB +ve	Total
Thick	Count	8	0	2	0	6	2	18
	%	53.3%	0.0%	20.0%	0.0%	60.0%	66.7%	45.0%
Thin	Count	7	1	8	1	4	1	22
	%	46.7%	100.0%	80.0%	100.0%	40.0%	33.3%	55.0%
Total	Count	15	1	10	1	10	3	40
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Discussion

The measurements of the various components of the masticatory mucosa, especially the gingival thickness, have become a subject of significant epidemiological and therapeutic interest in periodontics in recent years. [20] The bone and gingival tissue thickness directly affects osseous crest and soft tissue integrity. [21] Thick biotypes show greater dimensional stability during remodelling as opposed to thin biotypes. The

presence of lamina bone adjacent to the outer cortical plate in thick biotypes is expected to provide the basis for the metabolic reinforcement of the cortical bone and thus its integrity and sustainability. In thin biotypes, the cortical bone is susceptible to accelerated resorption, while the lamina bone is sparse or missing. [5]

From a clinical point of view, labial plate fracture during immediate implant placement and extraction are more commonly seen in thin gingival biotype. In case of thin biotype, it is seen that preservation of alveolar dimensions is critical for achieving optimal aesthetic results wherein, atraumatic extraction may be necessary. [21] Success rate of aesthetic reconstructive surgeries has been observed to be good when correlated with the other gingival morphologic entities or biotypes. [23]

For a thicker tissue biotype, there is an abundant blood flow that can enhance the revascularization of bone grafts, contributing to enhanced healing and integration of the graft. It is likely to obtain and sustain primary closure in these tissues. The adequacy of soft tissue coverage is one of the major attributes for promoting periodontal regeneration. [5] It can be stated that gingival tissue thickness at the site of surgery is one of the leading factors in determining the rate of prognosis of mucogingival defects treatment.[24] Thicker biotypes masks the titanium/metal margins and facilitates placing the implants at better angulation and position. P[25]

The objective of the present survey was to evaluate the prevalence of the different tissue biotypes in individuals with different blood groups taking the maxillary anteriors in specific. The method of assessment of gingival biotype was done through visual examination and translucency test.

In our study thicker biotype was observed around the age group of 20-40 years. Studies done by Rajashri Kolte et al, [26] Vandana et al [27] were in accordance with our results. When gender was taken into consideration male population had a thicker gingival biotype than the female subjects. Studies conducted by Muller HP et al, [28] Song JE et al [29] were in accordance with our results.

In this study, O +ve subjects had thicker gingival biotype (53.3%) and A +ve subjects had a thinner gingival biotype (80%). As to our best knowledge this was the first survey conducted to find an association between different blood groups and gingival biotype.

Conclusion

In the age of multidisciplinary dentistry, the clinical plan, treatment response and dental practice prognosis fluctuate between teeth and various biotypes depending on factual data. The present study is an attempt to understand the nature of gingival biotype based on different blood groups. This was a questionnaire-based survey by taking some clinical parameters into consideration. Although the results in the present study showed a non-significant association between different blood groups and gingival biotype as well as adequacy of attached gingiva, more studies in a larger population have to be performed to know the exact relation between blood groups with attached gingiva and gingival biotype.

Conflict of Interest: *None declared*
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