

Association between ABO Blood Groups and Dermatoglyphics with Periodontal Status among Individuals: A Pilot Study

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Abstract

Aim: The present study will be conducted to determine any correlation between periodontal diseases and ABO blood groups and dermatoglyphics pattern. **Material and Method:** Periodontal examination will consists of probing pocket depth, and clinical attachment level. Healthy participants displayed periodontal pocket depth and attachment loss <3 mm, and no clinical sign of gingivitis. The gingivitis patients displayed periodontal pocket depth >4 mm, no attachment loss with signs of gingivitis. Periodontitis patients exhibited at least one site with periodontal pocket depth more than 4 mm and attachment loss more than 3 mm. Thumb prints of each patient were recorded using ink pad method. They were then classified into different forms like arches, whorls and loops. **Result:** It was observed that there was no statistical significant association between periodontal status and blood groups. On statistical analysis significant association was found only between Left Thumbprints and periodontal status where patients with radial thumbprint were more prone to develop periodontal status. **Conclusion:** Within the limits of the study dermatoglyphics can be of potential diagnostic aid in determining genetic basis of periodontal diseases. However, further large scale qualitative and quantitative research will aid in proving the rightfulness of present study and investigate the biological plausibility to explain the association.

Keywords: ABO blood groups, Finger prints, periodontal disease

INTRODUCTION

Periodontal disease results in pathologic destruction of the periodontal tissues. It comprises a heterogeneous group of infectious diseases caused by the interaction of plaque bacteria and the host. Increasing evidence has shown genetic predisposition on causing diseases of the periodontium. Various studies have been conducted to establish a correlation between periodontal diseases and genetic predisposition.^[1]

A relative correlation of various phenotypes in blood groups and certain diseases has been studied, where it has been observed that individuals with blood Group A were prone to developing gall stones, tumors of salivary glands, diabetes mellitus, etc.^[2] Few studies have associated periodontal diseases with Rh factor.^[3,4] Several blood grouping systems have been identified so far, commonly used being ABO system. These systems are determined by the presence of different proteins present on the

surface of red blood cells (RBCs). The antigens of ABO system are not only found on RBC membrane but also in plasma.^[5] Some researchers claim that there is positive correlation between ABO blood group and periodontal diseases.^[6-8]

Dermatoglyphics is the art and science of patterns on pads of fingers. Every individual has a unique set of fingerprints, which are genetically determined, and hence remains constant for the entire life span.^[9] As mentioned above genetics play a major role in causing periodontal diseases with other environmental etiologies.^[10] Thus, it is remarkable to emphasize the role of genetic factors in patients with periodontal disease also. Based on this hypothesis, several studies have been conducted to

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deduce irregularities in dermatoglyphics patterns in varied disorders to establish a genetic basis.^[11]

Yilmaz *et al.*^[12] in their study tried to establish finger print pattern type that would aid in identification the patients with periodontal diseases. They concluded that with dermatoglyphics, clinician can anticipate health problems in children and initiate preventive and protective health measures early.

Individual studies have been carried out to find association between blood group and periodontal diseases and dermatoglyphics with that of periodontal disease. However, these studies have been conducted on different populations. Therefore, the aim of the present study was to determine the association between both ABO blood group and dermatoglyphics with periodontal status among individuals from central India.

MATERIALS AND METHOD

This study was conducted after obtaining ethical approval. All the participants were provided with a verbal explanation of the nature of the study and informed consent was obtained. The participants for the study were selected from patients reporting to the department of periodontics. The study comprised 102 adult participants, more than 18 years of age inclusive of both sexes and having at least 20 teeth excluding the third molars. The participants with a history of alcoholism, smoking, pregnancy, and those suffering from any systemic diseases were excluded from the study. Participants were divided into three groups: Group I (healthy participants), Group II (patients with gingivitis), and Group III (patients with periodontitis) based on the periodontal examination [Table 1].

Periodontal examination consisted of bleeding index, probing pocket depth, and clinical attachment loss. Healthy participants had no clinical signs of gingivitis. Gingivitis patients showed no loss of attachment but had gingival bleeding, change in color of the gingiva, gingival contour, and loss of stippling. Periodontitis patients exhibited at least one site with periodontal pocket depth >4 mm and attachment loss >3 mm [Figure 1]. During the investigations, blood groups of all the participants were recorded along with Rh factor by laboratory test. For the determination of dermatoglyphics, good quality thumbprints were recorded using the inkpad method. Thumbs were pressed on the stamp pad turn-by-turn and recorded on paper [Figure 2] and classified as arch, whorl, and loop [Figure 3]. The data collected were statistically analyzed.

Table 1: Patient characteristics	
Characteristics	Number of Individuals
Number of patients	102
Male:Female	4:13
Mean age (years)	27
Number of healthy participants	53
Number of participants with gingivitis	38
Number of participants with periodontitis	11

RESULTS

It was observed that among 53 healthy participants 12 were A +ve, 27,9,1,3 and 1 had B +ve, O +ve, O -ve, AB +ve, and AB -ve blood groups, respectively. It was observed that among 38 gingivitis patients, nine were A +ve, 1,11,13,1,3 had A -ve, B +ve, O +ve, O -ve, and AB +ve blood groups, respectively. In 11 patients with periodontitis two were A +ve, 1,1,6,1 had B +ve, B -ve, O +ve, and AB +ve blood groups. It was observed that there was no statistically significant association between periodontal status and blood groups [Table 2].



Figure 1: Periodontal pocket depth >4 mm



Figure 2: Thumbs recorded on paper



Figure 3: Classification of prints into loops and whorls

On examination of the right thumbprints, among 53 healthy participants observed, two had plain arch, 1, 31, 6, 10, and 3 had tented arch, ulnar loop, double loop, plain whorl, and central pocket loop prints, respectively. Out of 38 gingivitis patients observed, 19 had ulnar loop, 1, 9, 9 had double loop, plain whorl, and central pocket loop prints, respectively. No patients with gingivitis had a plain arch, tented arch print. In patients with periodontitis, one had plain arch, six, one, six had ulnar loop, plain whorl, and central pocket loop right thumbprints, respectively. No patients with periodontitis had double loop print [Table 3].

On examination of the left thumbprints, it was found that among healthy participants two had plain arch, 35, 5, 7, 4, had radial loop, double loop, plain whorl, and central pocket loop prints, respectively. Among gingivitis participants, one had plain arch, 21, 7, 4, 5, radial loop, double loop, plain whorl, and central pocket loop prints, respectively. In patients with periodontitis third had plain arch, four, one, third had radial loop, double loop, and had central pocket loop left thumbprints, respectively. No patient with periodontitis had plain whorl print [Table 4].

On statistical analysis, significant association was found only between left thumbprints and periodontal status where patients with radial thumbprint were more prone to develop periodontal status [Table 4].

DISCUSSION

The present study was conducted to find the association of periodontal status with ABO blood group and dermatoglyphics. According to Landsteiner, 4 blood groups have been defined depending on whether their RBC cell membrane contained antigens “A,” antigen “B,” neither A nor B (Group O) or both A and B (Group AB). Rhesus (Rh) factor system is another important blood grouping system.^[13] ABO and Rh systems have major clinical significance and they are determined by the nature of different proteins present on the surface of RBCs.

In the present study, group-wise comparison of ABO blood groups did not show any statistically significant difference among various periodontal status. The results are not in accordance with previous studies done by Pai *et al.*^[14] where they found higher percentage of blood Group A in periodontitis patients and higher percentage of blood Group O and B in gingivitis patients. This could be due to smaller sample size and different geographic distribution. No significant difference was found regarding the distribution of Rh factor among various groups, which is in agreement to the studies conducted by Demir *et al.* and Vivek *et al.*^[3,4]

There are few studies relating dermatoglyphics patterns to periodontitis. In a study by Vaidya *et al.* who studied the

Table 2: Relationship between periodontal status and blood groups

Period-ontal status	Total	A+ve	A-ve	B+ve	B-ve	O+ve	O-ve	AB+ve	AB-ve	χ^2	P
Healthy, n (%)	53 (100.0)	12 (52.1)	0 (0.0)	27 (45.76)	0 (0.0)	9 (32.14)	1 (50.0)	3 (42.85)	1 (100.0)	22.781	0.064
Gingivitis, n (%)	38 (100.0)	9 (39.1)	1 (100.0)	11 (28.20)	0 (0.0)	13 (46.42)	1 (50.0)	3 (42.85)	0 (0.0)		(N/S)
Period-ontitis, n (%)	11 (100.0)	2 (8.69)	0 (0.0)	1 (2.56)	1 (100.0)	6 (21.42)	0 (0.0)	1 (14.28)	0 (0.0)		
Total, n (%)	102 (100.0)	23 (100.0)	1 (100.0)	39 (100.0)	1 (100.0)	28 (100.0)	2 (100.0)	7 (100.0)	1 (100.0)		

+ve: Positive, -ve: Negative, N/S: Not significant

Table 3: Relationship between periodontal status and right thumbprints

Periodontal status	Total	Plain arch	Tented	Ulnar	Double	Plain whorl	Central pocket loop	χ^2	P
Healthy, n (%)	53 (100.0)	2 (66.66)	1 (100.0)	31 (55.35)	6 (85.71)	10 (50.0)	3 (20.0)	14.324	0.159
Gingivitis, n (%)	38 (100.0)	0 (0.0)	0 (0.0)	19 (33.92)	1 (14.28)	9 (45.0)	9 (60.0)		(N/S)
Periodontitis, n (%)	11 (100.0)	1 (33.33)	0 (0.0)	6 (10.79)	0 (0.0)	1 (10.0)	3 (20.0)		
Total, n (%)	102 (100.0)	3 (100.0)	1 (100.0)	56 (100.0)	7 (100.0)	20 (100.0)	15 (100.0)		

N/S: Not significant

Table 4: Relationship between periodontal status and left thumbprints

Periodontal status	Total	Plain arch	Radial	Double	Plain whorl	Central pocket loop	χ^2	P
Healthy, n (%)	53 (100.0)	2 (33.33)	35 (58.33)	5 (38.46)	7 (63.63)	4 (33.33)	17.255	0.028**
Gingivitis, n (%)	38 (100.0)	1 (16.66)	21 (35.0)	7 (53.84)	4 (36.36)	5 (41.66)		
Periodontitis, n (%)	11 (100.0)	3 (50.0)	4 (6.66)	1 (7.69)	0 (0.0)	3 (25)		
Total, n (%)	102 (100.0)	6 (100.0)	60 (100.0)	13 (100.0)	11 (100.0)	12 (100.0)		

**Significant result. P<0.05; significant

relationship between fingerprints and chronic periodontitis and concluded that a link exists between dermatoglyphics and anomalies of tooth and periodontium.^[15] In the present study, it was observed that there was statistically significant association between left thumbprint, comprising radial pattern and periodontitis. Not many studies were found that could be used compare the results of our study. Hence, there is further study required to analyze the genetics as the etiology of periodontal disease with larger sample size and different population to prove the hypothesis.^[16-20]

CONCLUSION

Within the limits of the study, dermatoglyphics can be of potential diagnostic aid in determining genetic basis of periodontal diseases. However, further large-scale qualitative and quantitative research will aid in proving the rightfulness of the present study and investigate the biological plausibility to explain the association.

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Conflicts of interest

There are no conflicts of interest.

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