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Research Article

Study of Lip Prints in Relation to Blood Groups for Human Identification

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Abstract

Introduction: Lip prints once formed on the vermilion border are permanent and unchangeable with age and are unique to a person. Lip prints can be observed in various crime scenes. Similarly, blood groups once established in an individual remains unchanged throughout the life. We carried out a study to know the relationship between lip print, blood groups and gender of the person.

Material and Method: For the study 160 subjects were taken among them 80 were male and 80 were female of age group 20 - 30 years. Lip prints were collected by using corporate invisible tape and analyzed by hand lens. Capillary blood was drawn by finger prick with a lancet and blood group was determined by slide agglutination method

Results: The most common type of lip print pattern was Type I' followed by type IV. The most common type of blood group was O^+ followed by B^+. The gender distribution in lip print pattern showed Type I and I' were common among females and Type IV and I' in males. Among blood groups B^+ followed by O^+ was common among females. Whereas, O^+ followed by A^+ was seen in males. Type IV lip pattern was had more individuals with group A+ve and O+ve blood group. Type I and I' with B+ve and O+ve.

Conclusion: Our sample size was small to determine the relationship of the lip pattern with blood group and gender. Studies in different populations with large sample sizes will allow a more definite picture of their relationship.

Keywords: *Lip Print Pattern; Blood Group; Cheiloscopy; Gender*

Introduction

Lip prints are normal lines, fissures in the form of wrinkles and grooves present in the zone of transition of human lip between the inner labial mucosa and outer skin [1,2]. The grooves or furrows once formed on human lips can exclusively identify each individual. The study of grooves covering till the vermillion border of the lips is known as cheiloscopy [3]. Lip prints are unique to every individual and do not change during the life of a person [3,4]. A lip print may be revealed as a surface with visible elements of lines representing the furrows [4].

Identification of a person is an integral part of forensic inquiry of an unknown deceased OR living individual, especially in case of mass disaster, missing person or identification of a criminal suspects [5]. In forensics, collecting and recording of lip prints of the suspect plays a very important role [6]. Even though the applicability of cheiloscopy in individual identification has been an area of extensive research, it has not gained sufficient acceptance among forensic experts [7]. Blood group is more specific to an individual and associating the lip print patterns with blood groups may be useful in forensic science for more accurate identification of an individual than with the use of lip prints alone [5]. Also, it would be interesting to know the correlation of gender with lip patterns. Hence, this study was conducted to determine the lip print pattern and blood groups among the study subjects and assess the gender differences in lip print patterns and various blood groups.

Materials and Methods

This study was carried out at a tertiary health care setting from July 2018-19. Healthy adults with 20 - 30 of age and those who gave their consent were included in the study. Subjects undergoing orthodontic treatment were excluded from the study. the individuals with bleeding disorders, congenital lip abnormalities, inflammation, trauma and hypersensitivity to lipsticks were excluded from the study as well.

All participants were approached serially and those who agreed to take part and those fitting into our eligibility criteria were included in our study. Patients were included serially by convenience sampling till the desired sample of 180 subjects was achieved. Informed consent was taken from each individual before collecting the lip print.

Materials required

Gloves, white bond paper, cellophane tape, scissors and Lakme lipstick, blood slide, anti-sera -A, B and D, magnifying glass, lancet to prick the finger and cotton roll.

Methodology

Lipstick was applied to the subject's lips in a single stroke. The glued portion of the cellophane tape was used to obtain impression of the lips with gentle pressure. This record was immediately transferred onto the paper by sticking the cellophane tape for permanent record. Lip prints was divided into 6 parts and middle part of the lower lip was considered for the study. Lip prints were studied based on classification given by Suzuki and Tsuchihashi (1971) classification.

Suzuki and Tsuchihashi	
Type I	Clear cut vertical grooves that run across the entire lip.
Type I'	Vertical grooves that don't cross the entire lip.
Type II	Branched grooves.
Type III	Intersected grooves.
Type IV	Reticular grooves.
Type V	Groove that cannot be morphologically differentiated.

Table

Blood group was tested. A drop of blood of each study subject was mixed with anti-A, anti-B and anti-Rh sera on the slide. A positive reaction with anti-A, anti-B, both anti-A and anti-B are considered as blood group A, B, AB, respectively. The absence of reaction with both anti-A and anti-B is considered as blood group O. Similarly, positive agglutination reaction with Rh antigen is considered as Rh +ve and the absence of reaction with Rh antigen is considered as Rh –ve.

Statistical analysis

The data was collected and tabulated and pattern of lip prints were correlated with the blood group and gender. Bar diagram was used to describe the pattern of distribution of subjects.

Results

A total of 160 individuals were included in our study. The most common type of lip print pattern was Type I' followed by type IV (Figure 1). The most common type of blood group was O^+ followed by B^+ (Figure 2). The gender distribution in lip print pattern showed, Type I and I' were common among females and Type IV and I' was seen in males (Figure 3). When the gender distribution in blood group pattern was studied, B^+ followed by O^+ was common among females. Whereas, O^+ followed by A^+ was seen in males (Figure 4). Type IV lip pattern was had more individuals with group A+ve and O+ve blood group. Type I and I' with B+ve and O+ve (Table 1). Distribution of lip patterns among various gender and blood groups was shown in table 2.

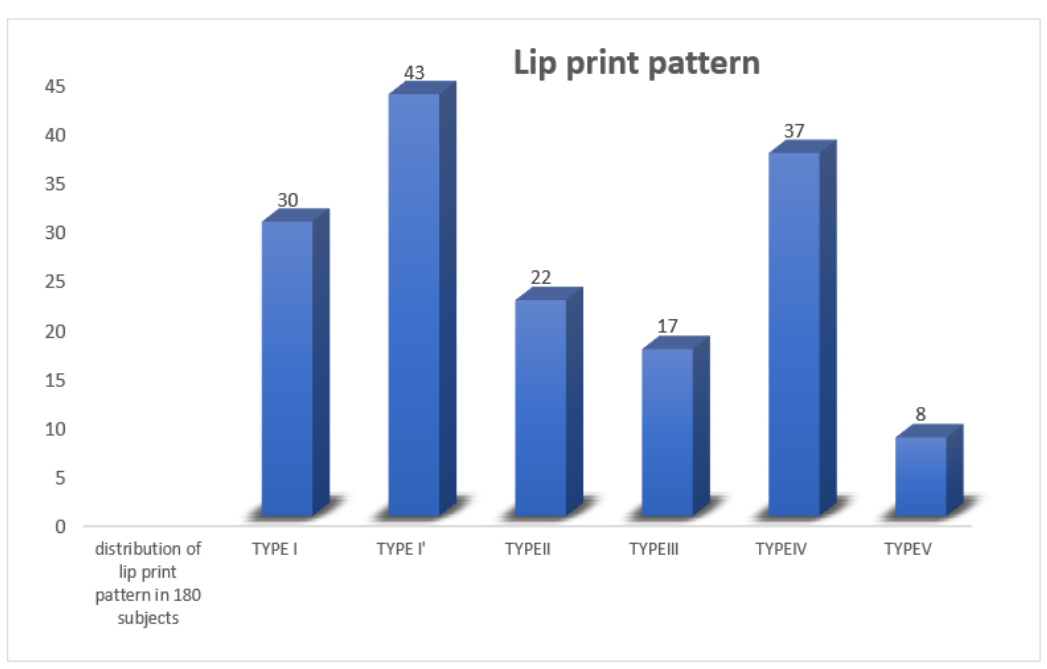

Figure 1: *Distribution of lip print pattern in total 160 subjects.*

Discussion

Cheiloscopy is a simple and inexpensive technique, which can be used as an additional tool in forensic investigations [8]. Cheiloscopy is applicable mostly in identifying the living, since lip prints are usually left at crime scenes, and can provide a direct link to the suspect [9]. The possible identification of living or deceased persons using the unique traits and characteristics are the corner stone's of forensic science [10]. Lip prints can be effectively used for personal identification [11]. Hence, the present study was conducted to assess the relationship of lip print with gender and ABO blood group.

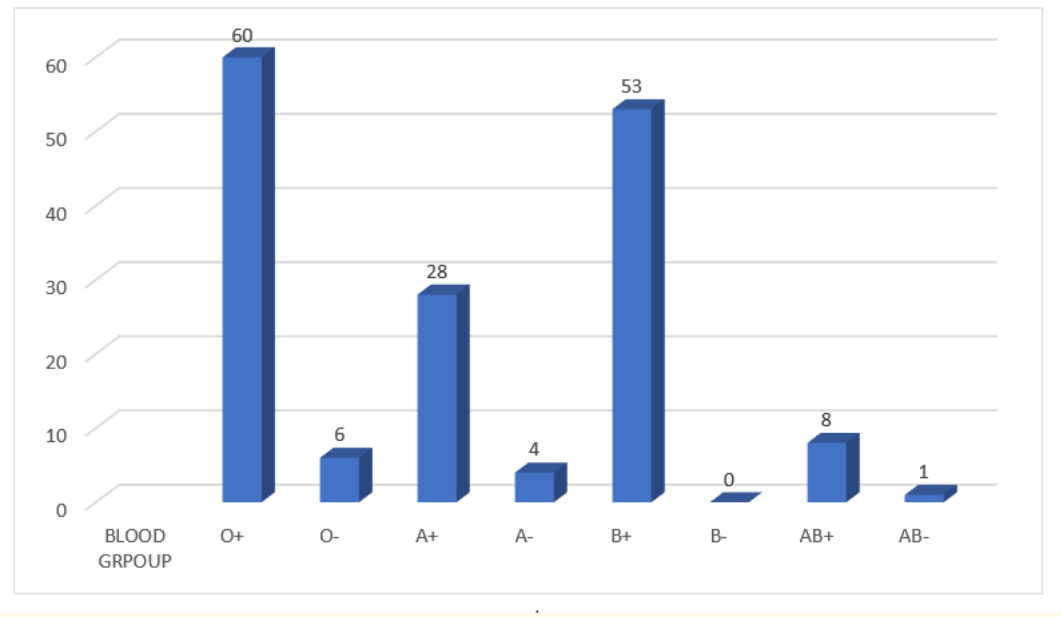

Figure 2: *Distribution of blood groups in 160 subjects.*

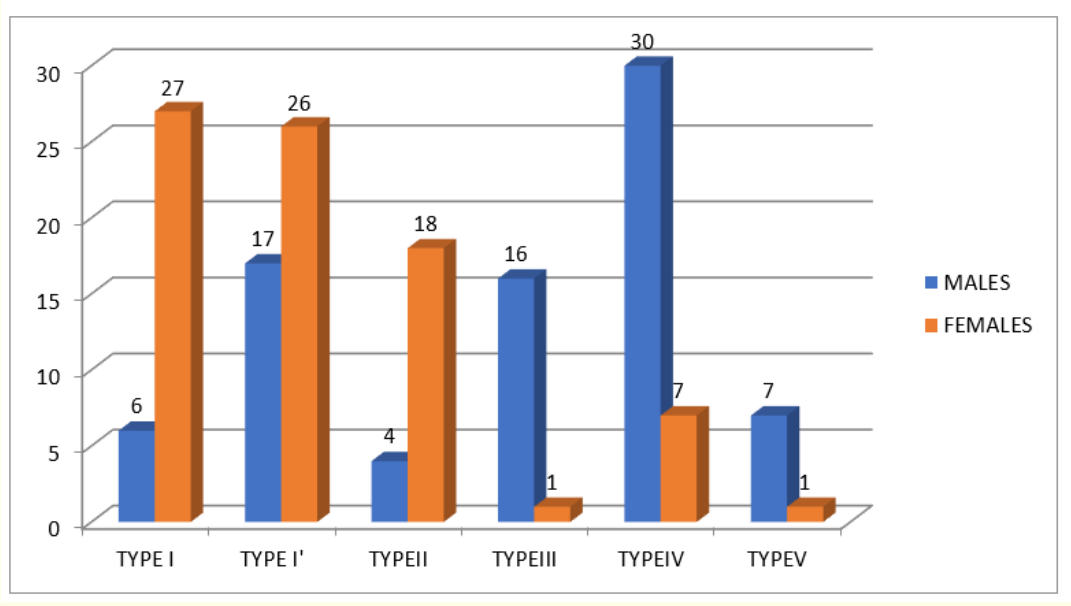

Figure 3: *Distribution of lip print pattern in males and females.*

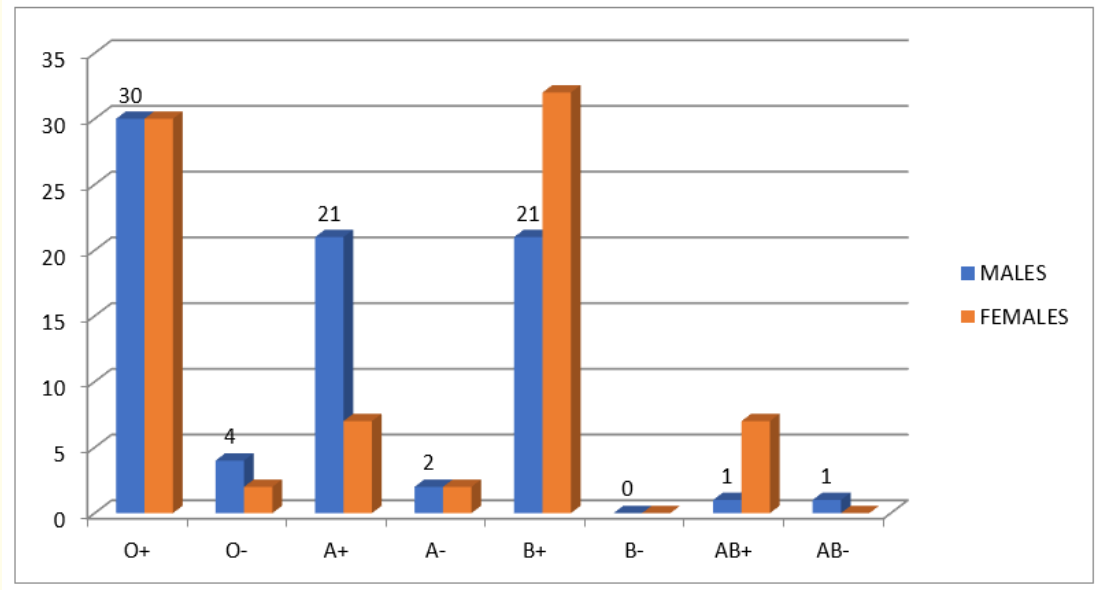

Figure 4: *Distribution of blood groups in male and female subjects.*

	O^+	O^-	A^+	A^-	B^+	B^-	AB^+	AB^-	Total
Type I	15	0	1	1	13	0	2	0	32
Type I'	13	2	6	3	18	0	2	0	44
Type II	10	1	2	0	6	0	2	1	22
Type III	9	1	4	0	3	0	0	0	17
Type IV	11	2	14	0	9	0	1	0	37
Type V	2	0	1	0	4	0	1	0	8
Total	60	6	28	4	53	0	8	1	160

Table 1*: Distribution of lip patterns among various blood groups.*

Blood groups	O^+		O^-		A^+		A^-		B^+		B^-		AB^+		AB^-		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Total
Type I	3	12	0	0	1	0	0	1	2	11	0	0	0	2	0	0	32
Type I'	6	7	2	0	2	4	2	1	5	13	0	0	0	2	0	0	44
Type II	0	10	0	1	2	0	0	0	1	5	0	0	0	2	1	0	22
Type III	9	0	1	0	3	1	0	0	3	0	0	0	0	0	0	0	17
Type IV	10	1	1	1	12	2	0	0	7	2	0	0	0	1	0	0	37
Type V	2	0	0	0	1	0	0	0	3	1	0	0	1	0	0	0	8
Total	30	30	4	2	21	7	2	2	21	32	0	0	1	7	1	0	160

Table 2: *Distribution of lip patterns among various gender and blood groups.*

In the present study, the predominant lip print pattern in general was I' followed by IV, I and II. The least common was type V and III. In the study by Verma P., *et al*. [12] the predominant patterns were II > III > I > I' > IV > V and in the study by Telagi N., *et al*. [13] II > III > IV > I > V whereas Sharma P., *et al*. [9] determined the common patters to be I > V > IV > II > I' > III. None of the study findings were similar.

In the present study the predominant lip print pattern in Females was I, I' and II and in Males IV and I' and III. Sharma P., *et al*. [9] determine in females I, I' and II was more common and in Males III, IV and V. Malik R., *et al*. [10] determined the predominant female pattern to be I, I' and II Males having III, IV and V patterns. These finding were similar to ours, except the patten I' was not common in the other studies.

The most common blood groups in our study was $O^+ > B^+ > A^+ > AB^+ > O^- > A^- > AB^- > B^-$. This was in accordance to the study by NS., *et al*. [14] and Basheer S., *et al*. [7] it is a known fact that O^+, B^+ and A^+ are the most common pattern of blood groups in the world [15].

In our study Type I, I' II and V with O^+ and B^+ and Type III and IV with O^+ and A^+. No other lip patterns were observed in this study. Shree R [16] found that Type IV lip pattern were predominant in A+ve blood group, Type II in O+ve and B+ve blood group individuals. Equal predominance of Type IV, Type II and Type I was found in AB+ve blood group individuals. Verma P., *et al*. [12] in their study determined Type I, I', II and III were more among B+ve group. Only Type IV lip pattern was equal, among A+ve, O+ve. SR A., *et al*. [8] found subjects with A+ve and O+ve blood groups had Type II lip print, in predominance and subjects, with B+ve, AB+ve and O+ve blood group, had Type IV in predominance. N S., *et al*. [14] observed that, Type I were predominant in O+ve group; Type IV and Type I equally predominant in B+ve group. Whereas, A+ve group individuals had Type IV predominant pattern. Our study did not show any correlation. No gender or ABO patten was observed in our study.

In our study different population showed different lip print pattern predominance, with no correlation in ABO blood groups. Gender differences were also not observed. Chelioscopy has to be carried out in depth on larger samples and in different populations of the world.

Limitation and Conclusion

This study had certain limitations. Firstly, our study used convenience sampling technique from a single centre. Secondly, the lip print pattern may differ in different race and ethnicity. Our study included single ethnic group over a minor geographical area. Lastly, there were under representation of rh negative blood groups in our study, to draw a conclusion.

Despite these limitations, our study adds to the existing literature about a particular lip print pattern and comparison with other literature shows that there is need for conducting more research in the area. Our study provides a reference line for future studies in cheiloscopy. Further work on the larger sample size among wide race and ethnicity and gender can help to make cheiloscopy a practical reality for forensic identification. To determine the relationship of lip print pattern with ABO blood group, future studies must include all the blood groups.

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