

A STUDY ON LIP PRINT PATTERN, ABO BLOOD GROUP AND THEIR CORRELATION IN THE POPULATION OF WESTERN UP BELTNisha Kaul¹, Vipin Kaul²**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: Lip print pattern and blood group of the blood sample taken from the scene of crime constitute very important supplementary aids in crime detection. The study of lip print pattern (Chieloscopy) is based on the arrangement of ridges and grooves on the vermillion zones of lips. There are six types of lip print patterns –type-I, type-II, type-III, type-IV, type-V, type-Y. Similarly there are two main types of blood groups in humans –ABO, & RH types. There are strong evidences of predominance of a particular lip print pattern and blood group in females & males respectively. These findings are of great importance in personal identification and juris prudence. There are also evidences of correlations between lip print pattern and ABO, RH blood groups, being governed by genes. **AIM:** The present study was undertaken to establish the prevalence of lip print pattern & Blood groups in male and female subjects separately & as combined group of a particular area, and to find any correlation between lip prints and blood groups of the said subjects. **SETTING & DESIGNS:** The study was carried out on the local residents of Pratap Vihar, Vijay Nagar, Ghaziabad (Western UP belt). **MATERIAL & METHODS:** Our study consisted of 100 female and 100 male subjects, between the age group of 20 to 30 years from whom proper written consent was taken and aims along with clinical applications of the study were explained thoroughly. **RESULTS:** The predominant lip print pattern observed both in females & male was type I followed by type Y. The predominant blood group seen In females was B⁺ followed by A⁺, followed by O⁺, where as in males the pattern noted was B⁺ followed by O⁺ followed by A⁺. In the Combined Study, the most predominant lip print pattern was type-I followed by type-Y. Predominant blood group-B⁺ followed by O⁺ and A⁺. Correlation-type-I followed by type Y lip print pattern was seen in all A⁺,B⁺,O⁺ blood grouped subjects. **CONCLUSION:** Our study shows a definite preponderance and a pattern of lip prints and blood group in females, males separately and as a combined group; in addition it also points to a definite correlation between lip print pattern & ABO blood group amongst the subjects of western UP belt but the results are not statistically significant.

KEYWORDS: Lip print pattern, Blood groups, Correlation, Gender and personal identification, criminology.

INTRODUCTION: The identification of an individual, whether alive or dead by using various traits at gross or molecular level is the basic essence of criminology. Although finger print analysis, post mortem report, DNA testing etc. are the methods most commonly used as identification tools;^(1,2) yet some supplementary aids like lip prints, palatal rogue pattern, bite marks, ABO & RH blood grouping of blood stains obtained from the site of crime, deserve equal importance for accurate identification at certain scenarios.^(1,3)

The identification of a person is not only important from the point of view of crime, but also as a pre-requisite for personal, social & legal reasons.⁽⁴⁾

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With the awareness of crime detection by using finger prints, the criminals have become wise enough to use gloves to conceal the evidence.⁽⁴⁾ Under such circumstances, lip print & blood group study proves to be a good and easily available alternative as supportive evidence.^(1,4)

A possible use of lip prints in the identification of an individual was mentioned by Synder in his book homicide investigation as early as 1950.⁽⁵⁾

Cheiloscopy-a Greek word refers to the study of lip prints based on characteristic arrangement of the lines appearing on the red part of lips (Vermillion zone).⁽⁶⁾ Fischer an anthropologist in 1902 was the first to describe furrows on red part of human lips.⁽⁷⁾ The wrinkles & grooves on the vermilion zone of lips have been given the names as Sulci Labiorum.⁽³⁾ The lip prints thus produced were named as FIGURA LINEARUM LABORIUM RUBORUM by Suzuki & Tsuchiashi.⁽⁸⁾

The lip prints are similar to finger prints. The grooves or creases and reddish raised areas outlined by creases appearing light & dark areas respectively in the lip prints are analogous to furrows & ridges of skin.⁽⁹⁾

The secretion of labial glands keeps lips moist & enables formation of lip prints. Evidences such as photographs, cigarette's, drinking glasses, cups, letters, clothing or even biological material such as skin may bear latent, visible or both types of lip prints.⁽⁹⁾

The studies on lip prints have been carried by many scientists. Santos in 1967⁽¹⁰⁾ was first to classify lip print pattern as:

- 1) Straight line. 2) Curved line. 3) Angled line. 4) Sine shaped line.

The classical classification of lip print pattern set by Suzuki & Tsuchihashi⁽¹¹⁾ is most widely used. According to this classification, the lip print pattern is divided as:

Type I: Clear cut vertical grooves that run across the entire lip.

Type I': Similar to type-I but do not cover the entire lip.

Type II: Branched grooves.

Type III: Intersecting grooves.

Type IV: Reticular grooves.

Type V: Grooves that do not fall in any of the pattern.

A Modified Classification Given by Vats et al⁽¹²⁾ Describes the Lip Prints as:

- | | |
|---|-----------------------------|
| I) Long vertical grooves. | I') Short vertical grooves. |
| II) Branched grooves. | II) Diamond shaped grooves. |
| IV) Rectangular grooves. | V) Unknown pattern. |
| Y) Blend of two or more than two patterns | |

Regarding the studies on blood group, the human population shows two main types of blood groups 1) ABO group 2) RH type.

ABO Group: It is further divided into four types-A, B, AB, O depending upon the presence or absence of A&B agglutinin. Group A shows presence of agglutinin A, group B shows agglutinin B, group AB shows presence of both AB agglutinin and group O shows absence of all agglutinin.⁽¹³⁾

RH Type: A person with antigen-D in the blood is said to be Rh positive & absence of antigen D means RH negative.⁽¹⁴⁾ Extensive studies on the pattern of blood group in Indian population reveals B+ to be the most common blood group followed by O+,A+, AB+.^(15,16) This is opposite to the findings of N

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Srilekha,⁽¹⁾ which showed O⁺ to be most common blood group followed by B⁺. A definite correlation has been found between lip print patterns and blood groups.^(1,14)

AIMS AND OBJECTS: The present study was undertaken in the subjects of western UP belt with an aim:

1. To establish the highest prevalence of any particular lip print pattern in males and females separately and as a combined group for statistical purpose and utilisation of this finding as a crime detection tool.
2. To find the highest prevalence of any particular blood group in the above mentioned population for the same mentioned purposes.
3. To correlate any particular lip print pattern with any particular blood group. This would help in:
 - Understanding the genetic relation between lip print pattern and blood group.
 - Criminology.

MATERIAL AND METHODS: Our present study was conducted on the local population of an area called Pratap Vihar, Vijay Nagar Ghaziabad (U. P.). The study was carried out on 200 subjects in the age group of 20 to 30 years, having 100 females and 100 males. Any subject with malformation, deformity, inflammation or scar of lips was excluded. A written consent for wilful participation in the study was taken from all the subjects and the clinical application of this study in crime detection & personal identification was also explained to everyone.

Study Material: For Talking Lip Prints: Lipstick of bright red colour and non-glossy from brand Lakme,, transparent cellophane tape of broad width, glued on one side, scissors, white bond paper, magnifying glass, cotton swabs, pears soap, a soft towel, cleansing milk and Nikon digital16MP camera.

For Recording the Blood Group: Glass slides, anti-A serum& anti-B serum, Rh antigen serum, lancets, spirit swabs.

METHODS: For Lip Prints: With soap &water, the lips were cleaned thoroughly and dried with a soft towel.

Method of Taking Lip Prints for Female Subjects: The lipstick was applied uniformly, starting at the middle of lips &moving laterally. The subject was asked to roll both lips inwards on each other to ensure an even spread of lipstick. The colour applied was allowed to dry for about 2 minutes. A strip of cellophane, 10cm long was cut with scissors. Keeping the oral fissure closed in normal resting position, the glued portion of cellophane tape was placed on the closed lips. It was held in place by dabbing in the center first and then pressing it comfortably towards the corners of the lips. The tape was carefully lifted from the lips, avoiding any smudging. This strip was then stuck to a white bond paper for a permanent record. The colour of the lipstick was cleaned from lips with cotton swab dabbed in cleansing milk.

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The print was subsequently visualized with the use of a magnifying lens. The number of lines and furrows present, their length branching pattern and combinations were noted. The lip prints obtained, were coded while noting the name & sex of the individuals.⁽¹⁷⁾

Method of Taking Lip Prints for Male Subjects: The male subjects were uncomfortable with the idea of using lipstick. Hence lip prints were recorded by direct photography of lips taking a close up picture of the lips with a Nikon digital 16 MP camera as advocated by SAAD W M et al.⁽¹⁸⁾ For classification of the lip pattern, the middle part of lower lip (10mm wide) was taken as study area because this fragment is always visible in any trace and this is the part most frequently found at a crime scene. The prints thus taken were studied & classified as per the pattern set by Tsuchihashi Y.⁽¹⁹⁾

For Taking Blood Groups: The subject was asked to wash hands & dry them. The pulp of middle finger was cleaned with a spirit swab. With the help of a lancet, a prick was given on the pulp of the finger, a blood drop taken and put on a glass slide. It was treated with anti A & anti B sera. A positive agglutination with anti A serum shows 'A' blood group; with anti B serum 'B' group; agglutination with both sera - 'AB' blood group and no agglutination with any sera - 'O' group. Agglutination with Rh antigen is 'Rh positive' and absence of agglutination is 'Rh negative'.⁽¹³⁾

RESULTS: Our Present Study Showed the Following Findings:

1. The predominant lip print patterns found both in females and males: Type I followed by Type Y. Ref. (table 1, 2) (figure A, B).
2. The predominant blood group found in females from higher% to lower % was: B+ followed by A+ followed by O+. In the males, the pattern found was B+ followed by O+ followed by A+. (Ref. table 1,2).

3. **Correlation between Lip Print Pattern and Blood Group:**

Females: Type I followed by type Y pattern predominant in all A+, B+, O+ blood grouped subjects. (Ref. table 1)

Males: Type I followed by type II pattern in blood group A+ subjects; type I followed by types II, IV, Y in blood group O+ subjects; Type Y followed by type I in blood group B+ males. (Ref. table 2).

4. **A Combined Study on both Female & Male Subjects:**

The most predominant lip print pattern observed was type I followed by type Y. (Ref. table 3).

The predominant blood group observed from higher% to lower% was B+ followed by O+ followed by A+. (Ref. Table 3).

Correlation between lip print pattern & blood group: type I followed by type Y pattern seen in all positive blood grouped i.e. A+, B+, O+ subjects. (Ref. Table 3).

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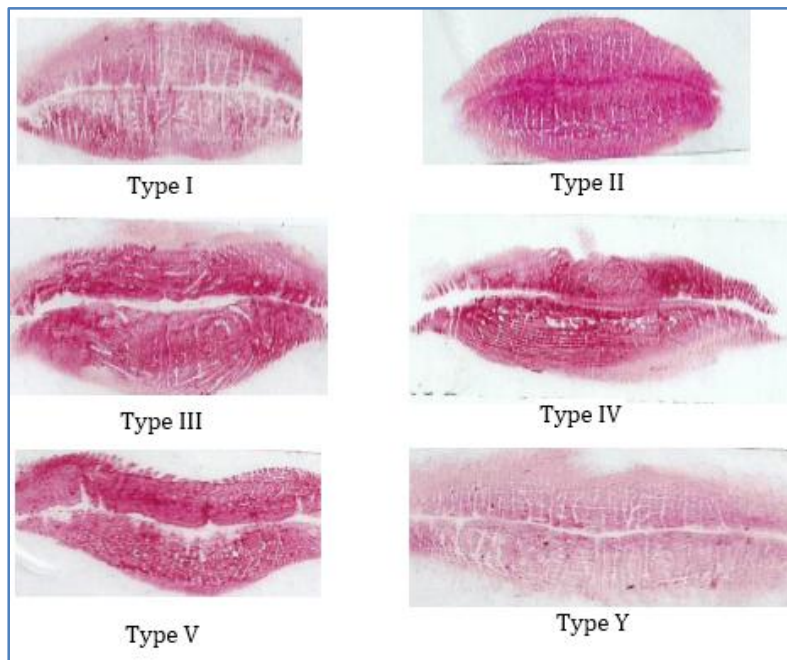


Figure A: Pictures of Female lip print pattern

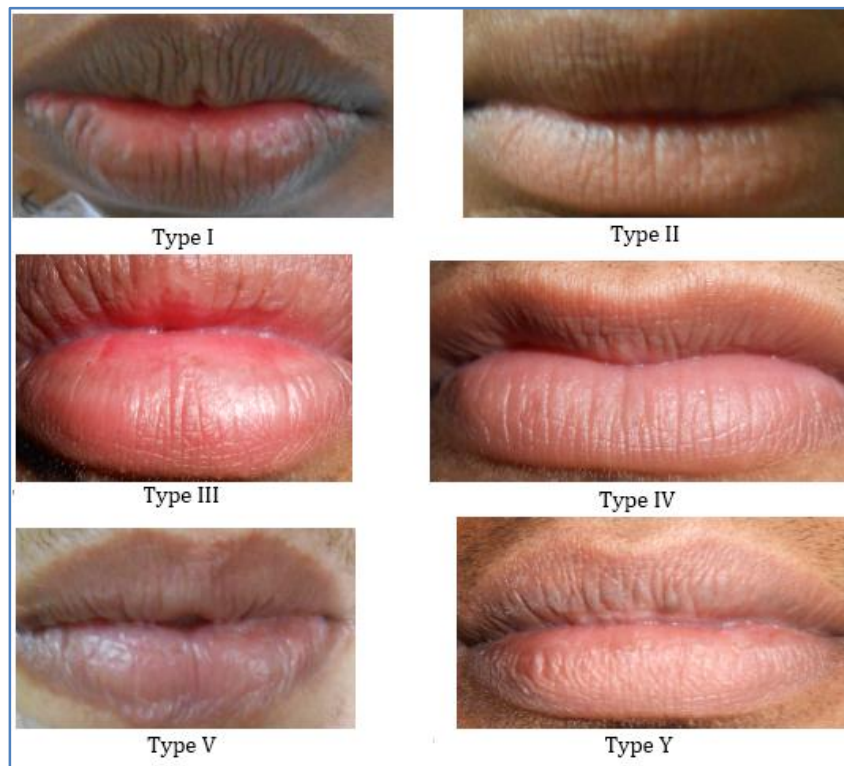


Figure B: Pictures of Male lip print pattern

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FEMALES									
Lip Print Pattern	Blood Group								Total
	A+	B+	O+	AB+	A-	B-	O-	AB-	
I	12	18	7	2	0	2	1	0	42
II	2	5	0	0	0	1	0	0	8
III	1	2	0	0	0	0	0	0	3
IV	3	2	6	0	0	0	0	0	11
V	3	5	5	0	0	1	0	0	14
Y	5	9	6	0	0	0	2	0	22
Total	26	41	24	2	0	4	3	0	100

Table 1

Showing distribution of lip print pattern, blood groups and their correlation in female population.

MALES									
Lip print pattern	Blood Group								Total
	A+	B+	O+	AB+	A-	B-	O-	AB-	
I	9	8	9	1	0	0	2	1	30
II	4	5	4	2	0	1	0	0	16
III	1	6	2	1	0	0	0	0	10
IV	3	7	4	0	0	1	0	0	15
V	1	2	2	0	0	0	0	0	5
Y	3	13	4	2	2	0	0	0	24
Total	21	41	25	6	2	2	2	1	100

Table 2

Showing distribution of lip print pattern, blood groups and their correlation in male population.

Combined (Males & Females)									
Lip print pattern	Blood Group								Total
	A+	B+	O+	AB+	A-	B-	O-	AB-	
I	21	26	16	3	0	2	3	1	72
II	6	10	4	2	0	2	0	0	24
III	2	8	2	1	0	0	0	0	13
IV	6	9	10	0	0	1	0	0	26
V	4	7	7	0	0	1	0	0	19
Y	8	22	10	2	2	0	2	0	46
Total	47	82	49	8	2	6	5	1	200

Table 3

Showing distribution of lip print pattern, blood groups and their correlation in combined group (male & female).

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DISCUSSION: The lip prints are genetically determined and are transmitted as recessive gene phenotype by the same major recessive gene which is primarily responsible for genetic predisposition to cleft lip & palate.⁽¹⁸⁾ The lip prints are unique and do not change during the life of a person.⁽²⁰⁾ However, any major trauma to the lips may lead to scarring & pathosis. A surgical treatment rendered to correct the pathosis may affect the size, shape of the lips, thereby altering the pattern and morphology of the grooves.⁽²¹⁾ A variation in lip print pattern among males & females could also help in sex determination.⁽²²⁾ Lipstick smears can lead to an indirect proof of a relationship or contact between victim and a suspect or a suspect and a crime scene.⁽²³⁾

The use of lip prints as a means of personal identification and crime detection device was recommended for the first time in 1932 by Edmond Locard.⁽²⁴⁾

A detailed study on the measurement of lips, use and colour of elevation, method of mapping the pattern and its subsequent use in forensic application was given by Suzuki in 1967.^(25,24) It was Suzuki & Tsuchihashi(1970) who gave a proper classification of lip prints.⁽¹¹⁾

Various studies showing predominance of a particular lip print pattern in male & females; in people of different castes; and different regions of India & abroad, have proved that gender and regional differences do occur. A study on lip prints of Japanese population by Suzuki & Tsuchihashi 1971 found type III to be most predominant lip print in both sexes.⁽²⁶⁾ A similar observation on indo dravidian population was made by Sivapathasundaram in 2001.⁽²⁰⁾ According to the study by Sonal-Nayak on the subjects living in Mumbai, type I & I' was dominant in females whereas type III & type IV pattern was dominant in males.⁽²⁷⁾ Preeti Sharma in her studies on medical students of Meerut (UP) noticed a similar pattern in females, but males revealed type IV pattern only.⁽²⁾

According to a study conducted on the people of rural & urban population of Aurangabad (Maharashtra), type III pattern was observed in both sexes.⁽²⁸⁾ A study on the lip pattern in Karnataka proposed type IV to be prominent in both males and females.⁽²⁹⁾ Nethu Telagi et al⁽¹⁴⁾ in his study on the subjects of the same state, gave an opposite result of type II being predominant in both sexes.

A study in Udaipur(Rajasthan)population by shilpa Patel et al⁽³⁰⁾ revealed type II and type I to be dominant in females & males respectively, whereas Manas Bajpai et al⁽³¹⁾ found type I and type III dominant in females & males respectively in Jaipur population.

Vats Y et al (2012) from dept. of anthropology Delhi University conducted lip print studies in both sexes of Brahmins, jats and schedule casts. The results revealed Y pattern to be most dominant in females of all caste, whereas Brahmin males showed Y pattern & males of other two castes III pattern.⁽¹²⁾

Verma P et al⁽³²⁾ in their study in the subjects of Sriganganagar Rajasthan found type II followed by type III to be predominating in both males & females. A study on the mixed population of keralite subjects & Manipuri subjects respectively by Koneru A et al revealed type I & I' pattern to be predominant in females of both states whereas type IV & V pattern were predominant in males of both states.⁽³³⁾

A very recent study conducted on the subjects of Eluru (AP) India by Srilrkha N et al⁽¹⁾ found type I as dominant lip pattern in females & type I & type IV to be dominant lip print in males. A random study by Ashwanirani SR et al⁽³⁴⁾ on subjects of Kerala & Maharashtra noticed type IV in former and type II in the latter areas.

Some studies on the correlation of lip print type & blood group in both genders reveal preferences of lip print pattern with a particular blood group, but all these studies at the end have not found statistically any significant correlation. Shilpa Patel et al on Mumbai subjects found type II

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pattern more predominant in A+ & O+ blood groups; whereas type I pattern being predominant in B+ blood group in male & female population individually as well as in combined group.⁽²⁹⁾

Nethu et al⁽¹⁴⁾ in Karnataka subjects, found a correlation of type II with A+ & B+ group & type III with O+ blood group. Verma P et al⁽³²⁾ found type IV lip print to be associated with A+, O+ groups and type I & type I' with B+ blood group respectively in random subjects from Rajasthan. Srilekha N⁽¹⁾ correlated only type I with O+ and type IV with B+ blood group in random study of Andhra Pradesh subjects. Ashwanirani SR et al⁽³⁴⁾ in their study on Maharashtrian subjects found type II pattern predominant in A+ & O-blood grouped people. Type IV was seen predominant in subjects having B+, AB+ & O+ blood groups.

CONCLUSION: Lip prints are unique for every person and show differences according to race & ethnic origin. No two lip prints match each other. Parameters like lip print pattern and blood groups play an important role in forensic identification. A positive correlation between lip print pattern and blood group has been found by a number of authors, though statistically no significant results were noted. Our present study also showed a strong correlation between lip print pattern and blood groups in females, males and a combined random population of males and females respectively. The pattern of correlation of lip print to blood group in our study was different from the observations made by various authors though at some instances some similarity was noted. Although correlation was noted in our study, yet the results were not statistically significant. Therefore a large sample size is required to find positive statistical evidence. Hence these combinations are not to be relied upon solely for individual identification but can be utilized as circumstantial evidences in crime where there are a few evidences.

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