

Cheiloscopy: An Aid to Personal Identification in India.

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ABSTRACT

Background: As said "Identification is an individual's birth right". Identification of the individual is based on certain characteristics, which is unique to that individual. Cheiloscopy is the examination of lip prints, the lip prints are permanent and fixed, like fingerprint and palatal rugae, hence it can be used in personal identification. Aim: This study is undertaken to evaluate the uniqueness of lip print for personal identification. **Methods:** The study was carried out on 400 subjects (200 male and 200 female) among the population of India. Lipstick was applied on the lips and print was taken on bond paper, the prints were divided into four quadrants and were analyzed by using magnifying lens and Suzuki and Tsuchihashi classification were used to identify the most common type of pattern among Indians for personal identification. **Results:** Our study shows that the most common type of pattern in Indian race was TYPE III (39%) and in all the quadrants (I, II, III, IV) most dominant pattern was type III in males and type II in females. **Conclusion:** The present study reveals that, there was no similarity in the lip print pattern of one individual with that of the other individual. The lip print pattern varies between the same age group people as well as among the population of same region.

Keywords: Cheiloscopy, Lip print, Lip stick.

INTRODUCTION

As said "Identification is an individual's birth right". Identification of the individual is based on certain characteristics which is unique to that individual. Fixation of the individuality of a person is an important aspect like DNA fingerprinting and Dactylography.^[1]

Cheiloscopy is a Greek word derived from, 'cheilos' means lips, 'skopein' means to see^[2], so the cheiloscopy is the examination of lip prints. Lip print of human being are the normal elevated line and fissures, which is present between the area of outer skin and inner labial mucosa in the form of wrinkle and groove.^[3]

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The lip print pattern of human being can be recognized as early as the sixth week of intra uterine life.^[4] From that time, the lip prints pattern shows minimal variation. The lip prints are permanent and fixed, like fingerprint and palatal rugae.^[5] There are certain pathological condition that damage the lip subtract like burns, which can

affect the cheiloscopic study.^[4] The most important significance of cheiloscopy is to established the link to the fact that lip print are unique to each person, excluding monozygotic twins.^[5,6]

The lip prints is an important anatomical character of human lip.^[7] The cheiloscopic technique have an equal weight age to be used as tool or evidence in forensic field like for personal identification and sex determination.^[8] In earlier days one of the challenge faced by man was to established the identity. Identity of a person is a concept, which represent the group of certain characteristics of the person including the physical character of the person, the mental status, functional character, either the person is normal or have any pathological condition, representing the individuality of a person. Now a days, it is very important to identify the identity of a person for social as well as legal reasons.^[9]

In the past century the fingerprints was the only method of identification. It was introduced by three distinguished person namely William Herschel and Francis Galton as well as Edward Henry. They does significant work in this field. In India the fingerprint system for human identification was first used by William Hersche in 1858.^[10] The fingerprint patterns are unique and permanent of each individual and hence considered as an important tool for human identification. In many

cases, the criminal come in contact with some material and fingerprint of that person is left behind on the material, which is used as a evidence. Due to the awareness of this technique for the investigation of crime, the criminal has altered their method and take precautions before the crime process like use of gloves. In such type of cases the criminal identification by the use of fingerprint fail to find out positive result. In such circumstances the investigator can use cheiloscapy as supplemented tool for crime investigation.^[11]

Classification of Lip Prints:-

The classifications are very useful to divide the lip prints into different category and limited the range for any investigating process. An organized database can also made for retrieving information with the help of classification. It is also used for comparison.^[12] There are various scientist who had given classification and these are as follows:-

- [1] Marty'n Santos classification
- [2] Suzuki and Tsuchihashi classification
- [3] Renaude classification
- [4] Afchar-Bayat lip prints classification
- [5] Jose Maria Dominguez classification
- [6] Individual features of line pattern on red part of lips

Suzuki and Tsuchihashi classification:-This is most accepted and widely used classification for sex determination and identification of the person.^[2]

Classification	Groove Type
Type I	Complete vertical
Type I'	Incomplete vertical
Type II	Branched
Type III	Intersected
Type IV	Reticular pattern
Type V	Undifferentiated

Many forensic scientist had worked on the lip prints and after their research they concluded that, lip prints are used as a good evidences in any crime investigation as well as for comparison and analysis of person with the help of their known lip prints, those who were present at the site of crime and they got a positive correlation. So, it is needed in forensic odontology to develop a new system related to cheiloscapy and its practical use and correlation between them.^[11]

MATERIALS AND METHODS

The study was conducted on 400 subjects (200 male and 200 female) between the age group of 17-24 year among the population of India. The subjects was asked to clean their lips and open their mouth and lipstick was gently applied on lips for taking the lip prints, for equal spreading of lipstick the subject were asked to rub their lips gently.

After that, a strip of transparent cellophane tape was taken and glued portion of the cellophane tape was applied on the lips of the subject for a few second. After that, tape was carefully lifted from the lips, from one end to the other. The strip of cellophane tape was pasted on a piece of white bond paper to preserve it as a permanent record. The print was subsequently analyzed with the help of magnifying lens. The prints were studied according to Suzuki and Tsuchihashi classification of lip prints and identify that if there is any similarity of lip prints present between two individuals [Figure 1-3].

For personal identification

Technique:

By a horizontal and a vertical line the lip prints were divided into four quadrants. The horizontal line divide the upper lip print from the lower one and the vertical line divide both the lip print into equal right and left halves. The right upper half taken as first quadrant left upper half taken as second quadrant, lower left half taken as third quadrant and lower right half taken as fourth quadrants. The lip prints were observed by using magnifying lens and were categorized into particular type depending upon the predominant pattern [Figure 1-3]. Then the lip print patterns were classified as per Suzuki and Tsuchihashi classification^[2] which states that

- 1. Type I: complete vertical groove i.e. run across the entire lips.
- 2. Type I': incomplete vertical groove i.e. do not cross the entire lips.
- 3. Type II: branched (y- shape)
- 4. Type III: intersected grooves.
- 5. Type IV: reticular grooves.
- 6. Type V: Undifferentiated.

Statistical analysis

All the data collected was analyzed by using Chi-square test. Chi-square test has been used to test for association between the variables. A p-value of <0.05 was considered significant for all analysis. The z-test was applied to test the significant difference between males and females for different types of lip print pattern.



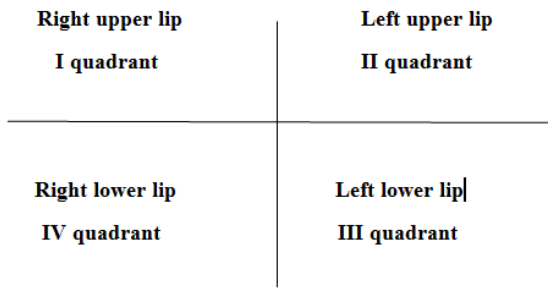


Figure 1: Division of lip print into four quadrant.

RESULTS

The present study was conducted on 400 subjects (200 male and 200 female) among the population of India. This study includes both the sexes between the age group of 17 – 24 year [Table 1, Figure 4]. The lip prints of all subjects were taken and the statistical analysis was done by the chi-square test to compare the proportions. All the quadrants of the subjects were studied [Table 2-7, Figure 5-8]



Figure 2: Materials used.

Table 1: Age distribution table of the total sample

Age in years	Number	Percentage (%)
17	36	9 %
18	96	24 %
19	142	35.5 %
20	58	14.5 %
21	32	8 %
22	14	3.5 %
23	12	3 %
24	10	2.5 %

[Table 1] Shows that maximum subject was of the age group of 19 year old.

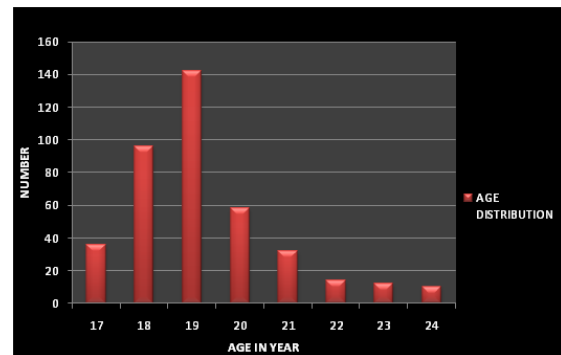


Figure 4: Showing age distribution of the total number of sample.



Figure 3: Impression on Glued surface of Cellophane tape.

Table 2: Showing statistical description of type I lip print pattern in all the quadrants between males and females.

Quadrant	Males	Females	Z-Value	P-Value*
Quadrant I	10	30	10.03	<0.05*
Quadrant II	12	30	7.68	<0.05*
Quadrant III	10	34	13.51	<0.05*
Quadrant IV	14	40	13.38	<0.05*

*represent the value of significant.

[Table 2] shows that the Z-value of type I in quadrant I is 10.03 and the P-value (<0.05) which is statistically significant. On comparing the type I in quadrant II in males and females the Z-value is 7.68 and the P-value (<0.05) which is statistically

significant. On comparing the type I in quadrant III the Z-value is 13.51 and the P-value (<0.05) which is statistically significant and the Z-value in quadrant IV is 13.38 and the P-value (<0.05) which is statistically significant.

Table 3: Showing statistical description of type I' lip print pattern in all the quadrants between males and females.

Quadrant	Males	Females	Z-Value	P-Value*
Quadrant I	12	40	16.11	<0.05*
Quadrant II	20	10	2.91	>0.05*
Quadrant III	16	40	10.98	<0.05*
Quadrant IV	16	33	5.95	<0.05*

*represent the level of significant.

[Table 3] shows that the Z-value of type I' in quadrant I is 16.11 and the P-value (<0.05) which is statistically significant. On comparing the type I' in quadrant II in males and females the Z-value is 2.91 and the P-value (>0.05) which is statistically non significant. On comparing the type I in quadrant III the Z-value is 10.98 and the P-value (<0.05) which is statistically significant and the Z-value in quadrant IV is 5.98 and the P-value (<0.05) which is statistically significant.

Table 4: Showing statistical description of type II lip print pattern in all the quadrants between males and females.

Quadrant	Males	Females	Z-Value	P-Value*
Quadrant I	40	76	14.87	<0.05*
Quadrant II	32	72	19.76	<0.05*
Quadrant III	30	62	13.56	<0.05*
Quadrant IV	36	66	11.06	<0.05*

*represent the level of significance,

[Table 4] shows that the Z-value of type II in quadrant I is 14.87 and the P-value (<0.05) which is statistically significant. On comparing the type II in quadrant II in males and females the Z-value is 19.76 and the P-value (<0.05) which is statistically significant. On comparing the type II in quadrant III the Z-value is 13.56 and the P-value (<0.05) which is statistically significant and the Z-value in quadrant IV is 11.06 and the P-value (<0.05) which is statistically significant.

[Table 5] shows that the Z-value of type III in quadrant I is 8.65 and the P-value (<0.05) which is statistically significant. On comparing the type III in quadrant II in males and females the Z-value is 25.81 and the P-value (<0.05) which is statistically

significant. On comparing the type III in quadrant III the Z-value is 22.45 and the P-value (<0.05) which is statistically significant and the Z-value in quadrant IV is 21.75 and the P-value (<0.05) which is statistically significant.

Table 5: Showing statistical description of type III lip print pattern in all the quadrants between males and females.

Quadrant	Males	Females	Z-Value	P-Value*
Quadrant I	68	36	8.65	<0.05*
Quadrant II	86	38	25.81	<0.05*
Quadrant III	80	36	22.45	<0.05*
Quadrant IV	78	35	21.75	<0.05*

*represent the level of significant

Table 6: Showing statistical description of type IV lip print pattern in all the quadrants between males and females.

Quadrant	Males	Females	Z-Value	P-Value*
Quadrant I	30	10	10.02	<0.05*
Quadrant II	10	34	13.51	<0.05*
Quadrant III	30	12	7.68	<0.05*
Quadrant IV	30	14	5.74	<0.05*

*represent the level of significant.

[Table 6] shows that the Z-value of type IV in quadrant I is 10.02 and the P-value (<0.05) which is statistically significant. On comparing the type IV in quadrant II in males and females the Z-value is 13.51 and the P-value (<0.05) which is statistically significant. On comparing the type IV in quadrant III the Z-value is 7.68 and the P-value (<0.05) which is statistically significant and the Z-value in quadrant IV is 5.74 and the P-value (<0.05) which is statistically significant.

Table 7: Showing statistical description of type V lip print pattern in all the quadrants between males and females.

Quadrant	Males	Females	Z-Value	P-Value*
Quadrant I	40	8	22.75	<0.05*
Quadrant II	40	16	10.98	<0.05*
Quadrant III	34	16	6.61	<0.05*
Quadrant IV	26	12	4.91	<0.05*

*represent the level of significant.

[Table 7] shows that the Z-value of type V in quadrant I is 22.75 and the P-value (<0.05) which

is statistically significant. On comparing the type V in quadrant II in males and females the Z-value is 10.98 and the P-value (<0.05) which is statistically significant. On comparing the type V in quadrant III the Z-value is 6.61 and the P-value (<0.05) which is statistically significant and the Z-value in quadrant IV is 4.91 and the P-value (<0.05) which is statistically significant.

DISCUSSION

Identification of the human being is one of the most important as well as very challenging act in the present era. For the certification of death and also for the personal identification for any social or legal reasons, the pre-requisite criteria is the identification of the individuality.^[1,2] Lip print is very important tool present for personal identification in any criminal investigation cases.

The present study was conducted on 400 subjects (200 male and 200 female) between the age group of 17-24 among the population of India. The lip print were taken and analyzed to the most common type of pattern in male and females. Similar age as was considered in Prateek Rastogi et al.^[13]

Different study gives different opinion about the lip print pattern among the males and females. In the present study the lip prints were divided into four different quadrants and each quadrant was analyzed separately among male and females. After the analysis it was noticed that no two or more than two individual have similar type of lip print which means lip print is an important and unique feature of an individual. Similar type of observation was reported by many other workers like Kasprzak et al^[1], William et al^[14], Saraswati et al^[3], Sharma et al^[15], Patel et al^[16], Vahanwala et al^[17], Jaishankar et al^[18], Narang et al.^[19]

The lip print pattern can also vary according to the geographical distribution. For the study of the Geographical distribution the subject should be selected from different geographic region depending on their state of origin. Prateek Rastongi et al^[13] had conducted a study on south Indian region and the present study was based on Indian races. Among Indians shown in the present study the most common type of pattern in quadrant I was type II and in quadrant II, III and IV was type III. In South Indian shown in Prateek Rastongi et al^[13] the most common pattern in quadrant I was type III and in quadrant II, III and IV was type II.

CONCLUSION

The present study reveals that lip prints are unique for each and every individual. The lip prints are the anatomical structure which are constant and can be used as a tool for identification.

In Quadrant I

- Type III was most common in male i.e 68 (34 %)
- Type II was most common in female i.e 76 (38 %)

In Quadrant II

- Type III was most common in male i.e 86 (43 %)

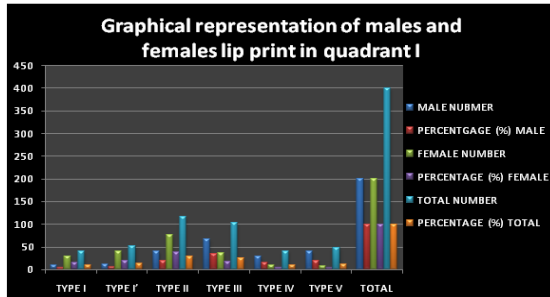


Figure 5: Showing the male and female lip print pattern in quadrant I.

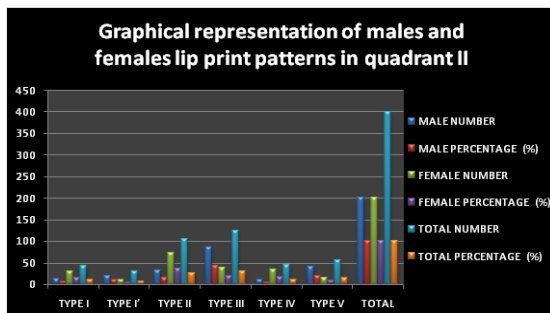


Figure 6: Showing the lip print pattern of male and female in quadrant II.

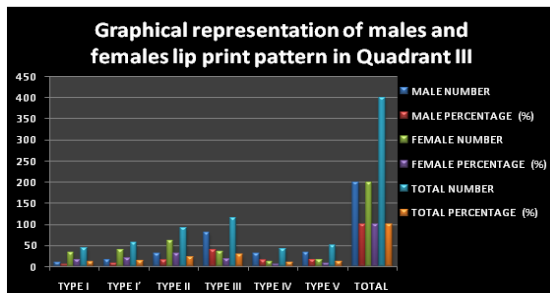


Figure 7: Showing the lip print pattern of male and female in quadrant III.

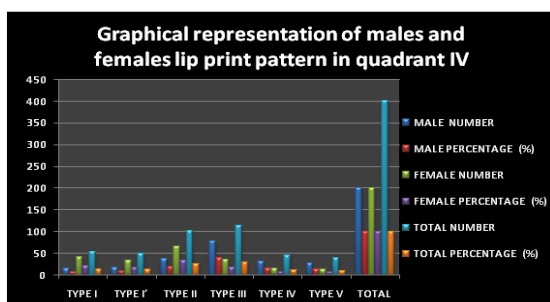


Figure 8: Showing the lip print pattern of male and female in quadrant IV.

- Type II was most common in female
i.e 72 (36 %)

In Quadrant III

- Type III was most common in male
i.e 80 (40 %)
- Type II was most common in female
i.e 62 (31 %)

In Quadrant IV

- Type III was most common in male
i.e 78 (39 %)
- Type II was most common in female
i.e 66 (33 %)

Different quadrant shows different type of pattern in male as well as in female which reveals that no two or more than two individual has same lip print. So , lip print is unique for each individual and can be used in personal identification.

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