

Original Research Article

CHEILOSCOPY: STUDY OF LIP PRINTS IN ESTABLISHING IDENTITY OF AN INDIVIDUAL

Varalakshmi KL¹, Sangeeta M *².

¹ Associate Professor, MVJ Medical College And Research Hospital, Dandupalya, Hoskote, Bangalore, Karnataka, India.

² Professor & Head, Department of Anatomy, MVJ Medical College And Research Hospital, Hoskote, Bangalore, Karnataka, India.

ABSTRACT

Background: The challenges faced by man in early days to provide the identity of an individual. Identity means determination of distinctiveness of a person, which is very important in legal medicine and criminal investigation. Cheiloscopy is a forensic investigation that deals with the identification based on lip traces. The lip prints are individualistic like the finger prints and do not undergo alteration during the life of an individual. The aim of the present study to assess the lip print pattern of different individual in different quadrant of lip and to evaluate the lip prints for their uniqueness.

Materials and method: The study was conducted on 100 medical students (50 male and 50 females) of 18-23 years from A.J.Institute of Medical Sciences, Mangalore. Lip stick was applied on the lips and print was taken with the help of white bond paper. While studying the lip print 4 quadrants were made on the lips as upper right and upper left and lower right and lower left. Predominant pattern in each quadrant is obtained by using Suzuki's classification and result s are analyzed statistically by calculating the percentage for each pattern in each quadrant of lip.

Result: The present study showed type 1(vertical) was the overall most common pattern among both male and females. In males, 40% were having type1(vertical), 26.5% of type3(branched), 13.5% of type2(partial length), 12% of type 5(intersected) and 8% of type4 (reticular).

In females, 37.5% were having type1(vertical), 22.5% of type2(partial length), 22% of type3(branched), 11% of type 4 (reticular), and 7% of type 5(intersected).

Conclusion: Study revealed that the lip prints pattern for each individual in each quadrant is unique. Lip print patterns are constant do not change with time. Because of its uniqueness and constant nature it can be used in the personal identification mainly for criminal and legal investigations.

KEY WORDS: Cheiloscopy, Personal Identification, Criminal, Legal Investigation, Suzuki's Classification, Uniqueness.

Address for Correspondence: Dr. Sangeeta M, Professor & Head ,Department of Anatomy, MVJ Medical College And Research Hospital, Dandupalya, Hoskote, Bangalore, Karnataka, India.
Ph.No.9980902559 E-Mail: drvara.hitesh@gmail.com

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INTRODUCTION

The principle of uniqueness plays a major role in identification of person especially for legal and criminal investigations [1].

Previously dactylography was the only liable method used for the identification purpose in crime scenes. In 1902 ,anthropologist by name R.Fischer studied furrows on the human lips and

introduced cheiloscopy. Cheiloscopy is the forensic investigation method dealing with the personal identification based on the study of furrows and fissures on the lips which are called as '**sulci labiorum rubrorum**' [2]. Use of lip prints for the personal identification purpose was proposed by France criminologist Edmond Locard in 1932. Later many doctors from Japan classified the pattern of lip prints and Santos M in 1967 was the first person who classified pattern of grooves on the lip into 4 types [3].

- Straight line
- Curved line
- Angled line
- Sine shaped curve [4]

In 1970 ,two Japanese scientists,Suzuki and Tsuchihashi classified the lip prints into following types.

- Type1:A clear cut groove running vertically across the entire length of lip
- Type2:Straight groove disappear half the length instead of covering the entire length(partial length)
- Type3;A branched groove
- Type4:A reticular groove/wire mesh pattern
- Type5:An intersected pattern/criss cross pattern [5]

By using above classification the present study was conducted with the aim to study the lip print pattern of different individual in different quadrants of lip and to evaluate the lip prints for their uniqueness.

MATERIALS AND METHODS

An observational study was conducted on 100 medical students (50 male and 50 females) of age group 18-23 years from A.J.Institute of medical sciences, Mangalore. All the participants were briefed about the purpose of study and written informed consent was taken. Lips with any deformity, inflammation or cicatrization were excluded from the study.

Lips were cleaned by using wet tissues .Brown /red/pink colored, nonpersistent, nonmetallic clip stick was applied uniformly on the lips. Over the lip stick bond paper was placed and print was traced in the normal resting position of lip by pressing it first in the centre and then to the

right and left corner of lips. While studying various patterns of lip print 4 quadrants were made on the lips- upper right, upper left, Lower right and lower left.

Using Suzuki's classification predominant lip print pattern was noted with the help of magnifying lens. The predominant pattern was noted in each quadrant of lip and statically analyzed by calculating the percentage.

RESULTS

Fig.1: Type1: A clear cut groove running vertically across the lip(40% in males and 37.5% In females).



Fig. 2: Type2: A partial length groove of type 1((13.5% in males and 22.5% in females)).

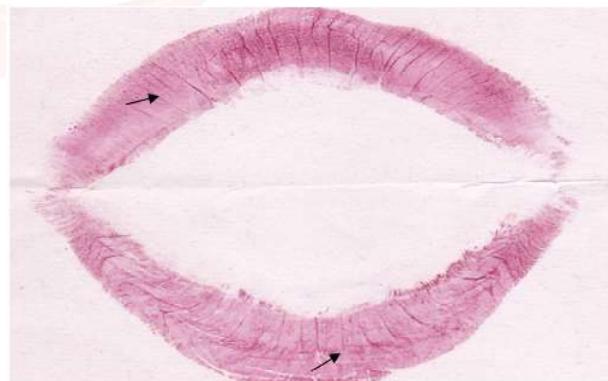


Fig. 3: Type3: A branched groove(26.5 % in males and 22% in females).



Fig. 4: Type 4: A reticular pattern(8% in males and 11% In females).



Fig. 5: Type 5: An intersected groove. (12% in males and 7 % in females).



Table 1: Lip print pattern in each compartment in males and females.

Lip compartments	Lip print pattern	Females	Males
Upper right	Vertical	44%	48%
	Partial length	12%	12%
	Branched	30%	26%
	Reticular	8%	4%
	Intersected	6%	10%
Upper left	Vertical	54%	52%
	Partial length	10%	16%
	Branched	18%	14%
	Reticular	10%	4%
	Intersected	8%	14%
Lower right	Vertical	28%	42%
	Partial length	42%	16%
	Branched	8%	18%
	Reticular	14%	8%
	Intersected	8%	16%
Lower left	Vertical	24%	20%
	Partial length	26%	10%
	Branched	32%	48%
	Reticular	12%	16%
	Intersected	6%	6%

In the present study it was observed that **VERTICAL** pattern was most common both among male and females.

In males, 40% were having type1(vertical), 26.5% of type3 (branched), 13.5% of type2(partial length), 12% of type 5(intersected) and 8% of type4 (reticular).

In females, 37.5% were having type1(vertical), 22.5% of type2(partial length), 22% of type3(branched), 11% of type 4 (reticular),and 7% of type 5(intersected).

DISCUSSION

One of the difficult process in forensic investigation is establishing the identity of a person. There is a huge pressure on the law to implement a method which provides suffice physical evidence which connect the offender to his crime.Theory of uniqueness was the mainly used principle in the identification of an individual. Even though finger prints, DNA analysis , dental procedures are the common technique used in this purpose, the methods like cheiloscopy can also be added to support the criminal investigation as it is a reliable method which will not alter during the life of a person [6].

Lip prints can be obtained at crime scene from clothing, glass, cups, windows etc. The prints obtained from the crime scene can be compared with that of suspected person and can be used to verify the presence or absence of a person at the crime scene [7].

Generally personal identification is made by comparing the ante mortem record with that of postmortem records. If a definite description of lip print patterns of different parts of upper and lower lips are established for an individual by detailed study, this ante mortem record can be used for matching the postmortem records for identification [8].

In our study the most common lip pattern in both male and female was type1 (vertical), followed by type2 (partial length) in females and type3(branching) in males.. A study by Harpeet Singh and PankajChikkara concluded that type1(vertical) was prominent in male and type 2(partial length) in females [9].

Study of Shilpa Patel and Uma Maheshwari showed type1 (vertical) in males and type 3

(branching) in females.⁴ In contrast to this, study by Suzuki concluded type 5 (intersecting pattern) more in both sexes [2,10].

A study by Vahanwala and Parekh suggested that individual with different pattern of lip print in different quadrants are more common in males compared to females where same pattern is seen in all quadrants [11].

Suzuki K and Tsuchihashi Y et al conducted a study on 150 males and 130 females ranging between 6-57 years and also 18 pairs of twins aged between 12-13 years from Japanese population. They used photographic method and lip prints were collected directly using finger printers and traced on cellophane paper and observed under magnifying lens. They concluded that lip prints are dissimilar among different individual including twins [12].

Kenneth JH had conducted an investigation and compared lip print pattern of suspect with that of the available bright lip rouge present on the back side of the photograph. In this investigation, both lip prints were matched and it justified and strengthened the use of lip prints in criminal investigations. He had also suggested that it is important to take multiple tracing of lip prints for accurate examination and comparison in case of criminal investigations [13].

A study was conducted by El Domiatyet al. on Saudi Arabic individuals, including 13 identical twins and 19 families and results of the study concluded that patterns of lip prints were different among different individuals of families even in identical twins. Since the use of finger print as a method of personal identification is very popular, studying in depth with recent advances may certainly help the lip print as a useful evidence in forensic medicine [14].

In a study conducted by Ahmed SA et al on 221 randomly selected Egyptian volunteers of both sexes, showed that reticular pattern was the most frequently represented pattern in the study sample, branched and intersecting patterns were more prevalent in males and females respectively. In the same study they also observed that prevalent pattern of lip print in lower Egypt was branched type and in upper Egypt was reticular type and they concluded in their study that lip print can differ due to gender and geographical

origin [15].

George R et al conducted study on 124 Malay students to analyze the resemblance

of lip print pattern between parents and biological offspring's in families of 31 Malay students as well as the distribution of different types of lip print in the study group. They observed that 53.08% of resemblance of lip print pattern between parents and offspring's and concluded that lip print pattern are hereditary in nature. The most common pattern of lip print in their study group was type 1 (clear cut vertical groove that run across the entire lip) [16].

Co-ward in his study observed the stability of lip print patterns over a period of time. He took the prints of 85 subjects and studied them over a period of seven months and showed that that lip prints remained unchanged [17].

Randhawa et al conducted a study to determine the effect of age changes on lip print pattern and its reliability in sex determination by using 600 subjects (289 males and 311 females) and divided them into three age groups (group 1: 1-20 years, group 2: 21-40 years and group 3 : 40 years and above). Results from the study concluded that there is significant difference in lip prints in males and females in group 2 and no significant difference in lip print pattern among group 1 and 3. The most predominant pattern of lip print in their study population was type 1. They suggested that age changes like immaturity of lips in group 1 and reduced anatomic details and tonicity in group 3 can have a significant effect on the lip print pattern which interferes with sex identification of an individual [18].

Previous studies have shown various methods to record the lip prints from a crime scene. Studies suggested that lip prints can be recorded by directly photographing the suspect's lips or on a non porous flat surface like mirror they can be photographed, enlarged and tracings can be taken to study the grooves. Lip prints can also be recorded by using finger printer, preferably a roller finger printer. The same method which is used in the present study by using bond paper and lip stick or asking the subject to impress his/her lips against a suitable surface and then processing these prints with either conventional

finger print developing powder or with a magna brush and magnetic method can also be used to record lip print [19].

SUMMARY AND CONCLUSION

In overall study we observed that in each compartment there was a mixture of all pattern.These patterns are unique for each individual. No particular pattern was specific to any gender, quadrants of lip or age. Lip prints did not change on repeated sampling. So in conclusion it can be said that since the lip prints patterns are unique, it can be used as supportive weapons for personal identification. Other than personal identification and evidential use, lip prints may also be used as a source of criminalistics information. Any available lip print at the site of a crime can be used to detect the character of the event, the number of the people involved, sexes, cosmetics used, habits, occupational traits, and the pathological changes of lips themselves.Further work on the same field with more number of subjects can help to make cheiloscopy a practical reality at the ground level of the forensic identification process.

Conflicts of Interests: None

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