



ORIGINAL RESEARCH PAPER

Forensic Medicine

A STUDY TO DETERMINE LIP PRINT PATTERN IN NORTH KARNATAKA REGION

KEY WORDS: Identification, lip prints, sex determination, crime scene investigation.

Dr. Raghavendra K. M*

Associate Professor, Department of Forensic Medicine & Toxicology, Tagore Medical College, Rathnamangalam, Chennai. *Corresponding Author

ABSTRACT

Human identification is a mainstay of civilization, and the identification of unknown individuals has always been of paramount importance to society. External surface of the lip has many elevations and depressions forming a characteristic pattern called lip prints, examination of which is referred to as cheiloscopy. This is unique for individuals like the finger prints. The use of lip prints in criminal cases is limited because the credibility of lip prints has not been firmly established in our courts. Present study carried out in M.R. Medical College, Gulbarga includes 50 Males and 50 Females and the materials used are lip stick, bond paper, cellophane tape, magnifying lens. Study is mainly focused on highlighting the unique nature of lip prints useful in personal identification and to find out the most common lip print patterns in study population.

INTRODUCTION

Human identification is a mainstay of civilization, and the identification of unknown individuals has always been of paramount importance to society. (1) By classifying the individuals into groups (e.g. age, sex, race, height), the identification possibilities are narrowed.

The concept of "identity" is a set of physical characteristics, functional or psychic, normal or pathological- that define an individual. Identification of humans is a prerequisite for personal, social and legal reasons. (2) Personal identification has played a crucial role in linking the suspect with the scene of crime and victim. Moreover, it has relevance in spotting the unknown deceased persons in homicidal, suicidal and accidental cases. (3)

For ages, crime investigations have been undertaken manually and were primarily dependent upon the witnesses. The primary mode of criminal enquiries relied upon 3rd-degree methods or, to a limited extent, on the interpretation of evidence. The current investigation scenario has shown a remarkable transformation from manual to scientific investigations; that is, the modern crime scene evaluation depends on observing and explicating the physical evidence and subsequent analysis in the forensic laboratories through scientific techniques.

Since the last few centuries, fingerprints (because of their permanence and uniqueness) have been the only significant means of human identification. However, increased awareness regarding the advanced scientific techniques to commit a crime and crime detection procedures has evoked the criminals to take precautions like wearing hand gloves to avoid or hide their fingertips while committing the malicious act. (4) A conviction based on fingerprint evidence often fails when such circumstances arrive. Thus, the investigating officer has to rely upon alternative techniques like Cheiloscopy as corroborative evidence. (5)

Impressions and grooves on labial mucosa called sulci labiorum forms characteristic pattern called lip prints and the study of which is referred to as cheiloscopy. The importance of cheiloscopy can be linked to its ability to distinguish individuals based on the shape of wrinkles and grooves. (6)(7)

Furrows on the red part of the human lips was first noted and described by anthropologist R.S. Fischer, in 1902. However the practical application of lip prints in the identification was done in the period 1968 to 1971 by Y.T Suchhishashi and T. Suzuki. They examined 1364 persons at the department of forensic odontology at Tokyo University and established that lip prints are individual and unique for human being. Lip prints are usually seen in the crime scene and their

characteristic pattern helps to trace the involved criminals. (8) Authors have claimed that lip print patterns are remarkably stable and do not change during a person's life. (9) It has also been verified that lip print patterns recover themselves even after undergoing severe alterations such as trauma, inflammation, and diseases, such as herpes. (10) The disposition and the form of furrows do not vary with changing environmental factors. (9)(11)

Lip print patterns get inherited over generations of families and can be used to trace familial lineage. (12)(13)(14)

Among all the systems mentioned above, the Suzuki and Tsuchihashi system of lip print classification (1970) has been the most widely used (7)

- Type I: Vertical, comprising of complete (end to end) longitudinal fissures/patterns.
- Type I': Incomplete longitudinal fissures
- Type II: Branching Y shaped pattern.
- Type III: Criss-cross pattern
- Type IV: Reticular pattern.

MATERIALS AND METHODS

This study was carried out in the Department of Forensic Medicine and Toxicology MRMC, Gulbarga. All the participants were explained about the purpose and procedure of the study. Written informed consent was obtained from each of the participant. Study includes 100 subjects of which 50 are males and 50 females, between the age group of 18-22 years.

Individuals without any lesion, whether active or passive on the lips were included in the study. Individuals with known hypersensitivity to lipsticks were excluded from the study. Lipstick was applied evenly on the vermilion border. The subject was then asked to rub both the lips to spread the applied lipstick evenly. The set of lip-imprints were then obtained on a simple bond paper and they were coded based on the name and the sex of the individuals.

For classification of lip print patterns the middle (10mm wide) segment of lower lip is taken as study area as proposed by shivapathasundaram (9) as this part is almost always preserved in any trace. We labeled a particular pattern on the basis of numerical superiority of types of lines present, that is, vertical, intersected, branched or reticular. If more than one pattern predominates it is typed as undetermined.

RESULTS

After interpretation of lip-print patterns, as per Vahanwala-Parekh, (15) sex determination was correctly diagnosed in 50 males and 50 females. The most predominant pattern in the

entire study population considering middle segment of lower lip was Type III (42.00%). This was followed, in order, by Type I (40.00%), Type IV (8.00%), Type II (7.00%), type I' (3.00%). In males, Type III (50.00%) lip pattern was predominantly reported whereas Type I (46.00%) lip pattern was commonly found in females.

Table No 1: Frequency of Lip print pattern in males

Type of Lip Print	Frequency	Percentage
Type I	17	34.00%
Type I'	01	2.00%
Type II	04	8.00%
Type III	25	50.00%
Type IV	03	6.00%
Total	50	100%

Table No 2: Frequency of Lip print pattern in females

Type of Lip Print pattern	Frequency	Percentage
Type I	23	46.00%
Type I'	02	4.00%
Type II	03	6.00%
Type III	17	34.00%
Type IV	05	10.00%
Total	50	100%

Table No 3: Frequency of Lip print pattern in both sex:

Type of Lip Print pattern	Frequency		Total	Percentage
	Males	Females		
Type I	17(16.13%)	23(21.77%)	40	40.00%
Type I'	01(0.81%)	02(2.41%)	03	3.00%
Type II	04(4.03%)	03(3.23%)	07	7.00%
Type III	25(28.23%)	17(15.32%)	42	42.00%
Type IV	03(4.03%)	05(4.03%)	08	8.00%
Total	50(50.00%)	50(50.00%)	100	100%

DISCUSSION

Lip prints act as a potential technique of identification as they are unique^[5] and do not change during the life of a person. It has been verified that lip prints recover after undergoing alterations like minor trauma, inflammation^[6] and diseases like herpes. The form of the furrows does not vary with environmental factors. It has also been suggested that variations in patterns among males and females could help in sex determination.^[15]

Vahanwala^[15] et al in their study noted type I and type I' are predominant in females which is in accordance with our study results. His study noted Type II, III predominant in males but in our study type III followed by type I was predominant in males.

Shivapathasundaram^[9] in his study concluded that type I and type I' are predominant in females which is consistent with our study results but in contrast the predominant pattern in males was Type IV.

In general, because the lip print is on the zone of transition of the lips, which are extremely mobile, it might differ in appearance according to the pressure, direction and method used while taking the impression, frequently being mistaken for another person. Therefore, the classification of the lip-prints is valuable in reducing the number of items to be compared, and the discernment of identity should be made, as in the case of fingerprints, by finding characteristic points to establish the diagnosis.^[8] Lip print identification methodology, although seldom used, is very similar to finger print comparison.^[16]

Recent studies^{[17],[18]} also point to other possibilities namely, DNA detection in latent lip-prints, where some researchers are trying to relate characteristic lip patterns with a person's gender.^[9] death. Utsuno et al.^[19] studied post-mortem changes of lip prints these and concluded that satisfactory

identification could be achieved in the cadavers. The main feature for dental identification is the existence of ante-mortem data^{[20],[21],[22]} which cannot be expected in cheiloscopy. Therefore, the only use of cheiloscopy will be to relate lip prints to the lips that produced them.

At the crime scene evidences such as photographs, cigarette butts, drinking glasses, cups, letters, window panes and other items that could bear lip prints should be closely examined. Such a lip print trace can be used for the reconstruction of the events and identifying suspects. These lip prints are characterized by their permanence and hence referred to as persistent lip prints. Even though they are invisible, they can be lifted using substances such as Aluminum powder, Magnetic powder. The edges of the lip has sebaceous glands admixed with sweat glands, thus the secretions of oil and moisture from these enable the development of latent lip prints analogous to latent finger prints.

Although lip prints have previously been used in a court of law, its use is not thoroughly established. The FBI has used this kind of evidence only in a single case in which lip prints were traced from underclothing in order to obtain a positive identification.

CONCLUSION

This study along with several other studies establishes the uniqueness of lip prints beyond doubt. For the purpose of using lip print patterns in the identification of an individual, further studies with larger sample size is required. In order to prove the evidential value of lip prints in the court of law, a standard and uniform procedure has to be developed for the careful collection, development, recording of lip prints and the ensuing comparison.

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