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Research Article

LIP-PRINTS – EVIDENCE LOST TO IMPERTINENCE

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ABSTRACT

Objective: Identity means determination of individuality of a person beyond doubt, based on physical characteristics unique to an individual. Article-6 of the Universal Declaration of Human Rights states that everyone has a right to identity as a person. The wrinkles and grooves on labial mucosa form a characteristic pattern and the study of these is referred to as cheiloscopy. These are unique to an individual just like the fingerprints thus, hold the potential for identification purpose. This study was designed to evaluate lip-prints as a tool of forensic identification.

Methods: The study was done in North Haryana on 1000 subjects aged between 15 and 25 years over a period of 2 years. Purposive sampling was done and subjects were asked to produce lip prints on bond paper, which were examined based on Suzuki and Tsuchihashi classification. Data obtained were analyzed using Student's t-test.

Results: It was found that no two individuals had similar lip prints. Type I pattern was most common followed by Type II whereas Type V was least common.

Conclusion: However, till date, no reliable system with repeatability has been developed for studying lip-prints especially to remove observer bias. Nor any comprehensive studies are available comparing lip-prints in live and dead subjects to authenticate their forensic identification potential, raising question at forethought and purpose of practical application of research in the field of cheiloscopy.

Keywords: Identification, Lip-prints, Cheiloscopy.

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INTRODUCTION

The concept of identity has been an indispensible part of our social and administrative systems since ages. From clay seals of Harrapa and Mohenjodaro to biometric based Id, it has changed various forms but its essence has remained the same. Identity is defined as determination of individuality of a person beyond doubt, based on physical characteristics unique to an individual [1].

Article 6 of the universal declaration of human rights states that everyone has a right to identity as a person, and its importance cannot be overemphasized anywhere else than in the court of law [2]. The question of identification arises every day in civil and criminal cases alike, ranging from unlawful possession of property, insurance claims, absconding soldiers, criminals accused of assault, rape, murder, etc.

Latent or chance impressions located on smooth surfaces are encountered in the majority of investigation such as finger-prints, foot-prints, and palate-prints, which require comparative analysis.

Although DNA finger printing has been successful in personal identification, DNA matching is a technically complex procedure and requires high quality laboratory facility which is not readily available everywhere in a developing country like ours. Finger prints on the other hand are prone to damage as a result of wear and tear and deliberate concealment and removal from crime scene.

The creases on the vermillion border of lips and the raised reddish areas outlined by these creases are analogous to furrows and ridges [3]. These wrinkles and grooves on labial mucosa, called as sulci-labiorum, form a characteristic pattern and the study of these is referred to as cheiloscopy.

Fischer was the first anthropologist to describe the furrows on the red part of the human lips. The use of lip prints was first recommended as early as in 1932 by Sir Edmond Locard, one of France's greatest criminologists. LeMoyne Snyder in his book Homicide Investigation, written as early as 1950, mentioned the possible use of lip prints in the identification of individuals [4]. Lip-prints can be instrumental in identifying a person positively and verify the presence or absence of a person at the scene of crime [5], especially in cases of heinous crimes against women.

Lip-prints are left at crime scenes more often than presumed on various surfaces such as windowpanes, cigarette butts, drinking glasses, and body of victim in sexual assaults. The most important fact is that their presence cannot be avoided by use of any protective covering like gloves.

Moreover, it has been verified that lip-prints recover after undergoing alteration due to inflammation, trauma, etc. and the pattern of furrows does not change significantly with environmental factors [6].

Apart from pattern analysis, lip-prints can be used to obtain various substances forming the print such as saliva and cosmetics which can be used as corroborative evidence [7].

The aim of the study was to study the potential of lip-prints as a tool of forensic identification.

METHODS

The study was done at a tertiary care center in North Haryana for a period of 2 years on 1000 subjects from age group of 15–25 years.

Inclusion criteria

Subjects with healthy lips and willing to participate in the study were included in the study.

Exclusion criteria

Subjects with pathology/deformity/injury over lips and those with allergy to lip-stick or general skin allergy were not included in the study.

Fig. 1: Procedure of sample collection

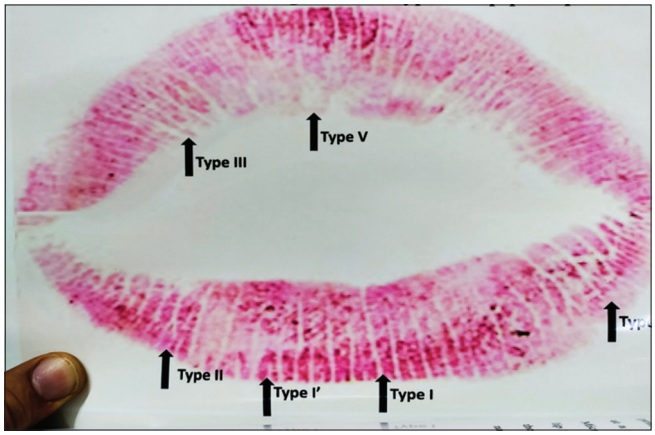

Fig. 2: Various types of patterns as per Suzuki and Tsuchihashi classification

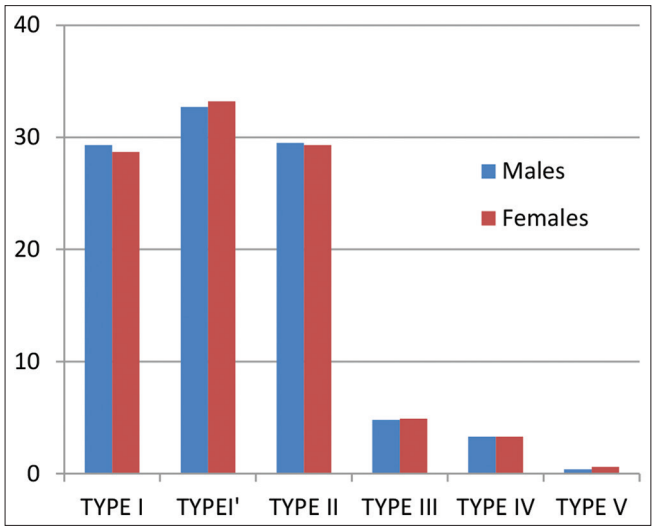

Fig. 3: Gender-wise frequency of lip-print patterns

Prior informed written consent was taken from participants after explaining the purpose and procedure of the study.

Purposive sampling was done and subjects were asked to produce lip prints on bond paper:

1. The subjects were asked to clean his/her lips with water and dry them with tissue paper.

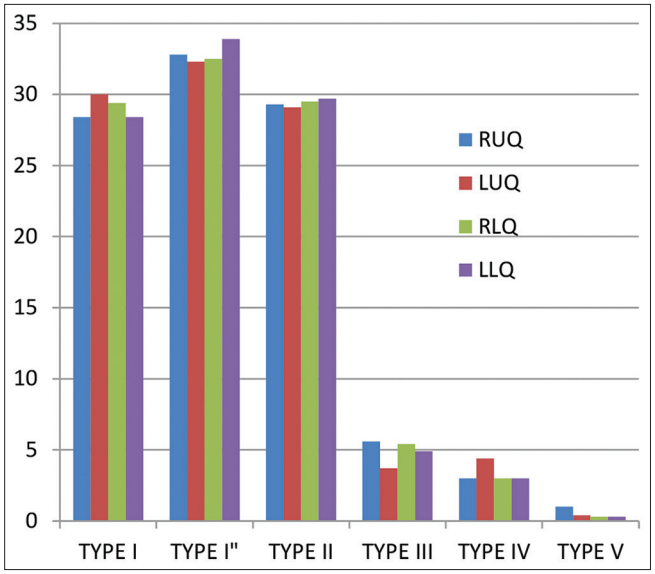

Fig. 4: Quadrant-wise frequency of lip-print patterns

2. A dark colored frosted lipstick was applied on the lips up to the vermillion border.
3. The subject was asked to approximate the lip for a smooth and uniform spread of lip-stick and allowed to dry for 2 min (Fig. 1).
4. A bond papers were fixed on cardboard, bearing the serial number and date of sample collection written on top were given to each subject.
5. The subjects were asked to press his/her lips onto the papers by holding it between the lips, so as to leave a clear impression of their lips on the papers (Fig. 2).
6. The samples thus obtained were examined for quality and those with incomplete marks or smudges were discarded.
7. The remaining lip-prints were randomized and scanned to obtain an image which could be enlarged and studied.
8. The images obtained were studied by noting 20 most prominent patterns per sample (five in each quadrant) in accordance to Suzuki and Tsuchihashi classification [8].

The data obtained after examination of samples were entered in Excel sheets to prepare master charts and analyzed for evaluating the significance of results using Student's t-test.

RESULTS

- It was observed that among 1000 subjects included in the study, 634 (63.4%) of subjects were males and 366 (36.6%) were females.
- It was observed that no two individuals had same patterns of lip-prints in all four quadrants.
- Although partial resemblance was observed in siblings in some cases, it was not a consistent finding.
- Among male subjects (63.5%), Type I' pattern was most common followed closely by Type I and II, whereas Type V was least observed pattern (Fig. 3).
- Among female subjects (36.5%), again Type I' pattern was most common followed by Type II, whereas Type V was least observed pattern.

Cumulatively, the frequency of patterns was as follows:
Type I' (33%) > Type II (29.4%) > Type I (29%) > Type III (5%) > Type IV (3.2%) > Type V (0.48%).

Quadrant-wise frequency of each pattern was as follows (Fig. 4).

Right upper quadrant (RUQ)
Type I' (32.8%) > Type II (29.3%) > Type I (28.4%) > Type III (5.6%) > Type IV (3%) > Type V (1%)

Table 1: Lip-print patterns of the previous studies and present study

S. No.	Study	Frequency of patterns
1	Suzuki and Tsuchihashi [8]	III>I>II>IV>V
2	Vahanwala and Parekh [10]	I>I'>II>IV>III
3	Augustine *et al*. [13]	III>II>IV>I>I'>V
4	Gondivkar *et al*. [14]	II>III>I>I'>IV
5	Patel *et al*. [15]	II>I'>I>IV>III>V
6	Patnaik *et al*. [16]	III>I>V>II>IV>I'
7	Present study	I'>II>I>III>IV>V

Left upper quadrant (LUQ)
Type I' (32.3%) > Type I (30.4%) > Type II (29.1%) > Type III (3.7%) > Type IV (4.4%) > Type V (0.4%)

Right lower quadrant (RLQ)
Type I' (32.5%) > Type II (29.5%) > Type II (29.4%) > Type III (5.4%) > Type IV (2.9%) > Type V (0.3%)

Left upper quadrant (LUQ)
Type I' (33.9%) > Type II (29.7%) > Type II (28.4%) > Type III (4.8%) > Type IV (2.9%) > Type V (0.3%)

DISCUSSION

The research has two aspects, that is, uniqueness of lip-prints and the most common patterns found which are being discussed separately as follows:

Uniqueness of lip-prints
In the present study, it was noticed that no two individuals had similar lip-prints as per my analysis, that is, each individual has a different set of patterns in his/her lips although some similarities were observed in twins but no exact replication of lip-prints was observed and thus, lip-prints are unique to every person. These findings were endorsed in the research works of various authors in the field including Suzuki and Tsuchihashi [8], Kasprzak [9], Vahanwala and Parekh [10], Saraswathi *et al.* [11], Patnaik *et al.* [12], and many more.

Lip-print patterns
A comparative chart of lip-print patterns between the previous studies and present study is shown for a comprehensive yet simplified and easy to understand table.

Table 1 clearly depicts that frequency of pattern IV and V is least and this finding is similar in most of the studies. The common pattern is Type I, II, and III although the most common pattern varies from one study to another. However, this difference in most common/predominant pattern could be due to difference in population on which the study was conducted and subjective observer variation.

CONCLUSION

- This study concludes that no two individuals have similar lip-print patterns in all four quadrants.
- Thus, lip-prints are a unique anatomical structure of an individual and can be used as a tool of personal identification, if collected and analyzed carefully.
- Although no two individuals have similar lip-print patterns in all four quadrants, some resemblance was observed in hereditary linked subjects.

Road-blocks in use of lip-prints as evidence

- Lack of standardization of methodologies of sample collection and analysis, an important aspect which has also been pointed out by other authors [17].
- Subjective (Observer based) nature of analysis of patterns.
- Lack of studies for comparing changes in lip-prints after death and onset of rigor mortis, so as to validate their use in postmortem identification.
- Lack of data base, such as finger prints or dental records.

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CONFLICTS OF INTEREST

None.

AUTHORS' CONTRIBUTION

1. Dr. Pankaj Chhikara*: Primary investigator/researcher
2. Dr. Abhishek Singh**: Assistance in sampling and statistical analyst.

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