Cheiloscopy: A Deterministic Aid for Forensic Sex Determination

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ABSTRACT

Background: Cheiloscopy, the study of lip prints, is an upcoming tool for the identification of persons. The lip print of every person is unique and can be used to fix personal identity.

Aim: The prime objective of the present study was to ascertain whether the lip prints behold the potential for determination of sex of the individual from the configuration.

Methods: The lip prints were recorded by applying lipstick on the lips, then cellophane tape was applied on the lips and the prints were taken. These prints were studied and classified according to Tsuchihashi’s classification.

Results: No two lip prints matched with each other, thus establishing the uniqueness of lip prints. Type I and I’ were most common in females; type IV and V were seen most commonly in males. Around 48 females and 45 males were correctly recognized on the basis of their lip prints.

Conclusion: The present study is able to convey that lip prints behold the potential of determination of the sex.

Keywords: Cheiloscopy, Sex determination.

INTRODUCTION

Human identification is one of the most challenging subjects that man has been confronted with. It is a universal process based on scientific principles. The concept of ‘identity’, is a set of physical characteristics, functional or psychic, normal or pathological—that defines an individual.1 In forensic identification, lip print patterns can lead us to important information and help in person’s identification. The grooves present on the human lips (sulci labiorum) are unique to each person and can be used to determine identity. The study of these grooves or furrows present at the zone of transition of outer skin and inner labial mucosa is known as cheiloscopy. This is considered unique to an individual and analogous to fingerprinting. This biological phenomenon was first noted by anthropologists, R Fischer, who was the first to describe it in 1902.1,4

OBJECTIVE

The prime objective of the present study was to ascertain whether the lip prints behold the potential for determination of sex of the individual from the configuration.

MATERIALS AND METHODS

Materials
1. A dark colored frosted lipstick
2. Cellophane tape
3. Thin bond paper
4. Magnifying lens
5. Pen/pencil for labeling the individual details.

Methods
The study group comprised of 100 students studying in a private coaching institute, 50 males and 50 females, in the age group of 20 to 30 years. Care was taken to select individuals having no lesion, whether active or passive on the lips. Individuals with known hypersensitivity to lipsticks were not included in the study. The lipstick was applied by the research personnel with a single stroke, evenly on the vermillion border. The subject was asked to rub both the lips to spread the applied lipstick. After two minutes, a lip impression as made on the strip of cellophane tape which was then stuck to the white bond paper. This served as a permanent record. The impression was then analyzed with a magnifying glass. The number of lines and furrows present, their length, branching and combinations were noted. The lip prints obtained were coded keeping in account the name and sex of the respective individuals. In this study, we followed the classification of patterns of lines on the lips (Figs 1 and 2) given by Tsuchihashi Y.:4

1. Type I: Clear cut vertical grooves that run across the entire lips
2. Type I’: Similar to type I but that do not run across the entire lip.
3. Type II: Branched groove (branched Y pattern)
4. Type III: Intersected grooves

Fig. 1: Various lip print patterns
Determination of sex of the individual by forensic methodology is warranted in cases of heirship, marriage, divorce and rape. With the advent of science and complicated technologies, man has been quite successful in deceiving ‘the law’. Mastering the loopholes and masking sheaf facts is very easy now. Hence, the criminal can be scot-free by deceiving the law and misguiding the police as well as the investigators. But, “Truth should prevail as truth”. The lip prints can therefore be used, as they get registered easily even on a steel or glass tumbler. Presence of lip prints is conclusive of the fact whether the beholder was a visitor or is related to the site of crime or not. If the sex of the individual is known, it is easy to shortlist the array of suspects with motive of the crime.

Suzuki et al conducted a study, and concluded that lip prints are dissimilar among different individuals. This is in accordance with the present study. In the past, some researchers have worked on lip prints proving the gender differences. According to study by Vahanwala et al Type I and I’ patterns were dominant in females while type III and IV were dominant in males. Similar results were obtained in a study conducted by Sharma P and Saxena S. Our results were consistent with their studies.

In the present study, we aimed to find out variations in the lip pattern in 100 individuals. Even though the lines and furrows are present both on the upper lip and lower lip, starting from one corner of the mouth to the other corner, only the middle portion

### Results

Our study revealed the following observations:

1. No two lip prints matched with each other, thus establishing the uniqueness of lip prints.
2. Type I and I’ were most common in females; type IV and V were seen most commonly in males (Table 1 and Fig. 3).
3. A total of 48 females and 45 males were correctly recognized on the basis of their lip prints (Figs 4 and 5).

The above data was statistically analyzed to see the difference in types in the two sexes that showed $\chi^2 = 45.135; df = 5; p < 0.001$; Highly significant.

### Discussion

The possible identification of living or deceased persons using the unique traits and characteristics are the corner stones of forensic science. Determination of sex of the individual by forensic methodology is warranted in cases of heirship, marriage, divorce and rape. With the advent of science and complicated technologies, man has been quite successful in deceiving ‘the law’. Mastering the loopholes and masking sheaf facts is very easy now. Hence, the criminal can be scot-free by deceiving the law and misguiding the police as well as the investigators. But, “Truth should prevail as truth”. The lip prints can therefore be used, as they get registered easily even on a steel or glass tumbler. Presence of lip prints is conclusive of the fact whether the beholder was a visitor or is related to the site of crime or not. If the sex of the individual is known, it is easy to shortlist the array of suspects with motive of the crime.

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is taken into account since this portion is always visible in any trace.\textsuperscript{2,5}

The present study is able to convey that lip prints beheld the potential of determination of the sex. As the table of accuracy reveals the female subjects were almost identified except for two cases. The accuracy percentage fell in identification of the males. This we reasoned out as variant types in all quadrants made decision making for the researchers difficult.

CONCLUSION

Cheiloscopy is a relatively new field among the large number of identification tools available to the forensic expert. Work on this subject has already elicited useful information, such as that lip prints are unique to an individual and can be used to fix the identity of a person; that they remain stable over time and that lip prints show gender differences. Further work on the subject can help to make cheiloscopy a practical reality at the ground level of the forensic identification process.

REFERENCES