

Cheiloscopy: The study of lip prints in sex identification

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Abstract

Human identification is a universal process based on scientific principles, mainly involving finger printing. Theory of uniqueness is a strong point used in the analysis of fingerprints to convince the court of law. Likewise, even the lip print is unique of an individual and hence beholds the potential for identification purpose. Thus, lip prints can be used to verify the presence or absence of a person at the scene of crime. The wrinkles and grooves on labial mucosa called as sulci labiorum form a characteristic pattern called 'lip prints' and the study of which is referred to as cheiloscopy. The study group comprised of 20 females and 20 males. The materials used were lipstick, bond paper, cellophane tape, a brush for applying the lipstick, and a magnifying lens. This study shows that lip prints are unique to an individual and behold the potential for recognition of the sex of an individual.

Key words: Cheiloscopy, lip prints, sex determination

Introduction

The professional obligation of dental surgeon to mankind is not only to serve in examination, investigation, diagnosis and treatment of oral and orofacial lesions of local origin, and oral manifestations of systemic diseases, but also to serve in other community services and legal matters as well.

Finger prints, postmortem reports, and of late, DNA finger printing have been successful in personal identification in the field of forensic science. Just like these methods, lip prints can be instrumental in identifying a person positively and can be used to verify the presence or absence of a person at the scene of crime.^[1]

The wrinkles and grooves on labial mucosa, called as sulci labiorum forms a characteristic pattern called as lip prints and the study of which is referred to as cheiloscopy. This is unique to an individual just like the fingerprints.^[2]

Fischer was the first anthropologist to describe the furrows on the red part of the human lips. The use of lip prints were first recommended as early as in 1932 by Edmond Locard (1877–1966), one of France's greatest criminologists.

LeMoyne Snyder in his book Homicide Investigation, written as early as 1950, mentions the possible use of lip prints in the identification of individuals.^[3]

On May 12, 1999, an Illinois Appellate Court accepted, in *People vs. Davis*, No 2-97-0725, the uncontroverted testimony of two state police experts (a fingerprint examiner and a questioned document examiner) that:^[4]

1. Lip print identification is generally acceptable within the forensic science community as a means of positive identification because it appears in the literature.
2. Lip print identification methodology, although seldom used, is very similar to fingerprint comparison and is a known and accepted form of scientific comparison.
3. There is no dissent in the forensic science community with regard to either the methodology used or the fact that lip prints provide a positive identification.
4. The F.B.I. and the Illinois state police consider that lip prints are unique like fingerprints and are positive means of identification.

Aim

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

Materials and Methods

The study sample comprised 40 students of Subharati Dental College, Meerut, 20 males and 20 females, aged between 20 and 30 years [Figure 1].



Figure 1: Materials used

Care was taken to select individuals having no lesions on the lips. Individuals with known hypersensitivity to lipsticks were not included in the study. A dark colored lipstick was applied with a single stroke, evenly on the vermilion border. The subjects were asked to rub both the lips to spread the applied lipstick. After about two minutes, a lip impression was made on a strip of cellophane tape on glued portion, which was then stuck to a white bond paper. This served as a permanent record. The impression was subsequently visualized with the use of a magnifying lens.

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. At the time of analysis the sex of the print was not disclosed [Figures 2–5]

In this study, we followed the classification of patterns of the lines on the lips proposed by Tsuchihashi Y^[5]

1. Type I: Clear-cut vertical grooves that run across the entire lips.
2. Type I': Similar to type I, but do not cover the entire lip.



Figure 2: Application of the lipstick

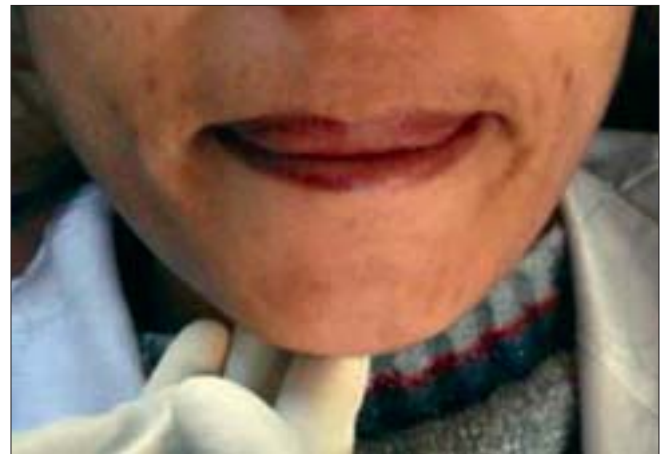


Figure 3: Rolling of lips to spread the lipstick



Figure 4: Impression on glued surface of cellophane tape



Figure 5: Sticking the cellophane tape on bond paper

3. Type II: Branched grooves (branching Y-shaped pattern).
4. Type III: Criss-cross pattern, reticular grooves.
5. Type IV: Undetermined.

For classification, the middle part of the lower lip (10-mm wide) was taken as study area, as proposed by Sivapathasundaram *et al.*^[2] Since this fragment is almost always visible in any trace, the determination of the pattern depends on numerical superiority of properties of the lines on this study area.

The sex of the individual was determined as:

1. Type I, I' pattern dominant: Female
2. Type I and II patterns are dominant: Female
3. Type III pattern present: Male
4. Type IV showing varied patterns: Male

The results obtained were verified from the coded data collected at the beginning of the study.

Results

The study of lip print pattern of 20 males and 20 females revealed the following observations:

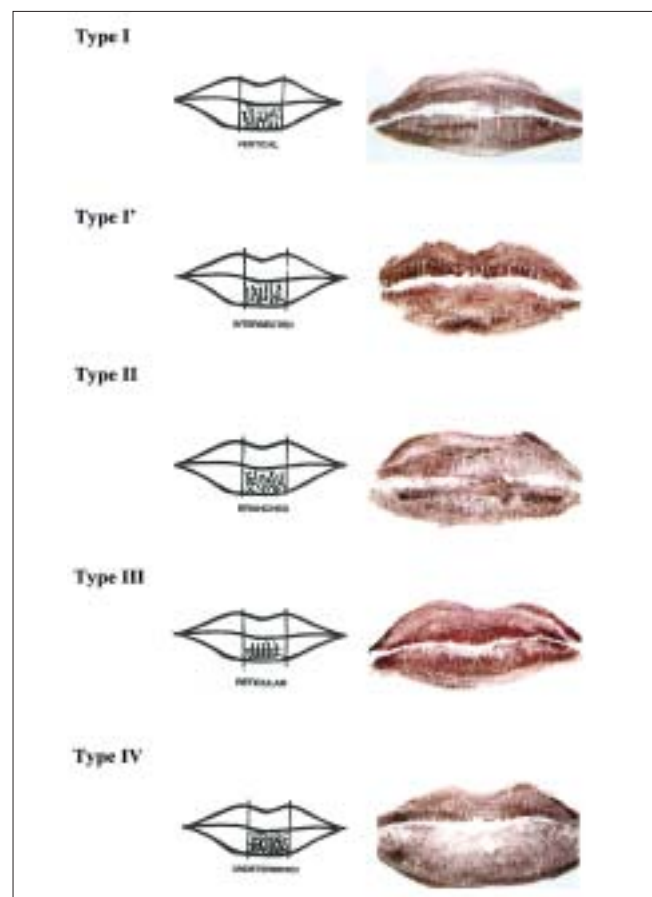


Figure 6: Patterns of lip prints

1. No two lip prints matched with each other, thus establishing the uniqueness of the lip prints [Figure 6].
2. Type I, I' was most commonly seen in females, whereas Type IV was seen most commonly in males [Figure 7].
3. According to the present study, 18 females were correctly recognized as females and 17 males were correctly identified as males on the basis of their lip prints [Figure 7].

Discussion

Lip prints are very useful in forensic investigation and personal identification. They are considered to be most important forms of transfer evidence, and are analogous to finger prints.

Lip prints are usually left at crime scenes, and can provide a direct link to the suspect. In recent years, lipsticks have been developed that do not leave any visible trace after contact with surfaces such as glass, clothing, cutlery, or cigarette butts. These lip prints are characterized by their permanence and are, therefore, referred to as 'persistent' lip prints. Although invisible, these prints can be lifted using materials such as aluminum powder and magnetic powder.^[6,7]

Also, the use of lipsticks is not indispensable for leaving lip prints. The edges of the lips have sebaceous glands, with sweat glands in between. Thus, secretions of oil and moisture from these enable development of 'latent' lip prints, analogous to latent finger prints.^[8] Even though the lines and furrows are present both in the upper lip and lower lip from one corner of the mouth to the other corner, only the middle portion in the lip is taken into account, since this portion is always visible in any traces.^[2]

In the past, some researchers have worked on lip prints with the idea of proving that a gender difference does

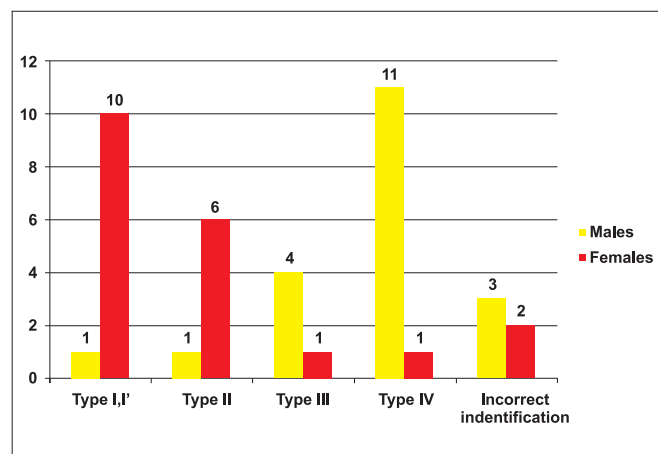


Figure 7: Distribution of number and type of lip print pattern among males and females

exist in lip print. According to a study by Sonal-Nayak^[9], Type I and Type I' patterns were found to be dominant in females, while Type III and Type IV patterns dominant in males. In another study conducted by Vahanwala-Parekh,^[10] it was shown that all four quadrants having same type were predominantly seen in female subjects and male subjects showed presence of different patterns in a single individual.

In this study, 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. In the present study, Type I and Type I' patterns were found to be predominant in females while Type IV pattern was predominant in males. We also observed that no lip prints matched with each other.

Conclusion

If the sex of the individual is known, it is easy to short list the array of suspects with motive of the crime. The present study is able to convey that lip prints behold the potential of determination of the sex. Though the result obtained by the present study does not prove to be an infallible method nevertheless it does seem to promise to go one step closer to the truth. Lip prints thus hold potential promise as a supplementary tool along with

other modes to recognize the sex of an individual.

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