

CHEILOSCOPY AS AN AID TO SEX DETERMINATION

*Dayananda R., **Priyadarshree Pradhan, ***Prince M. Paul, ****Sampath Kumar P.

Abstract

Objective: To study accuracy of sex determination through lip prints.

Methods: A prospective study was conducted at Hymamshu Jyothi kalapeetha comprising of 200 students (100 and 100 females). Details of the study were explained to the subjects and lip prints taken and analysed as per the Classification given by Tsuchihashi Y.

Results: Type I was the most common lip print in total subjects and males. Type III predominated in females. Type I, I', II constituted majority of females. Type III, IV, V predominated in males. Accuracy of sex determination was more for females as compared to males.

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Introduction

With the advent of science and complicated technologies, man is been quite successful in deceiving "The Law". Mastering the loopholes and masking sheer 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. Today it is an established fact that the traditional police investigative methods and resources are no longer equipped to handle the growing complexities of crimes such as fraud, corruption, murder, rape etc. Human identification is one of the most challenging subjects that police have been confronted with. Human identification is based on scientific principles, mainly involving estimation of age, sex, fingerprints, measurement of height, dental records. Just like these methods, lip prints can also be instrumental in identifying the sex which is vital for establishing the identity of an individual.

* Assistant Professor, Mysore Medical College, Mysore.

** Assistant Professor

*** Postgraduate

**** Professor and Head Sri Ramamchandra Medical College and Research institute, Chennai.

Corresponding Address: Dr Dayananda R.

50, III cross, Kuvempu main Road, Hebbal Kempapura, Bangalore – 560024. Mobile No – 09900076248.

Email id – drdaya.r@gmail.com

The wrinkles and grooves on the labial mucosa (called sulci labiorum) form a characteristic pattern called "lip prints," the study of which is referred to as cheiloscopsy. Locard and Synder were the pioneers who suggested the idea of using lip print for identification.^{1,2} The prime objective of this study was to ascertain whether lip prints behold the potential for determination of sex from their configuration.

Materials and methods

The present study comprised of 100 males and 100 females of Hymamshu Jyothi kalapeetha students, Bangalore. All the participants were briefed about the purpose of the study and their lip prints were obtained after their consent. Those with any known inflammation, trauma and congenital deformity of lips and hypersensitivity to the lipsticks were excluded from the study.

The armamentarium comprised of:

Lipstick of a dark, bright colour and non-glossy.

Transparent cellophane tape, glued on one side.

Scissors.

White bond paper.

Magnifying lens.

The participants of the study were asked to wash their lips thoroughly. The subjects were asked to open the mouth and lipstick was applied in one stroke. The subjects were asked to rub their lips gently to spread it evenly. A strip of cellophane tape, 10 cm long was cut with scissors. The subjects were told to keep the mouth stationary during the procedure. The glued portion of the cellophane tape was applied on the lower lip. It was held in place, applying gentle and even pressure for a few seconds. Then the tape was carefully lifted from the lip, from one end to the other, avoiding any smudging of the print. The strip of cellophane was stuck on to a piece of white bond paper. This served as a permanent record. The subject's serial number was written on the back to serve as a permanent record.

The middle part of the lower lip (10mmwide) was taken. The impression was subsequently visualized with the use of magnifying lens. The number of lines and furrows present, their length, branching and combinations were noted.

In our study we followed the classification of patterns of the lines on the lips proposed by Tsuchihashi Y³

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.
3. Type II: Branched grooves (branching Y shaped pattern)
4. Type III: Intersected grooves.
5. Type IV: Reticular grooves.
6. Type V: Undetermined.

The sex of the individual was determined as given by Vahanwala et al.^{4,5}

Type I and I' : Pattern dominant – Female.

Type II : Pattern dominant – Female.

Type III : Pattern dominant – Male.

Type IV : Pattern dominant – Male.

Type V : Pattern dominant – Male.

The results thus obtained were analysed for statistical significance.

Results

The meticulous examination of the lip prints revealed that no two lip prints were identical, thus establishing the uniqueness of the lip prints. Type I lip prints were the commonest (27.5%) and type V were the rarest (9.5%) (Table 1). In males type III was the commonest (45%) followed by type IV, V, I, II and I' respectively. The frequency of Type I was maximum in females and type V was the least (Table 1). On estimation of the sex from lip prints as given by Vahanwala, it was found that Type I, I' and II constituted 93 out of 100 in females and Type III, IV and V accounted for 84 out of 100 males. The chi square test was applied to determine whether the difference between males and females was significant, which showed that the difference was statistically significant (Table 3). Positive predictive value (%) in males and females was 90.32% and 85.32% respectively. The overall accuracy of cheiloscopy was 88.5%.

Discussion

Determination of the sex of the individual by forensic methodology is warranted in cases of

- a. heir ship
- b. marriage
- c. divorce
- d. legitimacy
- e. rape

Lip prints are useful in Forensic practice for identification purpose. They are considered to be most important forms of transfer evidence.⁶ The vermilion border of the lips when studied along with an individual structure of lines may form a circumstantial evidence. This method is applicable mostly in identifying the living, since these prints at crime scene can provide a direct link to the suspect. Lip prints can be found on surfaces such as glass, clothing, cutlery or cigarette butts. Even the invisible lip prints can be lifted using materials such as aluminum powder and magnetic powder.^{7,8} 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' or persistent lip prints, analogous to finger prints.⁹

In our study, we labelled 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. The most predominant type in total subjects was type I (Table 1). The above findings are in accordance with study done by Vahanwalla⁵ but in studies conducted by Ramandeep S Narang¹⁰ and Sivapathasundharam¹¹ type III was most common. Verghese et al studied lip prints in the population of Kerala and found that the most common pattern was type IV. This variation could be to the geographical and racial differences of the subjects in study. Our study included Indian and Malaysian students where as studies conducted by the other studies included only Indian population

Type III and I were predominant in males and females respectively. Thus the most common lip pattern for females is Type I/I/II (93%) and the most common lip pattern for males is type III/IV/V (84%). The overall accuracy of the lip prints is 88.5%. Similar results were obtained by

Preethi Sharma and Saxena et al.⁶ Similar results were obtained by studies conducted by Sathyanaryana Naik et al¹² and Chaitanya Babu et al¹³ in Karnataka Hence it is useful for sex determination.

Conclusion

Lips prints are unique to an individual. Predominant pattern in total subjects was type I. Most common pattern in males and females are Type III and I respectively. Accuracy of lip prints in estimation of sex is 88.5%. Present study beholds the potential for determination of sex. Though the results obtained in the study does not prove to be infallible method. It does seem to promise to go one step further closer to the truth.

Recommendations

More studies should be conducted on this subject in different geographical areas. The study can be taken up with larger sample size. The bias in our study can be eliminated by blindfolding.

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Table 1: Lip print patterns in males and females.

Patterns	Female	Male	Total
I	46	9	55
I'	33	2	35
II	14	5	19
III	4	45	49
IV	2	21	23
V	1	18	19
Total	100	100	200

Table 2: Prevalent lip patterns in males and females

Type	Female	Male	Total
I, I', II	93	16	109
III, IV, V	7	84	91
Total	100	100	200

Table 3: Accuracy of cheiloscopy in sex determination

	True positive	False positive	True negative	False negative	Positive predictive value (%)	Accuracy of cheiloscopy (%)
Females	93	16	84	7	85.32 %	88.5%
Males	84	7	93	16	90.32 %	

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