

## Cheiloscopy-An Armour to Forensic Dentistry

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### ABSTRACT

Cheiloscopy is derived from Greek word "Cheilos" which means lips. It is the study of characteristic pattern of elevations and depressions on labial mucosa. It is unique for every individual like finger prints and hence can be used to determine the sex and personal identity. Theory of uniqueness is a strong point used in the analysis of finger prints. Lip prints remain the same throughout life and are uninfluenced by injuries, diseases or environmental changes. This review discusses about various aspects of cheiloscopy.

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### 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. Lips are proved to have something that characterizes the human being the same as finger prints which is the lip prints. Forensic science refers to the areas of endeavor that can be used in a judicial setting and accepted by the court and the general scientific community to separate truth from untruth. Lip print analysis is a process that provides both qualitative and quantitative results.

Cheiloscopy is the forensic investigation technique that deals with identification of humans based on lip traces [1]. 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 cheiloscopy[2]. It is possible to identify

lip patterns as early as the sixth week of intrauterine life. Thereafter lip groove patterns rarely change resisting many afflictions[3]. Lip prints and palatal rugae patterns are considered to be unique for an individual and hence hold the potential for identification[4].

Presence of lip prints at crime scene can form basis for evidence regarding number of peoples involved, presence or absence of a suspect and sex of an individual[5]. Lip prints recover even after trauma, inflammation and diseases like herpes and can be recognized without difficulty[6].

### Discussion

Fisher was the first to describe cheiloscopy in 1902[1,3,4]. 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 one of France's greatest criminologists. LeMoyné Snyder in his book Homicide Investigation, mentioned the possible use of lip prints in the identification of individuals[7]. The formal training in forensic odontology and its inclusion in dental curricula was recognized and acted on in the 1960 and 1970 however the first course

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in forensic dentistry was probably conducted by Prof. Sadanori Mita of Japan as early as 1903[2].

Suzuki and Tsuchihashi examined 18 pairs of uniovular twins and found that there were considerable similarities in these twins. But one of the remarkable curiosities of nature is that even uniovular twins have different finger print patterns[8]. Similarity in the lip print patterns in members of the same family are seen supporting that hereditary factors also play a role in lip prints[9,10]. Mc Donell in 1972 reported that it was difficult to distinguish two identical twins by every other means but possible by their lip prints[11].

In 1967 Suzuki studied the measurement of the lips, the use and colour of rugae and the method for its extraction from the crime scene to obtain useful data for practical forensic application[12]. In 1990 Kasprzak conducted a research for period of five years on 1500 persons to explain in detail the practical use of Cheiloscopy[13]. In 1970 Suzuki and Tsuchihashi has given the most standardized and simplified classification for lip print reading when compared to others (Martin Santos (1966), Renaud (1973), Afchar Bayat (1979) since it has a clear description of nearly all of the commonly encountered lip patterns and is easy to interpret and apply due to its resemblance to the dental formula[14]. According to a study by Vahanwala et al[15] type 1 and type 12 patterns were found to be dominant in females while type 3 and type 4 patterns were dominant in males. In another study by Vahanwala and Parekh[16] it was shown that all four quadrants with the same type of lip prints were predominantly seen in female subjects and male subjects showed the presence of different patterns in a single individual.

#### *Procedures of Cheiloscopy*

Red or brown, non-persistent, non-glossy, non-metallic lip stick can be used to get clear lip prints. White papers and tissue papers can also be used to take the impressions of the lips. A thin film of lipstick is applied onto cleaned and dried lips left for 3 min, and then the impressions of the lips is taken on the specified papers. 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[3].

After about two minutes a lip impression was made on a strip of cellophane tape on the glued portion which was then stuck on to a white bond paper. The following methods can be used for taking

the impressions from every subject: Direct light pressure is applied by the lips on a folded paper. At least three prints are taken from each person to avoid subjective different pressure applied to the lip. 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 print is then divided into six topographic areas (each lip was divided into three areas) and each area is studied alone to determine the type of the grooves: a transverse line is drawn between the two highest points of the philtrum angles, two perpendicular lines are drawn on that transverse line at the points of its meeting with the angles of the philtrum. The perpendicular lines are extended to cut the upper and lower lips. Therefore, each lip print is divided into the following six areas: Upper right (UR), Upper middle (UM), Upper left (UL), Lower right (LR), Lower middle (LM) Lower left (LL).

#### *Classification of patterns of the lines on the lips proposed by Tsuchihashi(17)*

Type 1 : Clear-cut vertical grooves that run across the entire lips

Type 12 : Similar to type 1, but do not cover the entire lip

Type 2 : Branched grooves

Type 3 : Intersected grooves

Type 4 : Reticular grooves

Type 5 : Grooves do not fall into any of the type 1-4 and cannot be differentiated morphologically (undetermined).

#### *Study of lip prints for sex identification was done by Vahanwala et al [16] and gave classification as follows:*

Type 1, 12 : Pattern dominant - Female

Type 2 : Patterns are dominant - Female

Type 3 : Pattern present - Male

Type 4 : Male

Type 5: (varied patterns) - Male

Same patterns in all quadrants - Female

One common problem that is encountered during the cheiloscopy is that of smudging or spoiling of lip prints leading to unidentifiable mark. Correlating lip prints with blood groups may be useful in forensic science for more accurate identification of an individual than with the use of lip prints alone. However no evidence exists to correlate lip prints

and blood groups in the literature. Of course lip prints may never be on the same level as finger prints when it comes to identification and hence less database available. In recent years, lipsticks that do not leave any visible trace after contact with surfaces such as glass, clothing, cutlery or cigarette butts have been developed [19]. 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 aluminium powder and magnetic powder<sup>20,5</sup>.

## Conclusion

The lip prints of different individuals in different parts of the lips used to establish further facts and truth and throw more lights on lip print with an object of providing further information about lip print to police, forensic surgeon and investigator in the field of forensics to help in law and justice. Both cheiloscopy and rugoscopy are rather simple techniques not requiring any complex instrumentation. Lip prints thus hold potential promise as a supplementary tool along with other modes to recognize the sex of an individual. A major limitation of Cheiloscopy is that in very few circumstances antemortem data is available to compare with post-mortem evidence which obviously impairs a comparative study. To utilize the mammoth role of Cheiloscopy in forensic investigations, it is mandatory to perform more studies on different population groups to analyze the variations and to establish a database.

## Bibliography

1. Siegel JA, Saukko PJ, KG. Kasprzak J. Cheiloscopy. Encyclopedia of forensic sciences. 2nd ed. London: Academic Press; 2000.
2. Acharya AB. Teaching forensic odontology: An opinion on its content and format. Eur J Dent Educ. 2006;10(3):137-41.
3. Ball J. The current status of lip prints and their use for identification. Journal of Forensic Odonto-Stomatology. 2002. p. 43-6.
4. Caldas IM, Magalhães T, Afonso A. Establishing identity using cheiloscopy and palatoscopy. Forensic Science International. 2007. p. 1-9.
5. Castelló A, Alvarez-Seguí M, Verdú F. Luminous lip prints as criminal evidence. Forensic Sci Int. 2005;155(2-3):185-7.
6. Augustine J, Barpande SR TJ. Cheiloscopy as an adjunct to forensic identification: a study of 600 individuals. J Forensic Odontostomatol. 2008;27(2):44-52.
7. Synder LM. Textbook of homicide investigation. Identification of dead bodies. 1950.
8. Suzuki K and Tsuchihashi Y. Personal identification by means of lip print. J Forensic Med. 1970;17(2):52-7.
9. Hirth L, Göttsche H, Goedde HW. Lip prints – variability and genetics (author’s transl). Humangenetik. 1975;30(1):47-62.
10. Venkatesh R, David M. Cheiloscopy/ : An aid for personal identification. Journal of Forensic Dental Sciences. 2011. p. 67.
11. Aggarwal A. The importance of lip prints (Forensic Files) [Internet]. Available from: <http://lifeloom.com/>
12. Suzuki K, Suzuki H TY. On the female lips and rouge. Jpn J Leg Med . 1967;67:471.
13. Kasprzak J. Possibilities of cheiloscopy. Forensic Science International. 1990. p. 145-51.
14. Gondivkar SM, Indurkar A, Degwekar S BR. Cheiloscopy for sex determination. J Forensic Dent Sci. 2009;1:56-60.
15. Vahanwala S, Nayak CD PS. Study of lip prints for sex identification. Medico-Legal Updat [Internet]. 5(3). Available from: <http://www.indmedica.com/journals.php?journalid=9&issueid=69&articleid=878&action=article>.
16. Vahanwala SP PB. Study of lip prints as an aid to forensic methodology. J Forensic Med Toxicol. 2000;17(12):8.
17. Tsuchihashi Y. Studies on personal identification by means of lip prints. Forensic Sci. 1974;3(3):233-48.
18. Sivapathasundharam B PP, G. S. Lip prints (Cheiloscopy). Indian J Dent Res. 2001;12:234-7.
19. Rajendran R SB. Forensic Odontology. Shafer’s Textbook of Oral Pathology. 5th ed. new delhi: Elsevier; 2006. p. 1199-227.
20. Utsuno H, Kanoh T, Tadokoro O, Inoue K. Preliminary study of post mortem identification using lip prints. Forensic Science International. 2005. p. 129-32.