

CHELOSCOPY-A UNIQUE FORENSIC TOOL

Sharma S.M.¹, Krishnan Shalini² & Anchan Akshari³

¹Professor & HOD, ²Assistant Professor, Department of Oral & Maxillofacial Surgery, ³Junior resident, A.B. Shetty Memorial Institute of Dental Sciences, Nitte University, Deralakatte, Mangalore - 575 018, India

Correspondence :

S.M. Sharma

Professor and HOD, Department of Maxillofacial Surgery, A.B. Shetty Memorial Institute of Dental Sciences

Nitte University, Deralakatte, Mangalore - 575 018

Mobile : +91 98453 48515 E-mail : drsharma.sm@gmail.com

Abstract :

Identity is a characteristic that is unique to every individual. It is an important factor in cases of theft, criminal investigations of the dead or missing, mass disasters both by natural causes and by criminal intent – with this as our day to day reality, the establishment and verification of human identity has become extremely important. DNA and fingerprints are clearly the favored methods of identification, but, they require a prior record and verifiable baseline for comparison. When these tools cannot be used it is necessary to employ those biological factors with higher variation and lower diagnostic probability. Chelioscopy is one among them.

Keywords : Cheilioscopy, forensic odontology, lip prints

Introduction :

Every person is born with certain bodily features that makes him unique and one of a kind. For a long time forensics have been using Fingerprints, DNA and Retina Pattern for identification of a person. With advancement in technology many innovations have come across for the help of forensics. The external surface of the lip has many elevations and depressions forming a characteristic pattern called lip prints, which are unique to an individual like finger prints.

Identity is the establishment of a person's individuality which is a set of physical characteristics, functional or psychic, normal or pathological. Identification of an individual is a pre-requisite for certification of death and for personal, social and legal reasons.² Establishing this identity is a challenging task.

Traditional methods of personal identification include

anthropometry, dactyloscopy, DNA fingerprinting, sex determination, estimation of age, measurement of height, post mortem reports and differentiation by blood groups. Although lip print

identification has been utilized in court in isolated cases, more research needs to be conducted in this field^{2,3}.

In a crime scene investigation, lip prints can link a subject to a specific location if found on clothes or other objects, such as glasses, cups or even cigarette butts. Lip prints in the form of lipstick smears are frequently encountered in forensic science laboratories as one of the most important forms of transfer evidence.⁴

Lip prints are unique and do not change during the life of a person. The lip prints undergo alterations with minor trauma, inflammation and diseases like herpes, following which it recovers. The form of furrows does not vary with environmental factors. However, major trauma to the lips may lead to scarring, pathosis, and the surgical treatment rendered to correct the pathosis may affect the size and shape of the lip, thereby altering the pattern and morphology of grooves.

Analyzing the variations in lip patterns among the two genders will aid in forensic investigation and also standardize gender identification. Lip print recording is helpful in forensic investigation that deals with humans, based on lip traces. A lip print may be revealed as a surface with visible elements of lines representing the furrows. This characteristic pattern helps to identify the individuals

Access this article online

Quick Response Code



since it is unique for each and every individual excluding identical twin. When the lines are not clear (Only the shape of printed, individual identification of human beings based on the trace is extremely difficult unless the trace contains more individual characteristics like scars, clefts etc, and often identification ends with group identification¹.

. Lip prints are genotypically determined and are unique and stable. At the site of crime, lip prints can either be visible or latent⁴. Traditional lipsticks produce a lip print that can be easily studied that is visible lip print. Lipstick is an easily available and cost effective. It is thus used for the study. Prints obtained from non lipstick coated lips are considered latent prints. In criminal identification, latent prints are considered the key in solving a crime. It has been documented that these latent lip prints could be developed successfully for study purpose using various dyes. Also, lip prints can be used as a DNA source because epithelial cells could be retrieved from the print, so as to double its identifying value^{5,6}. The lip prints of parents and children and those of siblings have shown some similarities. Variations in the lip patterns are seen among males and females and this has been used in determination of the sex of the individual.⁷

Aims and Objectives:

To study the lip patterns, its role as an indicator of sex of an individual and to identify the variations and the most common lip patterns in two population groups.

Materials :

Simple bond paper and Lipstick

Methodology:

This study was carried out in the department of Oral and Maxillofacial Surgery, A. B. Shetty Memorial Institute Of Dental Sciences, Mangalore.

The study involved two researchers. Researcher-1 took the lip prints and recorded the patient details and researcher-2 analyzed and interpreted the imprints. This was done to avoid bias. Lip prints were taken by applying lipstick evenly to the vermilion border of the subject with a single stroke. The patient was then asked to rub both the lips to spread

the applied lipstick evenly. The lip prints were then obtained on a simple bond paper, and were coded based on the name and sex of the individuals.

Sample Size:

The study involved 100 patients reporting to the department. They were selected randomly after obtaining a written informed consent. The participants were divided into 2 groups of 50 each. Group A-those hailing from North Kerala and Group B- those hailing from South Canara. Each group comprised of 25 males and 25 females. Each subject will be given a code number to hide the actual sex from the analyzer.

All the lip prints were compiled, analyzed and interpreted by researcher-2, using Suzuki's classification, to study the variations in the lip prints in the two population groups. The data was then subjected to statistical analysis.

Statistical Analysis:

The data was compiled and analyzed using the Chi-square test.

Results :

The following conclusions were arrived at;

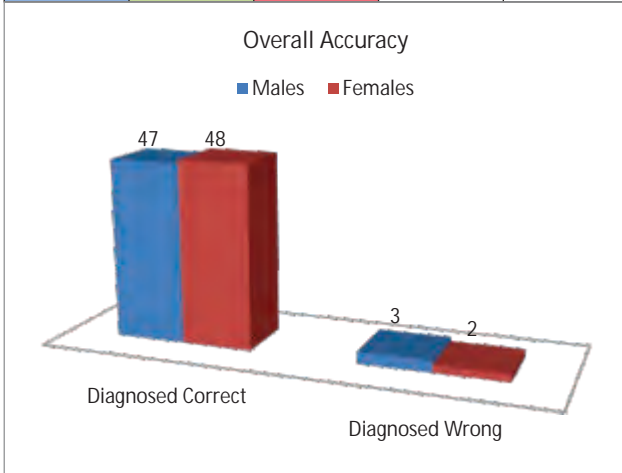
The most common lip prints in the individuals hailing from North Kerala as well as South Canara is the branching 'y' pattern. Therefore, this indicates that lip prints do not vary according to the geographical location.

When the lip is divided into four quadrants symmetrically, in males, only two opposite quadrants show similar grooves whereas in females at least three quadrants show similar pattern of grooves. This can be used as a major property in the indication of sex of an individual.

A new pattern of grooves which comprises of the mixed type of 'branching y' along with 'complete vertical fissure' was observed. This is an addition to the existing Suzuki's classification

Thus, we conclude that along with other traditional methods, Cheiloscopy can also serve as a very important tool in the identification of a person, based on the characteristic arrangement of lines in the red part of the lip

Age group	Diagnosed Correct	Diagnosed Wrong	P-Value	R ²
Males	47	3	0.893	0.0002
Females	48	2		
Total	95	5		



Future Directions:

- Although used in a few selected cases. More research is required for increasingly simpler, more sensitive and effective methods of sample collection and standardizing the techniques

Acknowledgements:

We humbly thank ICMR for granting studentship and accepting the study, A.B. Shetty Memorial institute Of Dental Sciences in general and also Dr. Ramanand Shetty-Vice Chancellor, Nitte University, for the encouragement in carrying on the study.

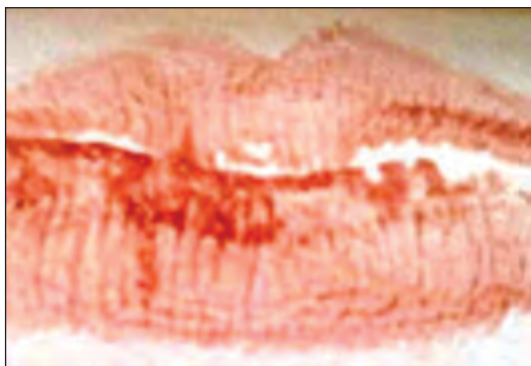


Fig. 1 - TYPE 1



Fig.2 - TYPE 2

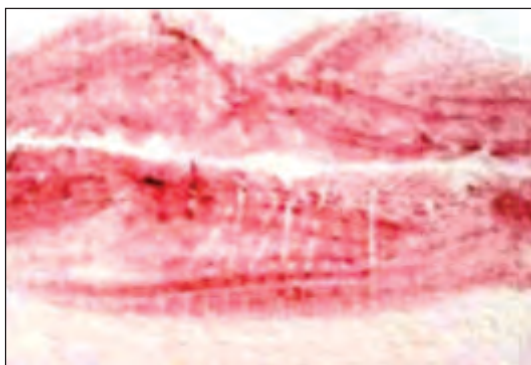


Fig. 3 - TYPE 3



Fig.4 - TYPE 4

References:

- Sivapathasundharam B. Prakash PA, Sivakumar G. Lip prints (cheiloscopy). J Forensic Odontostomatol. 2002 Dec; 20(2):43-6.
- Gondivkar SM. Cheilography for sex determination. Journal of forensic dental science; 1(2): (56-57).
- Ball J. The current status of lip prints and their use for identification. Forensic Sci Int. 2005 May 10; 149(2-3):129-32.
- Singh NN, Brave VR. Natural dyes versus lysochrome dyes: A comparative evaluation. Journal Of forensic dental sciences; 2:1(11).
- Castello A, Verdu F. development of latent lip prints on multicoloured surfaces, a problem resolved using fluorescent dyes. Indian Internet Journal of Forensic Medicine and Toxicology. 2006;4:2. Available from: <http://www.indianjournals.com/ijor.aspx?target=ijor:ijfmt&volume=4&issue=2&article=001>
- Navarro E, Castello A, Lopez JL, Verdu F. Criminalystic: Effectiveness of lysochromes on the developing of invisible lipstick – contaminated lipmarks on human skin: A preliminary study. Forensic Sci Int 2006;158:9-13.

7. Acharya B, Sivaphasundharam B. Forensic Odontology. In: Rajendra R, Sivaphasundharam B. Shafer's textbook of oral pathology. 5th ed. Elsevier;2006:1224.
8. Vahanwala S. Study of lip prints as an aid for sex determination. Med Leg Update 2005;5:93-8.
9. Utsuno H, Kanoh T, Tadokoro O, Inoue K. Preliminary study of post mortem identification using lip prints. Forensic Sci Int 2005;149:129-32.
10. Rothwell BR. Principles of dental identification. Dent Clin North Am 2001;45:253-9.
11. O'Shaughnessy PE. Introduction to forensic science. Dent Clin North Am 2001;45:217-27
12. Castello A, Alvarez M, Verdu F. Just lip prints? No: there could be something else. Faseb 2004;18:615-6.
13. Pretty IA, Sweet D. A look at forensic dentistry –Part 1: the role of teeth in the determination of human identity. Br Dent J 2001;190:359-66.
14. Kasprzak J. Possibilities of cheiloscopy. Forensic Sci Int 1990;46:145-51.
15. Adams BJ. The diversity of adult dental pattern in the United States and the implications for personal identification. J Forensic Sci 2003;48:497-503.
16. Valenzuela A, Martin-de las Heras S, Marques T, Exposito N, Bohoyo JM. The application of dental methods of identification to human burn victims in a mass disaster. Int J Legal Med 2000;113:236-9.