

New Insights of Cheiloscopy.

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ABSTRACT

Cheiloscopy is a forensic investigation technique that deals with identification of humans based on lips traces. This is unique for individuals like the finger prints. Lip prints are hereditary yet considered to be individualistic, each possessing their own unique characteristics. For this reason it is safe to suggest that lip prints can be included in the forensic sciences arena as a legitimate means of identifying persons of interest connected with criminal activity. Lip prints thus hold potential promise as an instrumental tool in forensic odontology. The purpose of this article is to give an insight into this branch of forensic odontology with an emphasis on its historical background, techniques of recording it and its future perspectives.

Keywords: Cheiloscopy, Lip Printing, Vermilion border.

INTRODUCTION

Dentistry's fundamental and clinical disciplines have, from time to time, shed light on questions of civil and criminal law. Civil cases range from single malpractice suits to mass disaster insurance claims. Criminal cases involve identification both of murder victims and of suspects.^[1]

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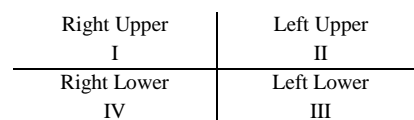
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Cheiloscopy (from the Greek words cheilos, lips, e skopein, see) is the name given to the lip print studies.^[2-4] This is unique for individuals like the finger print sand do not change during the life.^[5,6] It has been verified that lip prints recover after undergoing alterations like minor trauma, inflammation and disease like herpes. The form of furrows does not vary with environmental factors.^[7-9]

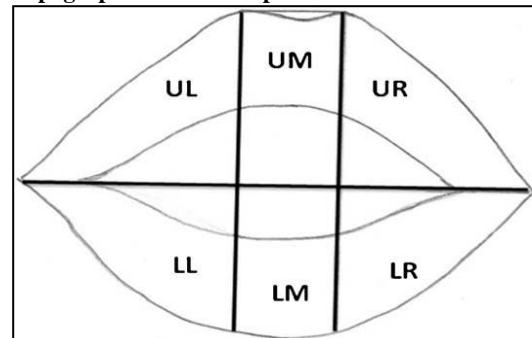
Lip prints are similar to fingerprints, palm Character is tics are used for identification. The creases on the vermillion border of the lips, which appear as white areas in lip prints, and the raised reddish areas outlined by these creases, which appear as dark areas, are analogous to the furrows and ridges of friction ridge skin. The creases on the vermillion border are also referred to as grooves, furrows, wrinkles and valleys.^[10] Lip prints of parents and children and those of siblings have shown some similarities.^[11,12]



Most characteristic groove patterns of human could be recorded in a cross line diagram.



Topographic Areas of Lip



UL= Upper Left, UM= Upper Middle, UR= Upper Right, LL= Lower Left, LM= Lower Middle, LR= Lower Right

Historical Overview

Fischer in 1902 was the first anthropologist to describe the furrows on the red part of the human

lips.^[13] In 1930, that Diou de Lille developed some studies which led to lip print use in criminology. Use of lip prints first recommended by the Edmond Locard in 1932.^[14] In 1950, Le Moyer Synder reported in his book Homicide investigation that the characteristics of the lips formed by lip grooves are as individually distinctive as the ridge characteristics of finger prints.^[15] Some time later, Santos, in 1960, suggested that the fissures and the criss-cross lines in the lips could be divided into different groups (simple and compound), and each group could be further divided into eight subtypes.^[16] In 1970, Suzuki and Tsuchihashi conducted a study on 107 Japanese families and named the grooves on labiorum rutorum as sulci labiorum. Lip prints consisting of these grooves as *Figura linearum labiorum rubrorum*.^[17] Renaud, in 1972, studied 4000 lip prints and confirmed the singularity of each one, supporting the idea of lip print singularity.^[17] Mc Donnell in 1972 conducted a study on lip prints between two identical twins and find different lip prints.^[19] Cottone in 1981 reported in his book outline of forensic dentistry that cheiloscopy is one of the special techniques used for personal identification. In 1990 Kasparzak conducted a research for period of five year on 1500 persons to elaborate the practical use of cheiloscopy.^[20,21] Recently Vahanwahalin 2000 conducted a study of lip patterns to promote the importance of cheiloscopy in forensic science identification.^[22]

Anatomical aspects

Lips are two, highly sensitive mobile folds, composed of skin, muscle, glands and mucous membrane. They surround the oral orifice and form the anterior boundary of the oral cavity. Anatomically, whether covered with skin or mucosa, the surface that forms the oral sphincter is the lip area. There is an upper lip (from under the nose and extending laterally toward the cheek from the nasolabial sulcus) and a lower lip (bound inferiorly by a prominent groove, the labiomental sulcus); the two lips are joined at the corners of the mouth - the commissures - and separated by the buccal fend.^[23-25]

Classification

In 1967, Santos was the first person to classify lip grooves he divided them in to four types namely.^[26]

1. Straight line
2. Curved line
3. Angled line
4. Sine-shaped curve

Suzuki and Tsuchihashi 1970 devised a classification method of lip prints.^[27]

- Type I – A clear-cut groove running vertically across the lip.
- Type I' – Partial-length groove of type I.
- Type II – A branched groove.

- Type III – An intersected groove.
- Type IV – A reticular pattern.
- Type V – Irregular.

Tsuchihashi's classification of lip prints



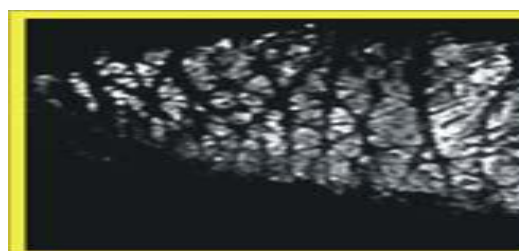
Type I: Vertical grooves across the lip.



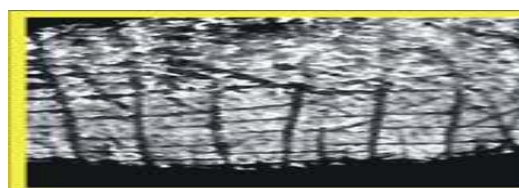
Type I': Partial length grooves of type I.



Type II: Branched grooves.



Type III: Intersecting grooves.



Type IV: Reticular grooves.

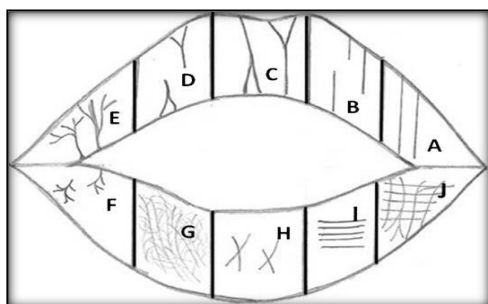


Type V: Other patterns.

Renaud lip prints classification^[28]

- Classification Groove type
- A. Complete vertical
 - B. Incomplete vertical

- C. Complete bifurcated
- D. Incomplete bifurcated
- E. Competebranched
- F. Incomplete branched
- G. Reticular pattern
- H. X or coma form
- I. Horizontal
- J. Otherform (ellipse, triangle)



Afchar-Bayat lip prints classification^[29]

Classification	Groove type
A1	Vertical and straight Grooves covering theThe whole lip
A2	Like the former, but Not covering the Whole lip
B1	Straight branched grooves
B2	Angulated branched grooves
C	Converging grooves
D	Reticular pattern grooves
E	Other grooves

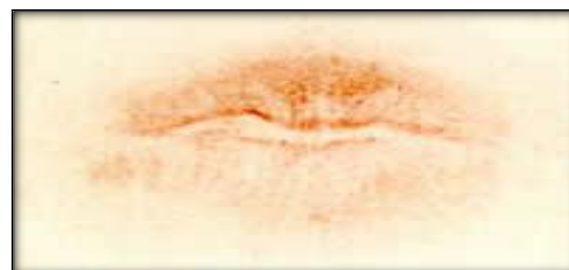
Jose´ Maria Dominguez classification^[30]

This is a classification based on the one made by Suzuki and Tsuchihashi. In the grooves classified as Type II of Suzuki and Tsuchihashi, the author and his co-workers observed, with some frequency, a slight variation: they observed that branched grooves often divided upwards in the upper lip, and downwards in the lower, as reported by Suzuki and Tsuchihashi; but they also realise that some grooves, the so called II type branched the other way around.

A study of vahanwahal-parekh, suggests that certain pattern trends were prevalent in either sex.

Lip Pattern	Site	Gender
Type	Predilection	Prediliction
Type I & I'	Quadrant	Female
Type II	Second Quadrant	Male
Type III	Never Occurs in lower lip	If so, Only Male
Varied Pattern	In all quadrant	Male
Similar Pattern	In all quadrant	Female

Recording Lip Prints



Lip prints can link a subject to a specific location if found on clothes or other objects, such as glasses, cups or even cigarettes' buts.^[31-33] All lip prints are important, even the ones that are not visible.^[31,34] Lip prints can be recorded in a number of ways.If located on anon-porous surface, lip prints can be photographed and enlarged.^[35] Using transparent overlays, it is possible to make an overlay tracing.^[35,36] Lip prints can be made using several substances, such as aluminium powder, silver metallic powder, silver nitrate powder, plumb carbonate powder, fat black aniline dyer or cobalt oxide.^[33,37,38] All lip prints contain lipids which make their development possible by using lysochromes dyes (Sudan III, Oil Red O, Sudan Black). Plumb carbonate is a white powder which can be used as a developer with a brush, over smooth, polished, metallic or plastic surfaces. Its only limitation is its use over white surfaces. In such circumstances, marphil black powder or fat black aniline dyer are better choices since they both have a dark colour.^[39] Silver nitrate can lead to positive results on nonideal surfaces, such as untreated wood or cardboard. DFO (1,8-Diazafluoren-9-one) and ninhydrin are chemical

developers also used on porous surfaces. On plastic or waxed surfaces, or on vinyl gloves, using cyanoacrylate dye is a good choice. In photographs, latent prints can be developed using cyanoacrylate dye or an iodine spray reagent.^[40,41]

Technique

Study material:

Brown and red colored lipstick
Cellophane tape
White chart paper
Magnifying glass

Technique:

Care was taken to select individuals. With no lesion on the lips. Hypersensitivity to lipstick the lips of the individuals were cleaned. Brown colored lipstick applied on the lip the subject was then asked to rub both the lips to spread the applied lipstick evenly. Over the lipstick, the glued portion of the cellophane tape strip was placed and the subject was asked to make the lip impression in the normal rest position of the lips by dabbing it in the center first and then pressing it uniformly towards the corner of lips. The cellophane strip was then stuck to the white chart paper for permanent record purpose and then visualized by magnifying lens. While studying the various types of lip prints, each individual's lips were divided into four compartments, i.e., two compartments on each lip, and were allotted the digits 1-4 in a clock-wise sequence starting from the subject's upper right.^[42]

Problems with Cheiloscapy

Pressure, Direction and method used in taking the print. If lipstick used, the amount and quality can also affect the print.^[43,44] Manual register of the overlay is another problem, due to the possibility of some subjectivity.^[45]

Another Factor

Pathological conditions (lymphangiomas, congenital lip fistula, lip scleroderma, Merkelson – Rosenthal syndrome, syphilis, lip cheilitis).^[46]

CONCLUSION

Recognition and detection of lip prints is an important role for odontologist because lip print can be a source for biological sample and hence DNA analysis and comparison. (Sweet et al 1994) In future cheiloscapy can be used for criminals identification.

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