

Lip Prints (Cheiloscopy): An Insight

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Abstract:

Lip print is a forensic investigation method that deals with the recognition based on lip traces. Positive identification of living or dead persons using the characteristic traits and features of the teeth and jaws forms a foundation of forensic science. Based upon the research, it was known that the arrangement of lines on the red part of human lips is distinctive for each human being. The pattern of wrinkles on the lips has appearances like fingerprints. They are unique, permanent and immobile even after death. Identification plays a very vital role in any crime investigation. The present article reviews in detail the history, classification, applications, scope of cheiloscopy and use of lip prints in crime detection.

Keywords: Cheiloscopy, criminal issues, fingerprints, lip prints.

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INTRODUCTION:

Personal identification is becoming significant not only in legal medicine but also in criminal investigation, identification, and genetic research.^[1] Lip prints are distinct lines and fissures in the forms of wrinkles and grooves present in the zone of transition of the human lip, between the inner labial mucosa and outer skin examination known as cheiloscopy. Cheiloscopy derived from Greek word cheilos-lips and skopein- the study of lip prints. Two Japanese scientists, Y. Tsuchihashi and T. Suzuki, in 1968-71, recognized that the arrangement of lines on the red part of the human lip in human beings is unique for each human being.^[2] The grooves present on human lips (Sulci labiorum) are exclusive to each person and can determine individuality. Forensic science refers to the area of effort used in a judicial setting and acknowledged by the court and the general scientific community to separate truth from untruth.

Fingerprints, post-mortem analysis, dental records, and DNA investigations have been successful; just like these methods, lip prints can be helpful in identifying a person positively and can be used to confirm the presence or absence of a person at the crime scene.^[3] It has also been suggested that variation in pattern among males and females could help in personal identification and sex determination.^[1,4] It has been confirmed that they recover after undergoing alterations like inflammation, trauma, and diseases like herpes and that the disposition and form of the furrows do not vary with environmental factors.^[5] These are unique as finger prints and do not change during the life of a person.^[1] The lip prints can be used to verify the presence or absence of a person from the crime, provided there has been consumption of beverages, drinks, usage of cloth, tissues, or napkin at the crime scene.^[6] Studying in-depth and establishing more facts and evidence in lip prints will help as useful in forensic dentistry.

Classification of Lip Prints:

(1) Martin Santos Classification (1966)^[1]

- I. Simple wrinkles
 - a) Straight lines
 - b) Angled lines
 - c) Sine shaped curve
- II. Compound wrinkles
 - a) Bifurcated
 - b) Trifurcated
 - c) Anomalous.

(2) Suzuki and Tsuchihashi Classification (1970) ^[7-9]
[Figure 1]

Type I: Clear cut grooves running vertically across the lip

Type I^a: Straight grooves; disappear halfway instead of covering the entire breadth of the lip

Type II: Fork grooves in their course

Type III: Intersecting grooves

Type IV: Reticulate grooves

Type V: Undermined

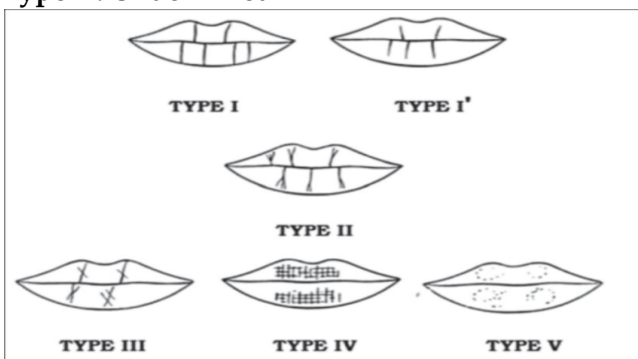


Figure 1: Suzuki and Tsuchihashi classification

(3) Raynaud's Classification:^[7]

- a. Complete vertical
- b. Incomplete vertical
- c. Complete bifurcated
- d. Incomplete bifurcated
- e. Complete branched
- f. Incomplete branched
- g. Reticular pattern
- h. X or coma form
- i. Horizontal
- j. Other forms (ellipse, triangle).

(4) Afchar-Bayat Classification (1979):^[1]

A1: Vertical and straight grooves covering the whole lip

A2: Vertical and straight grooves, but not covering the whole lip

B1: Straight, branched grooves

B2: Angulated branched grooves

C: Converging grooves

D: Reticular pattern grooves

E: Other grooves.

(5) The sex of the individual was determined as given by Vahanwala et al.^[5]

- 1. Type I and I^a pattern dominant: Female
- 2. Type I and II pattern dominant: Female
- 3. Type III pattern dominant: Male
- 4. Type IV pattern: Male
- 5. Type V varied patterns: Male.

(6) Only a 10 mm portion of the middle part of the lower lip is used recently for the basis of the classification ^[1,5]

- Linear "L" - if the lines prevail
- Bifurcation "R" - if the bifurcation is dominant
- Reticular "S" - if the lines cross
- Undermined "N" - when no superiority can be established.

(7) 23 types of individual features are characterized to establish individual features of patterns of the lines ^[5,10] [Figure 2]

An eye	⊙	A closing bottom fuscation	∧
A hook	┆	A delta-like opening	∇
A bridge	H	A simple opening	T
A line		A closing top bifucation	∇
A dot	•	A pentagonal arrangement	⊠
A rectangle like	⊠	A branch like top bifucation	∇
A triangle like	⊠	A star like bifucation	✱
A group of dots	••	A fence	≡≡
A simple top fuscation	∇	A branch like bottom bifucation	∧
A simple bottom fuscation	∧	Double fence	≡≡≡
A double eye	⊙⊙		
Hexagonal arrangement	⬡		
Crossing lines	X		

Figure 2: Individual features of patterns of the lines

Cheiloscopy [Examination of lip prints]:

Lip prints have to be taken within 24 hours of the time of death to prevent inaccurate data that would result from post mortem changes of the lip. Lip print outline depends on whether the mouth is opened or closed. In a closed-mouth situation, the lip exhibits well-defined grooves, whereas in an open position, the grooves are relatively ill defined and difficult to understand.^[1] Any pathology of the lip such as mucocele or any postsurgical alteration of the lip can change the lip print pattern. Loss of support because of loss of anterior teeth can cause changes in lip prints. Any debris or fluid on the lip surface, application of a thick layer of lipstick, or overstretching of cellophane tape can change lip print record.^[6]

Recording of lip prints:

The following methods can be used for tracing lip prints at the crime scene.

1. Direct photography of prints on a glass surface
2. Make use of fingerprint powders and fixing on foil. (Aluminum powder, Silver metallic powder, Silver nitrate powder, Cobalt oxide and Magnetic powder)^[11]

A lip print at the scene of the crime can be a foundation for conclusions as to the character of the event, the number of people involved, cosmetics used, people habit, sexes, occupational traits, and pathology of the lips themselves. Traces of lip prints should be looked particularly if a meal is taken at the scene of crime.^[12]

Recording lip prints from suspect:

The lip prints can be photographed on a nonporous flat plane such as mirror, enlarged and overlay tracings made of the grooves. Rouge is applied to the lips, and then lips are photographed.^[13] After applying lip stick, the impression should be taken on a paper until the lipstick has exhausted. Applying special creams on the lips and then transferring it. Print taken is directly photographed or enclosed by a cello tape to maintain a permanent record. Recently, Softwares are used for the recording of lip prints.^[13,14]

Application of Cheiloscopy:

1. For Personal identification: The specific grooves on the Human Lips play a great role in the identification of a Human being, and many studies have proven that.^[1]

2. In Sex Determination: In a study conducted by Vahanwala - Parekh, suggested that the sex of the individual was determined as: Type I and I a patterns are dominant in females in the third and fourth quadrants, i.e., lower lip and Type II pattern is common in males in the second quadrant, i.e., upper lip, left side. Individuals with different patterns in all quadrants were common in males, whereas having the same pattern in all quadrants were seen in females.^[4,15]

3. A tool in crime investigation: Lip prints added proof to a crime scene, and this is valuable, especially in cases of lacking other evidence, like fingerprints.^[5]

Merit of Lip Prints:

When the lip prints are not clear that is only the shape of the lip is printed, specific identification of a human being is very difficult. In these cases, it is acceptable to examine the substance which constituted the trace, e.g., saliva as a biological tracing.^[1] The huge potential for DNA typing from the lip print is marked.^[5] The lines are printed unclearly in the case where the lips are covered with food or cosmetics, and the trace will have the shape of the stain and can be subjected to chemical examination, to determine the substance covering the lips.^[5]

Demerits of Lip Prints:

According to the method, pressure, and direction used in taking the print, lip prints may vary in appearance that's why the same person can produce different lip prints. If lipstick is used as a recording medium, the quantity applied may also affect the print. Blurring of the lip prints may occur. The existence of some pathological conditions such as lymphangiomas, congenital lip, fistula, lip scleroderma, Melkersson-Rosenthal syndrome, syphilis, and lip cheilitis are the other causes which can invalidate the cheiloscopic study.^[14] The lip wrinkle pattern is on the vermilion border of the lip, which is the mobile portion of the lip.^[5]

Use of Lip Prints in Crime Detection:

Lip prints used as a detecting tool in forensic sciences, just like fingerprints and teeth. Traces of lips should be observed for on cutlery and crockery items, on the window or door glass, on photographs or letters. Lip prints may also look side by side with tooth marks on food products. In practice, lip prints

have also been discovered on the surface of windows, paintings, doors, plastic bags, and cigarette ends.^[14] They can most commonly appear in the scene of murders, rapes, and burglaries. Traces with clear lines and individual elements allow individual identification of a human being. It has the same significance as dactyloscopic traces. In the case of traces, in the shape of stains, the documentation examination terminates with group identification; in their character, they are like to other chemical and biological traces.^[16]

CONCLUSION

Lip prints are constant of an individual for lifetime; it may be used as a record for individual along with the fingerprints. A standard and uniform procedure has to be developed for the collection, development and recording of lip prints and the confirming comparison. However, many researches are still necessary to know more about the science of Cheiloscopy.

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