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CHEILOSCOPY AN ADJUNCT TO FORENSIC INVESTIGATION

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Research Article

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ABSTRACT

Identification of humans is a prime requisite in forensic science. It is need for certification of death and for personal, legal, social and humanitarian reasons. In forensic medicine, the chief methods of identification are fingerprints, DNA comparison and dental characteristics. Many times, one or all of these methods may not be totally effective or conclusive in establishing identity, especially in cases of burns, aircraft accidents etc. Cheiloscopy is a forensic investigation technique that deals with identification of humans based on lips traces. Cheiloscopy is gaining importance since last few decades. Lip prints are unique. This article deals with current knowledge about lip prints its collection, analysis and interpretation.

INTRODUCTION

Identification of humans is a prime requisite in forensic science. It is need for certification of death and for personal, legal, social and humanitarian reasons [1]. Every human being is distinct and discernible in that they exhibit their own pattern of characteristics [2,3]. Visual identification is the most common method applied in forensic medicine [4]. In forensic medicine, the chief methods of identification are fingerprints, DNA comparison and dental characteristics. Many times, one or all of these methods may not be totally effective or conclusive in establishing identity, especially in cases of burns, aircraft accidents etc [5]. In such circumstances, it is necessary to apply different and less known techniques. A new area of investigation in the detection of crime is the use of wrinkles on the lips [6]. Lip prints are normal lines and fissures in the form of wrinkles and grooves present in the zone of transition of human lip, between the inner labial mucosa and outer skin. The examination, study of lip prints and its possible use in forensic medicine for identification of an individual is referred to as "Cheiloscopy" [7-10]. Lip prints are unique [8]. It is possible to identify lip patterns as early as the sixth week of intrauterine life and do not change during the life of a person. After minor trauma, inflammation and infection like herpes, its verified that lip prints recover [2]. The form of the furrows does not vary with environmental factors [11].

History

Fischer in 1902 was the first anthropologist to describe the furrows on the red part of the human lips [9]. Edmond Locard, a criminologist, was the first person to use lip prints for identification of human in 1932 [12]. Synder in 1950 for the first time reported in his book "Homicide Investigation" the characteristics of lip grooves as individually distinctive characteristic as that of fingers [13]. Cottone, in 1981, reported in his book "Outline of Forensic Dentistry" that cheiloscopy is one of the special techniques used for personal identification [14]. Dr. Martins Santos in 1967 proposed that the lip characteristics could be used in personal identification and devised a simple system for classifying lip prints [15, 16].

Classification of lip prints

Dr. Martin Santos was the first to classify lip grooves. He divided them into four types [17].

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

A French scientist, Renaud, gave a classification after studying 4000 lip prints. His classification was as follows [19]

1. Type a Complete vertical
2. Type b incomplete vertical
3. Type c Complete bifurcated
4. Type d Incomplete bifurcated
5. Type e Complete intersecting
6. Type f Incomplete intersecting
7. Type g Reticulated
8. Type h In the form of sword
9. Type i Horizontal
10. Type j Other types

Kasprzak gave a classification based on individual feature of line pattern on red part of lips [9]

1. An eye
2. A hook
3. A bridge
4. A line
5. A dot
6. A rectangle- like
7. A triangle - like
8. A group of dots
9. A simple top bifurcation
10. A simple bottom bifurcation
11. A double eye
12. Crossing line
13. A closing bottom bifurcation
14. A delta-like opening
15. A simple opening
16. A closing top bifurcation
17. A pentagonal arrangement
18. A branch like top bifurcation
19. A star-like bifurcation
20. A fence
21. A branch-like bottom bifurcation
22. A double fence
23. A hexagonal arrangement

Classification of the patterns of the lines on the red part of the lips given by Kasprzak is as follows. If the lines prevail, the pattern is described as linear, “L.” If the bifurcation is dominant, it is called bifurcate, “R.” If the line cross, the pattern is dubbed

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reticular, "S." In case of no superiority the pattern is named undetermined, "N." [9,10].

Lip Print Analysis

To analyse the lip print for individual identification, three technical methods can be used

1. The method of determining common features. Establishment of seven to nine fine characteristic findings, as suggested by Kasprzak, lead to positive identification. This is similar to dactyloscopy.
2. The method of photographic montage
3. The contour method.

Lip Scoring

Prabhu have for the first time introduced the Weighted Value Scoring System to calculate the LIP SCORE for each lip [6].

The divided the lip into four quadrant ie. Upper right (I), Upper left (II), Lower right (III) and lower left (IV). Arabic numerals were given to each type of groove as follows **(Table 1).**

Table 1. Arabic Numerals to Each Type of Groove.

Suzuki and Tsuchihashi's Lip Print Pattern	Arabic Numeral Scoring
Type I	1
Type I'	2
Type II	3
Type III	4
Type IV	5
Type V	6

By summing the weighted lip line score values, lip score in each quadrant for an individual subject was calculated. By adding the scores of all the four lip quadrants the LIP SCORE for each individual was calculated.

Lip prints use in individual identification

Sharma [20] in 2009 studied middle part of lower lip of app 10 mm width in 100 individuals (50 males and 50 females). Study area was as recommended by Sivapathasundaram et al. [21] Determination of sex of an individual was done as per Vahanwala et al. [22].

Type 1, 1' – dominant – female

Type 2- dominant- female

Type 3- present- male

Type 4- male

Type 5 – male

They concluded that no lip prints studied matched and thus is an unique feature of each individual and thus can be considered as positive characteristic feature for individual identification.

El Domiaty et al. [23] studied 966 Saudi individuals including 13 identical twins and 19 families. Study was performed on 6 topographic areas as per Renaud's classification. They concluded that lip print is unique for each individual even in twins and family relatives.

Augustine et al. [24] studied lip prints of 600 individuals (280 males and 320 females). They divided the upper and lower lip into four parts each. Study was performed according to Tsuchihashi's classification. They concluded that lateral areas of lips showed significant difference in lip prints in males and females, while there was no significant difference in medial segments. But overall there was difference in lip prints in genders. They also studied hereditary resemblance between parents and offsprings. Their study showed difference of positive resemblance between mothers and offspring and between fathers and offspring was not found to be statistically significant. They concluded that a psotive hereditary pattern does exist between parents and offspring, but there does not seem to be a particular paternal or maternal influence on the pattern.

CONCLUSION

Cheiloscopy as a forensic investigation tool is gaining importance since last few decades. Great strides have been made in the collection, analysis and interpretation of the lip prints. Items such as photographs, cigarette butts, drinking glasses, cups, letters should be closely examined as such items may give valuable information for individual identification [9,10]. Advances have been made in the techniques and dyes, for developing lip prints [23-32]. Software's are now available for its analysis [33]. However extensive knowledge still is lacking in the subject and have to be high lightened, so that important evidences are not lost, and the identification of a victim and /or a criminal does not remain unnoticed.

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