International Journal of Anatomy and Research,
Int J Anat Res 2014, Vol 2(4):668-72. ISSN 2321- 4287
DOI: 10.16965/ijar.2014.520

Original Article

CHEILOSCOPY: A SCIENTIFIC APPROACH FOR PERSONAL IDENTIFICATION

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ABSTRACT

Introduction: Cheiloscopy is derived from Greek word "Cheiloswhich" meaning lips.It is the study of characteristic pattern of elevations and depressions on labial mucosa. It is unique for every individual like fingerprints and hence can be used to determine the sex and for personal identity.
Aim: This study is undertaken to evaluate the uniqueness of lip prints for sexual and personal identification of an individual.
Materials and Methods: lipsticks, brush, cellophane tape, bond paper and magnifying lens. 50 male and 50 female students were selected from Yenepoya University. Lipstick was applied on their lips evenly and the prints were taken on folded bond paper. The cellophane tape was stuck on the paper to preserve it as permanent records. The prints were analysed using magnifying lens and Tsuchihashi's classification of lip prints was used for to determine the most common pattern of lip prints found in males and females and to study any similarity of lip prints between two individuals.
Observations and Results: Our study showed in males the predominant pattern was of type III pattern (40%), followed by type IV (22%), type I (18%), type I' (12%) type II (6%) and type V(4%) respectively. This hierarchy is different for females, where type I was more predominant(54%),next was type I' (28%), type III (10%), type IV (4%), type II (1%)and type V(2%) .Hence these results confirm the uniqueness of lip prints for every individual and show its variation according to gender.
Conclusion: The data obtained from the above study shows promising results and indicates the uniqueness of lip prints like fingerprints for every individual. They hold a possible potential to determine the sex of an individual and hence can be used as records for personal identification.
KEY WORDS: Cheiloscopy, personal identification, Tsuchihashi's classification

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Access this Article online

Quick Response code

DOI: 10.16965/ijar.2014.520

Web site: International Journal of Anatomy and Research
ISSN 2321-4287
www.ijmhr.org/ijar.htm

Received: 24 Oct 2014
Peer Review: 24 Oct 2014 Published (O):30 Nov 2014
Accepted: 10 Nov 2014 Published (P):31 Dec 2014

INTRODUCTION

Lip prints or Cheiloscopy is the study of characteristic pattern of elevations and depressions on labial mucosa called as sulci labiorum [1]. Fingerprints since decades have been used as one of the important tool for personal identification by forensic experts. Since lip prints are unique like the finger prints for an individual, it can also be used as a Supplementary tool to verify the presence or absence of a person at the site of crime [2].

Lip prints can be identified as early as sixth week of intrauterine life and remain same during the life of an individual. Lip prints recover even after trauma, inflammation and diseases like herpes and can be recognized without difficulty [3]. 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 [4,5,6]. Hence lip patterns are unique, permanent and rarely change with age, resisting many tribulations and thus can act as a potential tool in identification process [2].

The present study was carried out to investigate and evaluate the uniqueness of lip prints, their role in personal identification with help of particular lip print pattern among different gender.

Aims and objectives

The present study was undertaken to evaluate the uniqueness of lip prints for sexual and personal identification of an individual.

MATERIALS AND METHODS

Elle 18 lipsticks, brush, cellophane tape, A4 size bond paper, pencil for labelling and magnifying lens (10 xs) were the materials used.

50 male and 50 female students aged between 17-22 years were selected from Yenepoya University. Written consent was taken from each student and clearance was also taken from college ethical committee. Students allergic to cosmetics, with ulcers, trauma or surgical scars to lips were excluded from the study. Students with normal lips without any congenital deformity were included in this study. For recording the lip prints, lipstick was gently and evenly applied on lips using a brush, students were asked to gently rub their lips for equal spreading of lipstick, impression was taken on folded bond paper and then cellophane tape was pasted on bond paper to preserve it as a permanent record, it was subsequently analysed with help of magnifying lens. The prints were studied and Tsuchihashi's classification of lip prints was used for analysis using magnifying lens to determine the most common pattern of lip prints found in males and females and study any similarity of lip prints between two individuals.

For personal identification,

The lip prints were divided into four quadrants (fig 1) by a horizontal line that divides the upper lip from lower lip and a median vertical line that divides lips into right and left halves; right upper as the first quadrant, left upper as the second quadrant, left lower as the third quadrant, and right lower as the fourth quadrant. The lip prints were observed using magnifying lens and were categorised into particular type depending upon the predominant pattern. Then the lip print patterns were classified as per Suzuki and Tsuchihashi's classification [4]. (Figure 2) which states that

1. Type I: clear vertical grooves that run across the entire lips.
2. Type I': similar to type I but that do not run across the entire lip (incomplete)
3. Type II: branched groove (branched y pattern).
4. Type III: intersected grooves.
5. Type IV: reticular grooves.
6. Type V: undetermined.

Fig. 1: Division of lip into four quadrants.

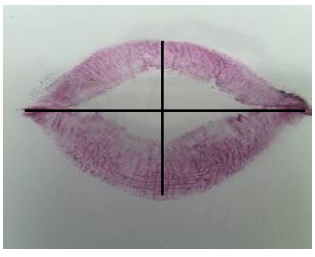
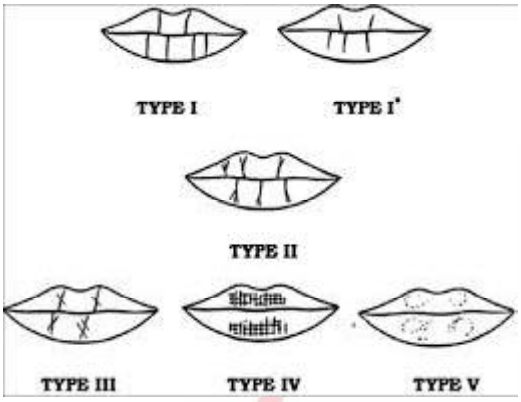


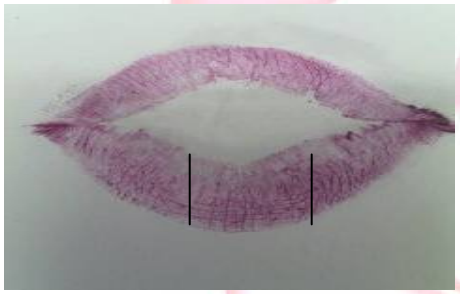
Fig. 2: Suzuki and Tsuchihashi classification of lip prints.



For the sex determination

Middle 10mm of lower lip (Fig 3) was selected for the study due to numerically supremacy and clear visibility of the lines as suggested by Vahanwahala [7].

Fig. 3: Middle 10 mm of lower lip for sex determination.



OBSERVATIONS AND RESULTS

After analyzing the lip prints using magnifying lens, we got all the types of patterns classified by Suzuki and Tsuchihashi, (figures 4-9) our studies also revealed that all the four quadrants of an individual's lip showed different types of patterns, and in each single quadrant there were multiple patterns present and hence we can confirm that no lip prints match with each other and every lip print is unique for an individual and can help in personal identification.

In our study for sex determination, (figure 10) males show the predominance of type III pattern (40%), followed by type IV (22%) and next is type I (18%), type I' (12%) type II (6%) and type V (4%). This grading is different for females, where type I is more predominant (54%) followed by type I' (28%) and next is type III (10%), type IV (4%), type II (1%)and type V(2%). Thus the sexual identification of a person involved in medical-legal case is rather easy due to the clear differences between the sexes.

Fig. 4: Type I Pattern.

Fig. 5: Type I' Pattern.

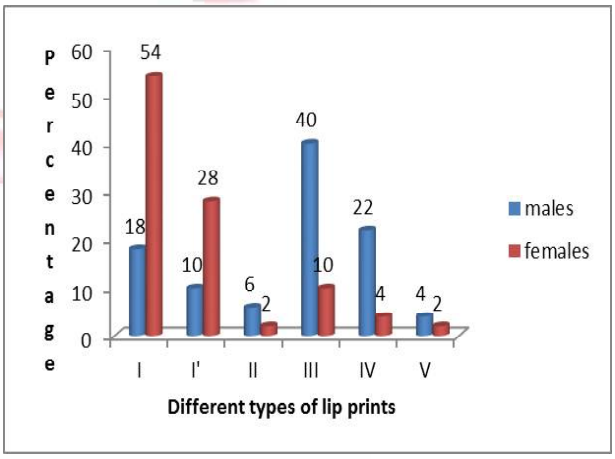
Fig. 6: Type II Pattern.

Fig. 7: Type III Pattern.

Fig. 8: Type IV Pattern.

Fig. 9: Type V Pattern.

Fig. 10: Bar diagram showing the predominance of lip patterns in different sexes.



DISCUSSION

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 [8]. If an exact description of lip prints of an individual are established and recorded by detailed study, then this antemortem record can be compared for matching with the details of lip prints obtained from postmortem records for personal identification of an individual [9].

Lip prints were first described by Anthropologist

R.Fischer in 1902 [10]. In 1932 Edmond Locard, French criminologists made use of lip prints for personal identification and criminalization [11]. In 1950, Synder in his book Homicide Investigation descrided the individuality of lip prints like finger prints [12]. Suzuki, in 1967, studied the measurement of the lips, the use and colour of rouge, and the method for its extraction from the crime scene to obtain useful data for practical forensic application [13]. In 1970, Suzuki and Tsuchihashi two Japanese, studied and classified lip prints into five types and stated that the arrangement of furrows on the red part of human lips of each individual is unique and it is possible to use these arrangement for the identification of a person. Tsuchihashi's classification for different types of lip print is the most standard. Keeping this classification as the basis, the current study was conducted to study the lip prints of different individuals to establish their personal identity [4]. 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 1990, Kasprzak conducted a research for period of five years on 1500 persons to explain in detail the practical use of Cheiloscopy [10]. Vahanwala in 2000 conducted a study of lip patterns to uphold the importance of cheiloscopy in forensic science for personal identification and stated that Type I and I' are more common in females and type III and IV are more common in males. Similar findings has been found in Present study and studies done by many authors [7,14,15,16,17,18].

Scope: Studies reveal the possibility of obtaining DNA from the latent lip prints of an individual which can help to detect his genetic profile. [8]

CONCLUSION

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. However, for living individuals, lip prints can be of the utmost importance, primarily due to their ability to distinguish individuals.

Our study led to the following conclusions: Lip print patterns show variation according to the gender. Type I was predominant in females whereas Type V was the rarest. Males had highest frequency of Type IV while Type I' was the least common. Lip prints can be used as a reliable aid to human identification in the field of forensic science.

The data obtained from the above study shows promising results and indicates the uniqueness and permanence of lip prints. They hold a conceivable potential to determine the sex of an individual. However, further studies should be conducted on a large number of individuals of different races, family members, twins, and siblings in order to achieve more accurate results. Research progress in this area will contribute not only to its direct use in personal identification in forensic medicine but will also open up a new field that can contribute extensively to criminal investigation and identification.

Conflicts of Interests: None

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How to cite this article:
Qudusia Sultana, M.H Shariff, Muhammed Asif, Ramakrishna Avadhani. CHEILOSCOPY: A SCIENTIFIC APPROACH FOR PERSONAL IDENTIFICATION. Int J Anat Res 2014;2(4):668-672.
DOI: 10.16965/ijar.2014.520