

Morphological Patterns of Lip Prints in Aden- Yemeni Population

Dr Huda Abdulwadood Mohammed Omer

Associate Prof. in Forensic Medicine and Toxicology Department. Faculty of Medicine and Health Sciences - Aden University, Yemen- Aden

ABSTRACT

The imprint produced by the lip is termed as "lip print", cheiloscopy is a forensic investigation technique deals with identification of humans based on lips traces. Lip prints have a good potential for use in identification. They are unique and do not change during the life of a person, and invariable and permanent. The aim of this study was to determine the most common lip pattern found among Aden- Yemeni population.

Materials and Methods: Lip prints of 84 students Aden population, including (37 males and 47 females) 3 pair identical twins, red lip sticks, was applied and recorded on a plain white paper. Lip print has visualized with magnifying lens. After divided lip into six areas. Suzuki and Tsuchihashi's classification has used to define the lip patterns and the data have statistically analyzed.

Result : Every individual has unique lip print, Type II (43.8%) appears to be the most predominant pattern in both males and female, In male, the order of appearance of patterns were Type II, followed by type III, type I, type I', type IV and V patterns. While in female Type II followed by type I, type III, type V, type IV and type I' patterns, no significant difference was observed between the lip print patterns of males and females in different lip areas.

Conclusion: Type II the most common lip pattern among Aden population and not related to sex determination.

Keywords: Cheiloscopy, lip print, forensic odontology, gender, Aden, Yemeni

INTRODUCTION

Human identification is a universal process based on scientific principles. [1] The numerous approaches employed in personal identification rather than traditional methods for anthropometry, fingerprints, gender determination, age estimation, measurement of height, and differentiation by blood groups and DNA. [2] Forensic odontology include rugoscopy, cheiloscopy, bite marks, tooth prints, radiographs, photographic study and molecular methods. [3]

Identification plays a major role in any crime investigation and there are many tool for human identification in both civil and criminal issues. Cheiloscopy, a new area of investigation in the detection of crime is the use of wrinkles on the lips. [4]

It is possible to identify the lip patterns as early as the sixth week of the fetal stage. [5,6] Since then, the lip print pattern remains permanent, resisting climatic change, minor traumas, inflammation, and afflictions such as herpetic lesions. [5,6] The oily and moist secretions from sebaceous and salivary glands located at the vermilion border and subsequent moisturization from the tongue enables the formation of a latent lip print. [7]

Lip prints have a good potential for use in criminal investigations. They have been used only occasionally despite their frequent occurrence at crime scenes. [8] it can be implemented as an auxiliary method of identification. [9]

The pattern of wrinkles on the lips has individual characteristics like fingerprints. Cheiloscopy is a forensic investigation technique that deals with identification of humans based on lips

traces. [10] The imprint produced by the lip is termed as "lip print". [11] Lip prints are unique and do not change during the life of a person, that is to say that they are invariable and permanent. [12]

The lip prints being uniform throughout the life and characteristics of person can be used to verify the presence or absence of a person from the crime, lip prints will certainly help as useful evidence in forensic dentistry. [10]

The lip prints; were first studied by the famous anthropologist, R. Fischer, in 1902, anthropology merely mentioned the existence of the furrows without suggesting a practical use for the phenomenon. In 1950, two Japanese scientists, Y. Tsuchihashi and T. Suzuki, reported that the arrangement of furrows on the lip is unique and proposed a classification for the same, which is still in use. [13,14] The classification is as follows:

Type I: clear-cut grooves running vertically across the lip;

Type I': the grooves are straight but disappear halfway instead of covering the entire breadth of the lip;

Type II: the grooves fork in their course;

Type III: the grooves intersect;

Type IV: the grooves are reticular; and

Type V: the grooves do not fall into any of the Type I to IV and cannot be differentiated morphologically.

In dead, lip prints have obtained within 24 hours of time of death to prevent any erroneous data that would result from post-mortem alterations of lip. [12]

Similarities have noted between the lip prints of parents, children, and siblings. Many studies have suggested the possibility of presence of gender differences in lip prints. [3,8] Despite the significant role of lip printing in distinguishing individuals and its common presence in crime scenes, studies in this regard are scarce. Lack of comprehensive databases of lip prints restricts unanimous acceptance of lip printing. [7,8]

The aim of study is to determine the most common lip pattern found among Aden- Yemeni population and variations in

lip patterns and evaluate the differences between sexes.

MATERIALS AND METHODS

This study carried out in March to July of 2018, was conducted on 84 students (37 males and 47 females) 3 pair identical twins, aged from 22 to 27 years of age, in Aden University of Medicine and Health Sciences- Yemen. Excluded criteria is 1) persons with lip scar. 2) Lip lesions 3) Lip congenital deformities 4) persons with known hypersensitivity to lipsticks.

The study protocol and objectives have thoroughly explained to the participants and informed consent has obtained from them. The Ethics Committee of Aden University of Medical and Health Sciences approved the study.

Materials used to record lip prints were: red colored lipstick, cellophane tape, white paper and magnifying lens. The technique of recording have selected according to Costa and Caldas. [15]

The subjects' lips; were cleaned with wet tissue first before taking the print. The lipstick has gently applied to the upper and lower lips, while the participants have told to rub the lips and gently squeeze them from the center to the corners of the lips. [22]

The subject; was asked to stop moving the lips during the procedure and to keep the lips in a resting position. The lip prints were lifted by a cellophane tape and pressed gently over the lips. The fluted tape; was then pasted onto a white sheet to provide a permanent record, which can be studied at any time. Repeat the registration procedure if any defects are observed. The impression was later visualized with the help of a magnifying glass. The remaining lipstick; was cleaned on the lips with a tissue to remove the make-up.

Lip prints were divided into six sextants (three areas in each lip) by drawing two lines, perpendicular to the transverse line, passing the two highest points of the philtrum including right upper lip (RUL), middle upper lip (MUL), left upper lip

(LUL), left lower lip (LLL), middle lower lip (MLL) and right lower lip (RLL). [22]

Obtained prints have examined carefully under hand magnifying lens.

The analysis of the records; was done using the most commonly used classification worldwide. [3,6,14] prevailing line pattern of each sextant was reported as its final type.

General dentist; was asked to help in analysis the lip pattern and the uniqueness.

Statistical analysis

The data were statistically analyzed using SPSS 22.0 software. The Pearson’s chi-square test has used to assess possible differences between males and females. The level of statistical significance was set at $P < 0.05$.

RESULTS

Classification of Tsuchihashi, of lip pattern; was used in the present study. [16]

Throughout the whole work, No identical lip print patterns (even in each pair of identical twin) have observed in the subjects. Every individual has a unique lip print, thereby confirming the uniqueness of the lip print.

Table 1, Frequency (%) for different lip patterns among all population, showed that type II (43.8%) appears to be the most predominant pattern in study population and

the least pattern is type V(7.73%) of all patterns.

In male lip prints, the order of appearance of patterns were Type II(44%), followed by type III(16.6%), , type I (14.9%) , type I' (9.5%),type IV(9.4%) and V(5.4%) patterns. While in female Type II(43.6%) followed by type I(16.3%), type III(15.6%), type V(9.57%), type IV(7.8%) and type I'(7.1%) patterns.

Table 2, Distribution of lip print patterns based on sex and site (percentage).

The patterns had different distributions in the sextants. The highest frequencies of type II (70.3%) (Fig.1), I (55.3%) (Fig.II), III (37.8%) (Fig.III), IV (29.8%) (Fig.IV), I' and V pattern showed same frequency (19%) were in sextants LUL, MLL, RUL, MUL and LLL respectively. Chi-square test showed no significant difference has observed between the lip print patterns of males and females in different areas ($P > 0.05$).

Table 1: Frequency (%) for different lip patterns among all population.

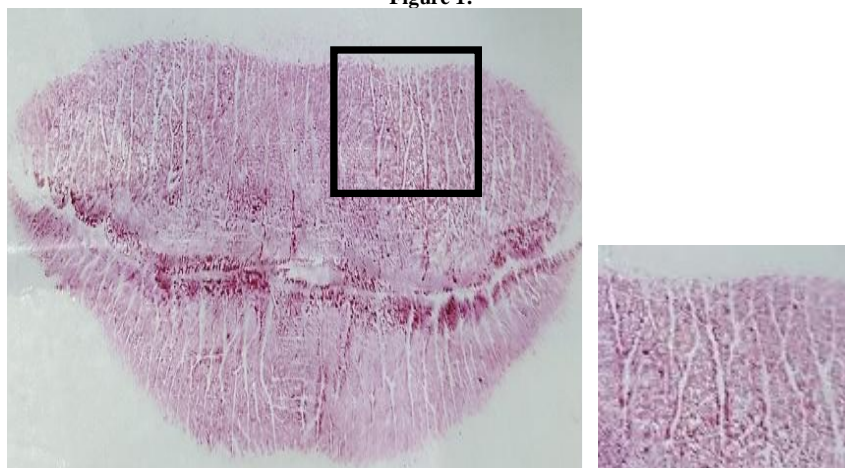
Pattern type	Female (%)	Male(%)	Total (%)
I	16.3%	14.9%	15.67%
I'	7.1%	9.5%	8.1%
II	43.6%	44%	43.8%
III	15.6%	16.6%	16.1%
IV	7.8%	9.4%	8.5%
V	9.57%	5.4%	7.73%

Table 2: Distribution of lip print patterns based on sex and site (percentage).

Area	Sex	Frequency of pattern type (%)						P value
		I	I'	II	III	IV	V	
RUL	Male	10.8	2.7	46	37.8	2.7	0	0.139
	Female	2.1	2.1	63.8	21.3	4.3	6.4	
MUL	Male	19	16.2	21.6	5.4	27	10.8	0.405
	Female	17	4.3	34	8.5	29.8	6.4	
LUL	Male	8.1	5.4	70.3	13.5	2.7	0	0.070
	Female	6.4	8.5	46.8	23.4	0	14.9	
RLL	Male	16.2	5.4	51.4	21.6	0	5.4	0.704
	Female	8.5	8.5	51	23.4	4.3	4.3	
MLL	Male	29.7	19	24.3	2.7	20	5.4	0.185
	Female	55.3	10.6	17	4.3	6.4	6.4	
LLL	Male	5.4	8	51.4	19	5.4	10.8	0.796
	Female	8.5	8.5	49	12.8	2.1	19	

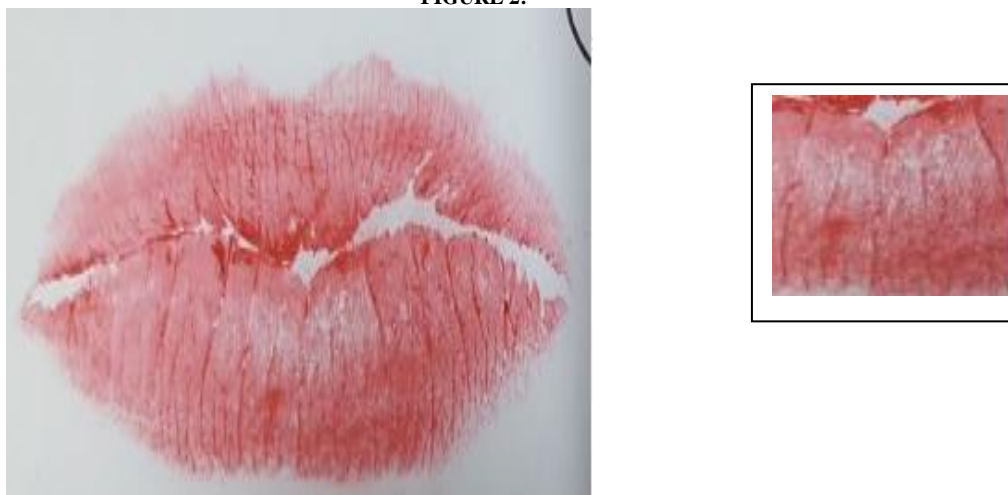
Right upper lip (RUL), middle upper lip (MUL), left upper lip (LUL), right lower lip (RLL), middle lower lip (MLL), left lower lip (LLL). Chi-square test, showed no significant difference between the lip print patterns of males and females in different sextants ($P > 0.05$).

Figure 1:



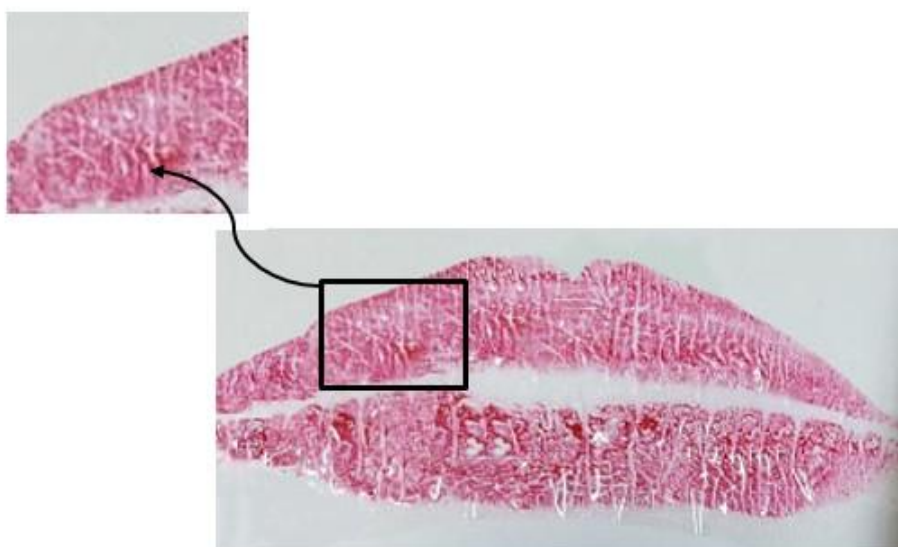
Type II

FIGURE 2:



Type I

FIGURE 3:



Type III

FIGURE 4:



Type IV

DISCUSSION

Lip prints are thought to have the ability to distinguish individuals and, hence, have a potential use in human identification purposes. [15] They cannot always be used, sometimes it is necessary to apply different and reliable investigations like cheiloscopy and palatoscopy. [12] Suzuki and Tsuchichashi revealed that lip prints do not change with age. [17]

Lip prints could be a useful adjunct to fingerprints and teeth for human identification, [18,19] in situations such as crime scenes, accidents and mass disasters. [6,15]

Different prevalence of lip print patterns has been reported; in different populations. In this study the most common pattern was type II(43.8%) and the least common was type V (7.73%),this agreed with Parmarand Rathodfound that type II (branched) was most common type of lip print observed among students while type V (mixed indefinite) was the least common among Indian students, [20] and also in consistency with study conducted on a Portuguese population. [15] Maheswari & Gnanasundaram observed in their study maximum number of Indian male and female subjects have Type II lip prints. [21] While Moshfeghi et al, reported that type V was seen most commonly in an Iranian population. [22] Prasad and Vanishree reported type IV most common among their population. [23]

We observed no identically similar lip-print pattern appeared in two subjects,

this supported by Maheswari & Gnanasundaram and El Domiaty et al. [6,21]

According to role of lip prints in sex determination, our result agreed with Moshfeghi et al, who concluded that no statistically significant difference was observed in the lip print patterns of males and females. [22] In parallel with Maheswari, & Gnanasundaram those recorded that no peculiarity of lip print was established in males and females. [21]

On the contrary, to Costa &Caldas and Kumar et al., stated that lip prints are able to distinguish individuals and may be useful in sex determination, hence this has been used in gender identification. [12,15] Non-identical lip print patterns were recorded in identical twins agreed with El Domiaty et al., and Kumar et al. [6,12]

Intact lips provide prints that can provide valuable legal evidence. Lip print varies in different parts of the lip, which establishes that every individual has unique lip print. [23]

CONCLUSION

Type II is the most common pattern among Aden population and type V is the least pattern. Lip print is unique for every individual hence it is a reliable tool in the forensic investigations, and difficult to use in gender identification.

REFERENCES

1. Sandhu SV, Bansal H, MongaP, Bhandari R. Study of lip print pattern in a Punjabi population. J Forensic Dent Sci. 2012;4:24–28.

2. Reddy LV. Lip prints an overview in forensic dentistry. *J Adv Dent Res.* 2011, 2:17–20.
3. Devi A, Astekar M, Kumar V, Kaur P, Singh N, Sidhu GK. The study of inheritance analysis and evaluation of lip prints in individuals. *J Forensic Dent Sci.* 2015, 7(1): 49–53.
4. Prabhu RV, Dinkar A, Prabhu V. Digital method for lip print analysis: A New approach. *J Forensic Dent Sci.* 2013, 5(2): 96–105.
5. Castello A, Segui MA, Verdu FA. Luminous lip-prints as criminal evidence. *Forensic Sci Int.* 2005, 155:185–187.
6. El Domiaty MA, Al-gaidi SA, Elayat AA, Safwat MD, Galal SA. Morphological patterns of lip prints in Saudi Arabia at Almadinah Almonawarah province. *Forensic Sci Int.* 2010, 200:179.e.1–9.
7. Vats Y, Dhall JK, Kapoor AK. Gender variation in morphological patterns of lip prints among some north Indian populations. *J Forensic Dent Sci.* 2012, 4(1): 19–23.
8. Augustine J, Barpande SR, Tupkari JV. Cheiloscopy as an adjunct to forensic identification: a study of 600 individuals. *J Forensic Odontostomatol.* 2008, 26(2): 44–52.
9. Prabhu RV, Dinkar AD, Prabhu VD, Rao PK. Cheiloscopy: Revisited. *J Forensic Dent Sci.* 2012, 4:47–52
10. Dineshshankar J, Ganapathi N, Yoithaprabhunath TR, Maheswaran T, Kumar MS, Aravindhana R. Lip prints: Role in forensic odontology. *J Pharm Bioallied Sci.* 2013, 5(1): S95–S97.
11. Dolly A, Rodrigues C, Bankur R, Gopinathan PA, Sharma R, Doddamani A. Evaluation of Efficacy of Three Different Materials Used in Cheiloscopy –A Comparative Study. *J Clin Diagn Res.* 2016, 10(10): ZC67–ZC71.
12. Kumar GS, Vezhavendhan N, Vendhan P. A study of lip prints among Pondicherry population. *J Forensic Dent Sci.* 2012, 4(2): 84–87.
13. Randhawa K, Narang RS, Arora PC. Study of the effect of age changes on lip print pattern and its reliability in sex determination. *J Forensic Odontostomatol.* 2011, 29:45–51.
14. Verma P, Sachdeva SK, Verma KG, Saharan S, Sachdeva K. Correlation of Lip Prints with Gender, ABO Blood Groups and Intercommissural Distance. *N Am J Med Sci.* 2013, 5:427–431.
15. Costa S, Caldas IM. Morphologic patterns of lip prints in a Portuguese population: a preliminary analysis. *J Forensic Sci.* 2012, 57:3: 786–788.
16. Tsuchichashi Y. Studies on personal identification by means of lip print. *Forensic Sci Int.* 1974, 3:233–48.
17. Suzuki K, Tsuchichashi Y. A new attempt of personal identification by means of lip print. *Cann Soc Forens Sci J.* 1971, 4:154–158.
18. Prasad P. A comparison of lip prints between Aryans-Dravidians and Mongols. *Indian J Dent Res.* 2011, 22:664–668.
19. Karki RK. Lip prints: an identification aid. *Kathmandu Univ Med J (KUMJ)* 2012, 10:55–7.
20. Parmar P, Rathod GB. Pattern of Lip Print among Undergraduate Students: A Forensic Anthropological Study. *IAIM,* 2017, 4(5): 52–55.
21. Maheswari, TNU & Gnanasundaram, N. Role of Lip prints in Personal Identification and criminalization. *Anil Aggrawal's Internet Journal of Forensic Medicine and Toxicology [serial online].* 2011, (12) 1: 21.
22. Moshfeghi M, Beglou A, Mortazavi H, Bahrololumi N. Morphological patterns of lip prints in an Iranian population. *J Clin Exp Dent.* 2016, 8(5): e550–e555.
23. Prasad P, Vanishree. A comparison of lip prints between Aryans-Dravidians and Mongols. *Indian J Dent Res.* 2011, 22:664–668

How to cite this article: Omer HAM. Morphological patterns of lip prints in Aden-Yemeni population. *International Journal of Science & Healthcare Research.* 2019; 4(2): 38–43.
