

Lip outline: A new paradigm in forensic sciences

Aruna Kumari Maloth,
Shyam Prasad Reddy
Dorankula,
Ajay Prakash Pasupula¹
*Department of Oral Pathology,
Kamineni Institute of Dental
Sciences, Nalgonda, ¹Department
of Oral Pathology, Mallareddy
Dental College for Women's,
Hyderabad, Telangana, India*

Address for correspondence:
*Dr. Aruna Kumari Maloth,
Department of Oral Pathology,
Kamineni Institute of Dental
Sciences, Nalgonda - 508 254,
Telangana, India.
E-mail: dr.arunaopath@gmail.com*

Abstract

Introduction: Personal identification is becoming increasingly important not only in legal medicine but also in crime/criminal investigation and identification. Sometimes establishing a person's identity can be a very difficult process. Dental, fingerprint, and DNA comparisons are probably the most common technique used. However, there are many well-known implanted methods of human identification, one of the most interesting emerging methods of human identification which originates from the criminal and forensic practice, is human lips recognition. Cheiloscopy is a forensic investigation technique that deals with the identification based on lip traces. The lip outline of every person is unique and can be used to fix the personal identity. **Aim:** The aim of this study was to assess the distribution of lip outline patterns among males and females, and to evaluate the uniqueness of lip outline pattern. **Materials and Methods:** The study group comprised of 200 individuals from Kamineni Institute of Dental Sciences. Lip outline patterns were obtained and were transferred to the proforma sheet for analysis. **Results:** The results of the study revealed that the lip outline patterns for each individual were unique. **Conclusion:** This study showed that lip outline patterns are unique to each individual and can be used for personal identification.

Key words: Cheiloscopy, forensic sciences, lip outlines

Introduction

The word "Forensic," derived from the Latin word, "Forensis," means the art or study of public. Forensic science refers to the area of endeavor that can be used in a judicial setting and accepted by the court and the general scientific community to separate truth from untruth.^[1] There are many well-known implanted methods of human identification, one of the most interesting emerging method of human identification which originates from the criminal and forensic practice, is human lips recognition.^[2]

Cheiloscopy is a forensic investigation procedure which deals with human identification based on lip traces.^[3]

History

In 1902, Fischer was the first to describe the biological phenomenon of systems of furrows on the red part of human lips.^[4] Use of lip prints in personal identification and criminalization was first recommended in France by Edmond Locard.^[5] Since 1950, the Japanese have carried out extensive research in the matter. Based on the research done by two Japanese Scientists Tsuchihashi and Suzuki, it

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Maloth AK, Dorankula SP, Pasupula AP. Lip outline: A new paradigm in forensic sciences. J Forensic Dent Sci 2016;8:178-9.

Access this article online

Website:
www.jfds.org

DOI:
10.4103/0975-1475.195109

Quick Response Code



was established that the arrangement of lines on the human lips is individual and unique for each human being.^[1] Mc Donell in 1972 conducted a study on lip prints between two identical twins and reported that two identical twins seemed to be indistinguishable by every other mean, but their lip prints were different.^[6]

Cheiloscopy is one of the special techniques used for personal identification was reported by Cottone, in 1981, in his book outline of forensic dentistry.^[7] In 1990, Kasprzak conducted research to elaborate the practical use of cheiloscopy.^[4] Vahanwala in 2000 conducted a study of lip patterns to promote the importance of cheiloscopy in forensic science identification.^[8] Sivapathasundharam *et al.* in 2001 studied the incidence of particular lip print patterns in the Indo-Dravidian population.^[9]

The objective of this study was to assess the distribution of lip outline pattern among males and females and to evaluate the lip outlines patterns for their uniqueness.

Materials and Methods

Study sample

A sample of 200 individuals comprising 100 females and 100 males were included in the study. All individuals were aged between 17 and 25 years. The subjects were selected whose lips were free from any pathology such as inflammation, mucocele, cicatrization, and deformities such as cut marks or lesions. Individuals with known hypersensitivity to lipsticks were not included in the study. Informed consent was taken from each of the subjects.

Study materials

To classify the lip outline pattern in this study, the classification scheme proposed by Chandrashekar was followed [Tables 1 and 2]. Materials used were:^[10]

1. Lip liner/lipstick of a bright red color and non glossy
2. Transparent cellophane tape, glued on one side
3. Scissors
4. White bond paper
5. Adhesive tape
6. Cotton
7. Scale
8. Magnifying lens
9. Pen/pencil for labeling the individual details.

Recording of lip outline

The lips of individuals were cleaned, and a dark red colored lip liner was used to mark upper and lower vermilion border. A lip outline impression was made on strip of cellophane tape on glued portion, by dabbing it in the center first and then pressing it uniformly toward the corners of the lips [Figure 1]. The cellophane strip was then stuck to the white chart paper for permanent record purpose and

Table 1: Upper lip outline pattern

Twin peak	Dome
Un even peak	Double convex
Cantilever bridge	Flying bird
Suspension bridge	Sine curve
Butte	Flat
Butter fly	Cleft

Table 2: Lower lip outline pattern

Apple bottom	Boat
Concave arc	Basin
Companulate	Flat

then visualized by magnifying lens [Figure 2]. The recording was done by noting outline pattern in both upper and lower lips, in both males and females.

Results

A total of 200 individuals were included in the study, comprising of 100 males and 100 females each, in the age group of 17–25 years. The lip outline pattern obtained from each individual was carefully examined with an illuminated magnifying lens and checked for the pattern. The lip outline pattern was marked based on the classification described.

It was observed in our study that ten different upper lip outline patterns in females and nine different patterns in males [Figures 3 and 4]. Most common upper lip outline pattern in females was uneven peak (28.5%) [Figure 5], followed by twin peak, double convex, dome, flat, butterfly, flying bird, cantilever, butte, suspension bridge, and flat. Most common upper lip outline pattern in males was twin peak (32.9%) [Figure 6] followed by an uneven peak, double convex, flat, dome, butterfly, suspension bridge, butte, and cantilever.

In males, the most common lower lip outline pattern observed in our study was companulate (28.6%) followed by basin, boat, flat, apple bottom, and concave arc. We observed most common lower lip outline pattern in females was companulate (34.4%) followed by boat, basin, flat, apple bottom, and concave arc.

Discussion

Personal identification is required for an unknown deceased person in homicide, suicide, accident, mass disaster, etc., and for living individual who are missing or culprits hiding their identity. Identification can be made by comparing the antimortem record with that of the postmortem record. If a definite description of the different parts of the upper lip and lower lip are established for an individual by



Figure 1: Taking lip outline pattern on a cellophane tape



Figure 2: Cellophane tape with lip outline pattern stuck on white chart paper for permanent record



Figure 3: Upper lip out line patterns showing (a) twin peak (b) uneven peak (c) flying bird and (d) double convex



Figure 4: Lower lip out line pattern showing (a) companionate (b) boat (c) basin and (d) apple bottom



Figure 5: Lip outline patterns in females showing (a) twin peak (b) uneven peak (c) companionate and (d) basin patterns



Figure 6: Lip outline patterns in males showing (a) twin peak (b) uneven peak (c) boat and (d) companionate

detailed study, this antimortem record can be scanned and preserved for matching the details of lip outlines patterns in postmortem records for personal identification.

Lips are two fleshy folds surrounding the oral orifice, lined externally by the skin and internally by mucosa. The skin is continuous with the mucosa at transitional

or vermillion border, a reddish zone covered by thin keratinized epithelium. The junction between the vermillion border and the skin forms the lip outline, produced by characteristic shape in the labial mucosal surface, unique for the individuals like finger prints.^[1] These lip outline patterns can be employed in forensic investigations as an adjuvant tool along with the lip prints.

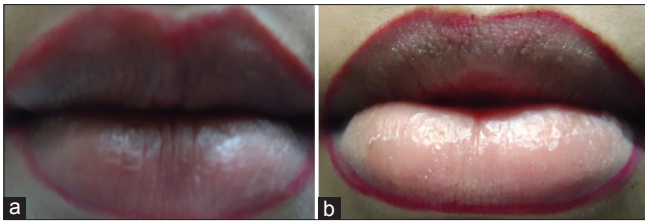


Figure 7: Common lip outline patterns in females showing (a) uneven peak (b) twin peak

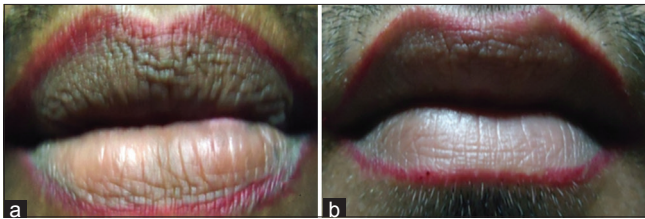


Figure 8: Common lip outline patterns in males showing (a) twin peak (b) uneven peak

The presence of lip outline on materials left in the crime scene is considered as an evidence of a relationship between the suspect and the crime scene. Research studies and information regarding the use of lip outline patterns as evidence in personal identification and criminal investigation in forensic dentistry is very much scanty. In spite of few studies available, the study of Chandrashekar gives a standard classification of his own for different types of lip outline patterns. Keeping this classification as the basis, the current study was conducted to study the lip outline pattern of different individuals, to establish facts so as to aid in giving further details of lip outline patterns.

Analysis of lip outline pattern in females showed that ten different upper lip outline patterns. Most common upper lip outline pattern in females was uneven peak (28.5%), [Figure 7] followed by twin peak, double convex, dome, flat, butterfly, flying bird, cantilever, butte, suspension bridge, and flat. Analysis of lip outline pattern in males showed that nine different patterns. Most common upper lip outline pattern in males was twin peak [32.9%], followed by uneven peak, double convex, flat, dome, butterfly, suspension bridge, butte, cantilever.

In males, the most common lower lip outline pattern observed was companulate (28.6%) [Figure 8] followed by basin, boat, flat, apple bottom, and concave arc. We observed

most common lower lip outline pattern in females was companulate (34.4%) followed by boat, basin, flat, apple bottom, and concave arc.

Conclusion

Cheiloscopy is a relatively new field among the large number of identification tools available to the forensic expert. Lip outlines are unique to an individual and does not change with time so it can also be used as a method for identification. It may be helpful in forensic Investigation in addition to Lip prints. Further work on the subject can help to make lip outline pattern a practical reality at the ground level of the forensic identification process.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Jaishankar S, Jaishankar N, Shanmugam S. Lip prints in personal identification. *J Indian Acad Dent Specialist* 2010;1:23-6.
2. Choras M. Human lips recognition. In: Michal C, Kurzynski, *et al*, editors. *Human Lips Recognition: Computer Recognition Systems 2*, Advances in Soft Computing, Springer. 2007. p. 838-43.
3. Reddy LV. Lip prints: An overview in forensic dentistry. *J Adv Dent Res* 2011;II:17-20.
4. Kasprzak J. Possibilities of cheiloscopy. *Forensic Sci Int* 1990;46:145-51.
5. Thomas CJ, van Wyk CW. The palatal rugae in an identification. *J Forensic Odontostomatol* 1988;6:21-7.
6. Aggarwal A. The importance of lip prints (Forensic Files). Available from: <http://lifeloom.com/II2Aggarwal.htm>. [Last accessed on 2008 Oct 24].
7. Cottone JA, Standish SM. Textbook of outline of forensic dentistry. *Special Tech (Cheiloscopy)* 1981. p. 135.
8. Vahanwahal SP, Parekh DK. Study of lip prints as an aid to forensic methodology. *J Indian Dent Assoc* 2000;71:269-71.
9. Sivapathasundharam B, Prakash PA, Sivakumar G. Lip prints (cheiloscopy). *Indian J Dent Res* 2001;12:234-7.
10. Chandrashekar P. Text Book of Lip Forensics, Forensic Cheiloscopy for Crime Investigation and Criminal Identification. 2011.
11. Bhindu U, Jeethani SL, Mehrotra N, Rohatgi RK, Arora M, Sinha P. Lip prints as a method of identification in human being. *J Anat Soc India* 2009;58:152-5.