



RESEARCH ARTICLE

PREDOMINANT PATTERN OF LIP PRINTS IN VISAKHAPATNAM POPULATION

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ABSTRACT

Context: Establishment of a person's individuality is of significance for legal as well as humanitarian purpose. Lip print is one of the evidence that can be left in the crime scene by which it helps in identification purpose. Thus the investigators can rely on chieloscopy as supportive evidence in specific investigation.

Aim: The aim of the study to evaluate the predominant pattern of lip prints in Visakhapatnam population. The objectives of this study were to highlight the importance of lip prints related to forensic investigators for identification, to study the uniqueness of lip prints as like thumb prints in forensic investigations, to study the most common lip print in each individual and to compare the lip print patterns of male and female and to find out sex wise predilection of the lip.

Materials and Methods: The study was conducted on 900 students of dental college in South India. The lips of the individuals were cleaned and a red colored lip stick was applied evenly, followed by transfer of lip prints using cellophane strip. Data was analyzed using SPSS (Statistical Package for Social Sciences, Version 7.5) Statistical Package.

Results: Type I and type IV were the most predominant lip patterns while type V was the least common pattern observed. There was no statistically observed difference between males and females in individual lip print types.

Conclusion: So based on the findings we conclude that no two lip print patterns match each other thus establishing the uniqueness of lip prints.

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INTRODUCTION

The professional obligation of dental surgeon to mankind is not only to serve in examination, investigation, diagnosis & treatment of oral and orofacial lesions of local origin and oral manifestations of systemic diseases but also to serve in other

community and legal matters as well. (Slade et al., 2004) Identification of an individual plays primary role in any forensic investigation. (Shilpa Patel et al., 2010) The positive identification of living or diseased persons using the unique traits and characteristics of the teeth and jaws forms a corner stone of forensic science. (Preeti Sharma et al., 2009) Many methods are being used for this purpose like Dental assessment, DNA Analysis, Finger prints, Postmortem reports, Anthropometry, Dactyloscopy, Bite and nail marks

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etc.⁴ However since they can't always be used because of expense, non-availability and other reasons, so there is a need for a reliable alternative method for establishing identity. (Domaity *et al.*, 2010) The invention of finger prints in the past century is the only reliable means of human identification. Awareness of the modern techniques of crime detection has altered the criminals for taking sufficient precautions like the use of gloves. The theory of uniqueness is a strong point used in the analysis of finger prints, likewise the lip print of individual is unique and hence holds the potential for personal identification. (Simarpreet Virk Sandhu *et al.*, 2012) The creases on the vermilion border of the lips, which appear as white areas in lip prints, and the raised reddish areas outlined by these creases, which appear as dark areas, are analogous to the furrows and ridges of friction ridge skin. The creases on the vermilion border are also referred to as grooves, furrows, wrinkles and valleys. (Williams, 1991) The wrinkles and grooves on the labial mucosa form a characteristic pattern called lip prints and the study of the lip prints referred to as chelioscopy or Quiloscopy. (Vijay Kautilya *et al.*, 2013) It has been verified that lip prints recover after undergoing alterations such as minor trauma, inflammation and herpes. However major trauma to the lips may lead to scarring and pathosis and surgical treatment rendered to correct the pathosis may affect the size, shape thereby altering the pattern and morphology of the grooves. (Williams, 1991; Vijay Kautilya *et al.*, 2013)

MATERIALS AND METHODS

The study was conducted on 900 students of dental college in South India and comprised 372 males and 528 females. The subjects were aged between 18 to 30 years. Patients undergoing orthodontic treatment, having abnormalities, inflammation and trauma on lips or sensitivity to lip stick were excluded. Ethical clearance was taken from institutional ethical committee. Prior written informed consent was taken from all the participants. The lips of the individuals were cleaned and a red colored lip stick was applied evenly with a single stroke on the vermilion border and the subjects were asked to rub both the lips and spread the applied lip stick after the glued portion of the cellophane tape was placed over the lip stick. Lip prints were obtained in the normal rest position by dabbing in the centre first and then pressing it comfortably towards the corner of the lips. The cellophane strip was then stuck to the white bond paper for a permanent record and then visualized through a magnifying glass. The data were collected on forms and entered into a Microsoft excel sheet and analyzed by using SPSS (Statistical Package for Social Sciences, Version 7.5) Statistical Package.

RESULTS

A total of 900 subjects were included in the study, comprising 372 males and 528 females, in the age group of 18 to 30 years. In our study no two lip print patterns matched each other thus establishing the uniqueness of lip prints. In our study it was found that Type I (clear cut vertical grooves that run across the entire lip) was the predominant pattern in both males and females, 41.9% and 36.3% respectively. This is followed by Type IV (Crisscross patterns, Reticular grooves) 26.6% in males and 28.4% in females. Type V' is least common of all

patterns in males 4.03% and in females 5.11%. In males we did not find even a single case of Type V pattern (Undetermined) and in females 3.4%. There is no statistically observed difference between males and females in individual lip print types.

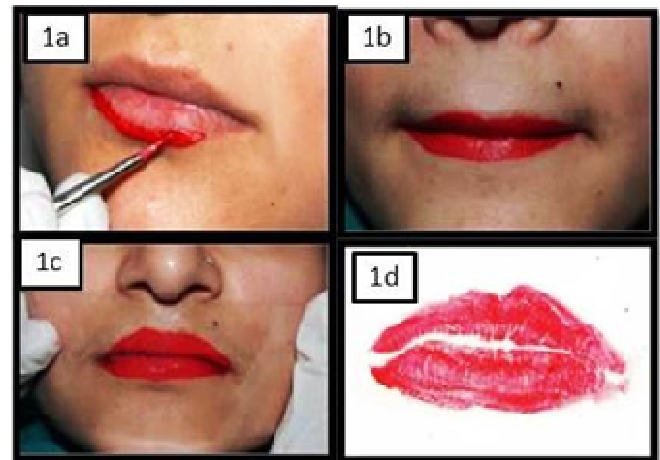
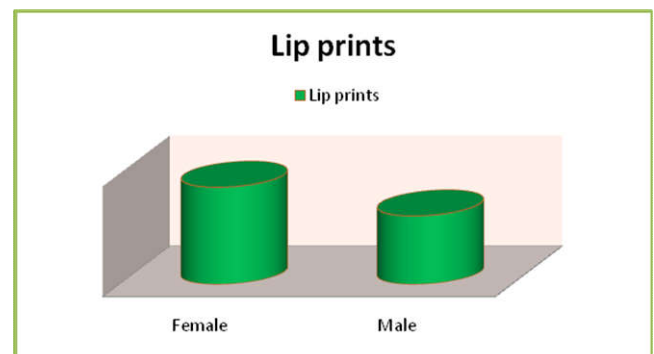


Fig. 1. 1a: Application of lipstick, 1b: Rolling of lips to spread the lipstick, 1c: Impression on glued surface, 1d: Sticking the cellophane tape on bond paper



Graph 1. Distribution of samples among males and females

Table 1. Lip print Patterns in Males and Females

Type	Female (528)		Male (372)		P-value
	No	%	No	%	
Type I	192	36.30%	156	41.90%	0.54
Type I'	27	5.11%	15	4.03%	0.93
Type II	60	11.30%	54	14.50%	0.77
Type III	84	15.90%	45	12%	0.73
Type IV	150	28.40%	99	26.60%	0.86
Type V	18	3.40%	0	0	0.00

DISCUSSION

Fischer was the first anthropologist to describe the furrows on the red part of the human lips in 1902.² However until 1930; Anthropology merely mentioned the existence of furrows without suggesting a practical use for the phenomena. Edmond Locard was one of the France's greatest criminologists who first recommended the use of lip prints in personal identification and criminalization. In 1950 Synder also suggested the idea of using lip prints for identification. (Shivaramu *et al.*, 2014) In the period 1968-1971, two Japanese

scientists, Suchihashi and Suzuki, examined 1364 persons at the Department of Forensic Odontology at Tokyo University. Based on this research, it was established that the arrangement of lines on the red part of human lips is individual and unique for each human being.⁷In further research, the Japanese scientists examined the principles of the heredity of furrows on the red part of lips. This statement led to the conclusion that there is a possibility of using the arrangement of furrows on lips for the identification of a person. A lip print at the scene of the crime can be a clue to the character of the event, the number, sex, habits and occupation of people involved. It also provides information about the cosmetics used and the pathological changes of lips themselves. (Vamsi Krishna Reddy, 2011) Traces of lips should be looked for on cutlery and crockery items, cigarette ends, paintings, plastic bags, on the window or door glass, on photographs or letters. Dr. Santos in 1966 divided the nature of wrinkles and grooves into simple and compound types. (Santos M. Queiloscopy, 1967) Simple type was further subdivided into four groups: Straight line, Curved line, Angled line and Sine-shaped curve. Compound type was further subdivided into three groups: Bifurcated, Trifurcated and Anomalous groups. Santos also classified the lip based on its thickness as Thin, Medium, Thick and Mixed type. Thin lips are generally seen amongst the European people. Medium lips are 8–10 mm in thickness, in which the pink zone is found to be more rounded. This type is more commonly found in the general population. Thick or very thick lips are very big in which the labial string appears inverted. These are the characteristics of Negros. Mixed type of lips was very commonly seen in Oriental people. Santos also reported various types of commissures like horizontal, flat, and elevated. Suzuki and Tsuchihashi named the grooves existing on the labiorumruberum as “sulci labiorumruberum” and the lip prints consisting of these grooves as “Figura linearum labiorumruberum,” i.e. in general, “lip print” and thus evolved a new classification of lip prints. (Williams, 1991) Lip prints were classified into six types according to the shape and course of the grooves. This classification is most commonly followed for recording the patterns on the lips. (RashmiVenkatesh and Maria Priscilla David Cheiloscopy, 2011)

Type I: Clear-cut vertical grooves that run across the entire lip
 Type I': Similar to Type I but does not cover the entire lip
 Type II: Branched grooves (Y-shaped pattern)
 Type III: Intersecting
 Type IV: Crisscross patterns, reticular grooves
 Type V: Undetermined

The use of lip sticks is not indispensable for leaving lip prints. The edges of the lips have sebaceous glands with minor salivary glands in between. Thus secretions of oil and moisture from lips enable to development of latent lip prints. (Segui *et al.*, 2000) even though the lines and furrows are present both in the upper lip and lower lip from one corner of the mouth to other corner, only the middle portion in the lip is taken into account since this portion is always visible in any traces. (Sivapathasundaram *et al.*, 2001) Any pathology of the lip such as mucocoele or any post surgical alteration of the lip can change the lip print pattern. Also loss of support due to loss of anterior teeth can cause changes in lip prints. By comparison of this study results with other studies done in various states it

reveals that type III pattern was predominant in both males and females in Tamil Nadu state done by Sivapathasundaram *et al.* whereas study done by Manipady *et al.* in Karnataka state population type II was predominant in both males and females. Study done in Maharashtra by Gondvikar *et al.* found to be type III was predominant in males and type II was predominant in females. In Uttar Pradesh population study by Sharma Petal found to be type I, I' was commonly seen in females and type IV was seen in males. Type III was common pattern among both males and females in Tamilnadu population done by Saraswathi *et al.* whereas study done by Vahanwala *et al.* in Maharashtra population type II was more seen in females and type III was more seen in males. In Kerala population type IV was predominantly seen in both males and females which was done by Verghese *et al.*

Conclusion

So based on all these studies it can be concluded that no two lip print patterns match each other and the lip prints were different from one person to other person thus establishing the uniqueness of lip prints. But considering the single city sample of our study more collaborative work needs with multiple centers with larger study groups required forming a cohesive chelioscopic system and data base.

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