

## Lip prints- A study of its uniqueness among students of MediCiti Medical College

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### Abstract

**Background:** "Cheiloscopy" is a technique that deals with lip prints. The pattern of fine creases on the lips are unique to the individual. They are similar to finger prints and useful in crime investigation.

**Aims and Objectives:** To study the uniqueness, prevalence, and gender significance of lip print patterns in human subjects.

**Materials and Methods:** The study was conducted on 100 randomly selected male and female undergraduate medical students. The lip print of each subject was obtained and its pattern was analyzed according to Suzuki and Tsuchihashi classification.

**Results:** The study showed that Type I lip pattern was the commonest.

**Conclusion:** Our study has added to confirmation of the distinctiveness of cheiloscopy, which can be used as an additional tool for identification. Studies on lip prints being very scanty, our findings add significantly to the meager literature on this subject. Further in-depth studies to establish prevalence of patterns in lip prints will certainly help as useful evidence in forensic investigations.

**Keywords:** Lip Prints, Cheiloscopy, Identification, Forensic Dentistry, Unique.

### Introduction

The labial mucosa forms a characteristic pattern of skin creases/grooves called lip prints". Study of lip prints is called Cheiloscopy.<sup>(1,2)</sup> The applications of Lip prints are similar to those of fingerprints. As they are unique we can use lip prints for identification of suspects. In past there were different modalities used for identification like fingerprints, MN blood group system, and DNA finger printing: of these, finger printing is most widely used. As knowledge of using fingerprints for identification is increasing in the general population, offenders are taking care not to leave behind fingerprints at a crime scene. So cheiloscopy can also be used as an additional tool for crime investigation. One of the earliest workers in this field was "Dr. Martinez Santos from Brazil who classified the furrows on the lips and showed that they can be used for identification". In the past several studies were conducted in various specialties in different parts of the world such as Czechoslovakia, Germany, Italy, France, Great Britain and Iran.<sup>(4)</sup> In the last decade, lip print studies attracted attention as a new tool for human identification. Cheiloscopy was first described by Fischer in 1902.<sup>(4)</sup> Locard recommended usefulness of lip prints in criminal investigation and personal identification<sup>5</sup>. The present study had adopted Tsuchihashi classification to categorize lip prints. According to Tsuchihashi there are 6 types of lip prints. These are:

- Type I - A clear-cut groove running vertically across the lip
- Type I' - Partial-length groove of Type I
- Type II - A branched groove
- Type III - An intersected groove
- Type IV - A reticular pattern

- Type V - Other patterns<sup>(6)</sup>

### Materials

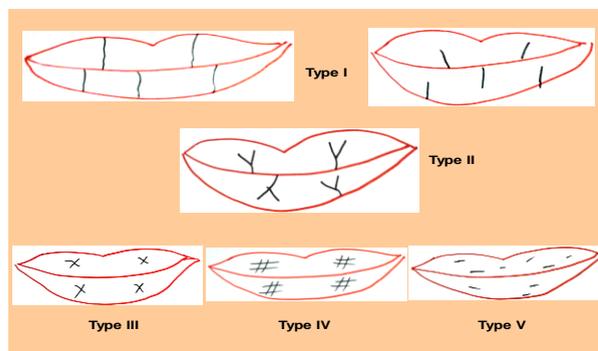
This is a Cross sectional study was conducted at MediCiti Institute of Medical Sciences (Hyderabad, India). This study was approved by MediCiti Ethics Committee (Ref: No: FWA00002084, Dated 18/11/2015). Subjects were recruited after taking written informed consent from them. A total of 100 subjects of both sex (50 from each gender) aged between 17-19 years were recruited in the study.

**Inclusion criteria:** Young adults without any disease related to lips, with normal lip mucosa were included.

**Exclusion criteria:** Subjects having any gross congenital deformities of lips (e.g. cleft lip), and those with any inflammation, allergic to the lip stick, and with any kind of disease were excluded from our study.

### Methodology

All the participants were informed about the study, its method and objectives were explained in clear detail, and they were made comfortable. The lips were cleaned and a thin layer of dark red colored lip-stick was applied on the lips, and they were asked to spread it evenly. "Hinged" portion of folded bond paper was placed between the lips and they were instructed to press their lips by applying pressure evenly. It was then "unfolded" and the lip was divided into four quadrants by employing the dental formula generally used. The lip prints in all the quadrants were studied by an expert using a magnifying lens and double check was done before the data entry. Lip prints were classified by using Suzuki and Tsuchihashi classification (Fig. 1).



**Fig. 1: Suzuki and Tsuchihashi (1970) classification showing lip print patterns**



**Fig. 2: Showing type 1 lip pattern in an individual**

**Statistical analysis:** The difference between males and females for lip patterns was done by Chi square test. The p value less than 0.05 was considered significant. There was no significant difference observed between genders. All the statistical procedures were done using MedCalc Statistical Software version 13.0 (MedCalc Software bvba, Ostend, Belgium; <http://www.medcalc.org>; 2014).<sup>(10)</sup>

## Results

The present study was conducted to assess the uniqueness of lip prints and the gender-wise predilection of its patterns. Lip print impressions were obtained from either sex of student population and were classified by Suzuki's classification. The gender wise distribution of lip print types was analyzed, Type 1 was found to be more common in the present study. Distribution of various types of lip prints in males and females were summarized (Table 1).

**Table 1: Gender wise distribution of lip prints**

Type	Female	Male
Type 1	22 (44%)	33 (66%)
Type 2	22 (44%)	10 (20%)
Type 3	1 (2%)	0
Type 4	4 (8%)	3 (6%)
Type 5	1 (2%)	4 (8%)

The data shows percentage wise distribution of different lip patterns

In the present study the analysis of lip print patterns revealed that no two lip prints were similar, thus establishing the uniqueness of lip prints. The commonest pattern found in our study was Type I (55%). This was followed, in order, by Type II (32%), Type IV (7%), Type V (5%) and Type III (1%). There was a difference in gender wise distribution of lip prints. Among females, Type I and II (44%, each (22) appear to be equally dominant patterns followed by the Type IV(8%), Type III (2%)and Type V(2%) patterns while in males, Type I (66%) was the predominant pattern followed by Type II (20%), Type V (8%), Type IV (6%), and Type III (0%) patterns.

## Discussion

Cheiloscopy is an upcoming tool in crime investigation. Though finger prints and DNA comparison are most commonly used, additional tools like cheiloscopy and palatoscopy can be used for identification. The commonest lip pattern found in present study was type-1. Various studies carried out in India, done by Sivapathasundaram et al,<sup>(2)</sup> Govindkar,<sup>(9)</sup> and Saraswathi,<sup>(8)</sup> showed type-III as predominant type, (Table 2). Studies of Sharma et al<sup>(10)</sup> and Verghese et al<sup>(3)</sup> showed type-IV as predominant type. The present study coincides with Vahanwalla and Parekh<sup>(6)</sup> study done in a Mumbai population. This variation in prevalence can be explained by the ethnic and racial differences of the several cohorts studied. Cheiloscopy can be useful for forensic investigation based on available literature

irrespective of ethnic origins of a person. However further studies on lip prints involving a larger cohort may be useful which can show ethnic, geographic and racial differences if any.

Just as efficient equipment and databases have been built over time for fingerprint detection recording and matching, similar effort and investment in methodologies and personnel, would help in expanding the utilization of lip prints in forensic science.

**Table: 2 Studies on lip prints from India**

Author	Region	Predominant lip pattern
Vergheese (2011)	Kerala	Type-IV
Sharma (2009)	Uttar Pradesh	Type- IV & V
Gondivkar (2009)	Maharashtra	Type -III
Saraswathi (2009)	Tamilnadu	Type-III
Sivapathasundaram (2001)	Tamilnadu	Type -III

### Conclusion

In the present study, lip prints of our study participants did not match with each other. Therefore, the result of our study validates that lip prints are unique as that of finger prints and therefore has forensic importance. Regional population variation in prevalence pattern merits further study, and hence in future could gain more anthropological significance. Even though there is no significant difference in lip patterns of males and females, studies with larger sample may be used for depicting sex differentiation if any.

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