

**A STUDY OF RELATIVE CORRELATION BETWEEN THE PATTERN OF FINGER PRINTS AND LIP PRINTS**M. Murugan<sup>1</sup>, T. Karikalan<sup>2</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT: BACKGROUND AND OBJECTIVE:** The use of conventional methods such as dactylography (study of finger prints) & cheiloscopy (study of lip prints) is of paramount importance, since personal identification by other means such as DNA analysis is sophisticated and not available in rural and developing countries. Fingerprint in its narrow sense is an impression left by the friction ridges of human fingers. The second prints of interest are lip prints. Studies of association between finger print and lip prints are scanty in literature. The present study was aimed to analyze the predominant pattern of lip and finger prints and to identify whether there is any correlation between these two parameters. **MATERIALS AND METHODS:** The study sample included 300 college students. Brown/pink colored lip stick was applied on the lips and the subject was asked to spread it uniformly over the lips by gentle movement of the lips. The unglazed white paper was then pressed uniformly over the lips. After the fingers were cleaned with tissue paper, the subjects were instructed to roll the tip of their fingers across the surface of an already made ink-stained pad, ensuring that the ink covered the entire pattern area. The inked finger was then enrolled over a white paper to obtain the print and analyzed using magnified hand lens. These prints were examined using magnifying glass, classified, and analyzed. The data was statistically analyzed by using Chi-square test. **RESULTS:** The percentage distribution of lip print shows that the most frequent lip print pattern in the male is Type I (36.8%) and in female it is type II (34.4%). There is no statistically significant association between the pattern of finger prints and lip prints ( $p$  value = 0.9). **CONCLUSION:** It is known that individual parameters, i.e., lip print and finger print patterns play an important role in forensic identification. Correlation of these two parameters in our study did not show any significant association, hence, these combinations as such cannot be used in individual identification, but rather, they can be used to substantiate facts in crimes where there are few evidences

**KEYWORDS:** Identification, finger prints, lip prints, correlation.

**INTRODUCTION:** Individual identification is a crucial and an exigent task in forensic investigation. Although DNA comparisons and finger print analyses are common techniques which are employed to ensure fast and secure identifications, there are certain crime scenarios where other supplemental aids like lip prints, palatal rugae pattern, bite marks etc. become indispensable, since human identification involves a combination of different procedures for individualizing a person or an object.

The use of conventional methods such as dactylography (study of finger prints) & cheiloscopy (study of lip prints) is paramount importance, since personal identification by other means such as DNA analysis is sophisticated and not available in rural and developing countries. Fingerprint in its narrow sense is an impression left by the friction ridges of human fingers. The science of fingerprints had acclaimed and reputed as panacea for individualization particularly in forensic investigations.<sup>1</sup>

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The three basic patterns of fingerprint ridges are arch (plain and tented), loop (radial and ulna), and whorl (plain and others).<sup>2</sup>

The second prints of interest are lip prints, which are normal lines and fissures in the form of wrinkles and grooves present in the zone of transition of human lip between the inner labial mucosa and outer skin. The appearance of lip prints, like fingerprints vary from persons to persons<sup>3</sup>. The biological phenomenon of systems of furrows on the red part of human lips was first noted by anthropologists; R. Fischer who was the first to describe it in 1902.<sup>4</sup>

Use of lip prints in personal identification and criminalization was first recommended in France by Edmond Locard.<sup>5</sup> The most commonly used classification scheme of lip-prints invented by Suzuki and Tsuchihashi<sup>6</sup> in 1970 are: Type I; a clear-cut groove vertically across the lips, type I'; a partial-length groove of type I, type II; a branched groove, type III; an intersected groove type IV; a reticular pattern and finally type V; other types.

Cottone and Standish,<sup>7</sup> reported in their book "Outline of Forensic Dentistry", that cheiloscopy (study of lip prints) is one of its special techniques used for personal identification, and Ball<sup>8</sup> has also reported the history of lip prints as an evidence in the Courts of Law. Hence, it was proved beyond doubt that lip prints are as good as fingerprints in criminal identification and can be definitely used when no other means of traditional method of identification are available.

Reference data on various forms of personal identification such as fingerprints, lip prints etc. are of paramount importance in solving security findings.<sup>9</sup> Very few studies done in the recent past suggest that a correlative study between the lip print and finger print will be very useful in forensic science for gender identification.<sup>10</sup> Studies of association between finger print and lip prints are scanty in literature. The present study was aimed to analyze the predominant pattern of lip and finger prints and to identify whether there is any correlation between these two parameters.

### **MATERIALS AND METHODS:**

**MATERIALS:** Brown and pink colored lip stick, unglazed white sheet, blue inked stamp pad and magnifying lens. The study sample included 300 college students in the nearby locality (152 males and 148 females aged between 18 to 21 years). Individuals free from any pathology of the lips or fingers were included in this study. The procedure of taking lip and finger prints was explained to the participants and informed written consent of all the individuals was obtained.

The subjects were asked to rinse the mouth with water and lips were allowed to dry. Brown/pink colored lip stick was applied on the lips and the subject was asked to spread it uniformly over the lips by gentle movement of the lips. The unglazed white paper was then pressed uniformly over the lips. After the fingers were cleaned with tissue paper, the subjects were instructed to roll the tip of their fingers across the surface of an already made ink-stained pad, ensuring that the ink covered the entire pattern area.

The inked finger was then rolled over a white paper to obtain the print and analyzed using magnified hand lens. While studying the lip prints, each subject's lips were divided into four quadrants and were allotted the digits 1-4 in a clockwise sequence starting from subject's upper right. These prints were examined using magnifying glass, classified, and analyzed. The data was statistically analyzed by using Chi-square test.

**RESULTS:** Fig. 1 shows percentage distribution of left thumb prints according to sex. In males the most common fingerprints pattern were loops (62.5%), followed by whorls (28.2 %) and arches

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(9.2%). Similar pattern was seen in females as loops (52 %), followed by whorls (37.8%) and arches (10%).

In Fig. 2 the percentage distribution of lip print shows that the most frequent lip print pattern in the male is Type I (36.8%), followed by type II (29.6%), type I' (15%), type III (9.2 %), type IV (5.26%) and the least was type V (3.9 %). In female the type II (34.4%) was predominant, followed by type I (29%), type I' (14%), type III (11.4%), type IV (9.5%) and the least was type V (1.3%). The association between lip prints and finger prints was shown in Table 1. The result shows that there is no statistically significant association ( $p$  value = 0.9)

**DISCUSSION:** The result of the present study shows that the percentage distribution of left thumb print patterns is 57.3% as loops, 33 % as whorls and 9.6% as arches and the finding is in par with the findings of Srilekha et al<sup>11</sup> done in South Indian population. Suzuki and T suchihasi divided lip prints in to Types I, I', II, III, IV and V, whereas in the study done by Nagasupriya et al both partial and vertical lip patterns were included under one category as vertical lip pattern (Type I), and to prevent overlap, intersected and reticular type lip prints were unified, because these patterns were almost similar (Type III). The branched lip print constituted the type II pattern.

Saraswathi et al., found that intersecting pattern of lip print was more common in both males and females.<sup>12</sup> Sharma et al., concluded that type I and I' lip patterns were most commonly seen in females and that type IV was seen most commonly in males.<sup>13</sup> Srilekha et al., concluded that type I was predominant in females and types I and IV predominant in females.<sup>11</sup> L H Adamu et al., concluded that type V lip prints was predominant in a study done in Nigerian population.<sup>9</sup> In our study, type I lip prints was found to be predominant in males and type II in females. In the percentage distribution of lip prints the variation noticed with respect to other previous studies may be linked to genetic influences which vary with respect to different races.

Another possible reason could be due to inter-observer variations, given the fact that some of the above studies have attempted to overlap the different types of lip prints while classifying it. Several studies established association of lip prints and sex,<sup>14-16</sup> the present study further analyzed the association of left thumb prints and lip prints. Nagasupriya et al., concluded that there was a significant association between arch type finger prints and branched type lip prints in males.

It also concluded that there was significant association between vertical lip pattern and arch finger print pattern in females.<sup>10</sup> L H Adamu et al., have shown statistically significant association between left thumb prints and lip prints (in lower left medial and lower right medial compartments of lips).<sup>9</sup> However our study have not shown any statistically significant association between left thumb prints and lip prints.

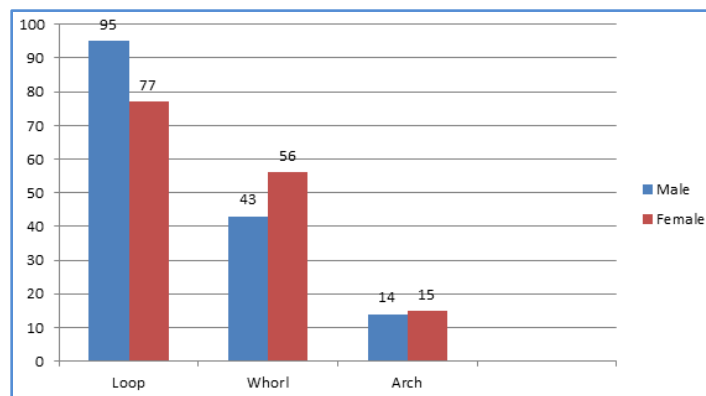
It is known that individual parameters, i.e., lip print and finger print patterns play an important role in forensic identification. Correlation of these two parameters in our study did not show any significant association, hence, these combinations as such cannot be used in individual identification, but rather, they can be used to substantiate facts in crimes where there are few evidences.

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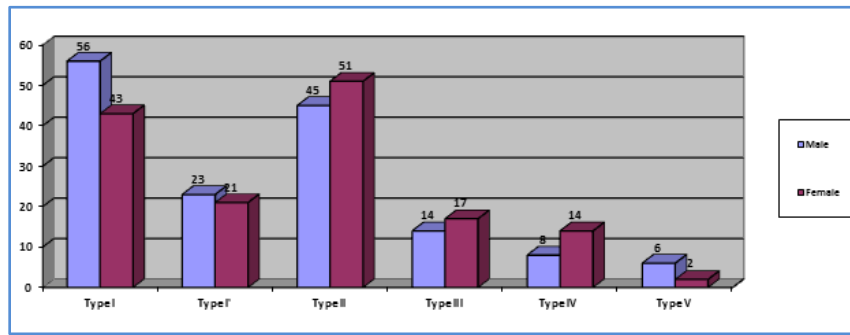
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**Fig. 1: Distribution of pattern of left thumb print according to sex**



**Fig. 2: Distribution of pattern of lip prints according to sex**

Lip print pattern	Finger print pattern			p value
	Loop	Arch	Whorl	
Type I	53	29	31	
Type I'	19	5	15	
Type II	39	19	35	0.9
Type III	15	0	12	
Type IV	17	0	7	
Type V	2	2	0	

**Table 1: Association between left thumb prints and lip prints**

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