

A Prospective Study to Understand and Analyse, Correlation between Finger Prints and Lip Prints

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Abstract

The present study was a prospective study conducted in LVD College, Raichur, Karnataka, and study period was December 2013 to November 2014 (One year). During study period, total of 210 subjects (40 male and 170 female) of Raichur origin with known blood groups were randomly selected and included in the study. The students were in the age group between 18 to 28 years. The purpose of the study was to find out the possibility of correlation between lip prints and ABO and Rh blood groups. Although a number of studies have been taken up on Dactylography and Cheiloscopy individually, studies combining features of both dactylography and cheiloscopy are very few. In the view of few literatures correlating dactylography and cheiloscopy and their importance individually in the identity fixation, the present study carries immense medico-legal importance and could prove to be a valuable step towards the identification of an individual.

Keywords: Lip prints; Finger prints; Identification.

Introduction

Identification is of paramount importance in any medico-legal investigation. Identification means the determination of the individuality of a person.¹ Personal identification is one of the most challenging processes confronted by mankind.

In the living; in civil courts - identification is required in cases such as insurance, pension and

inheritance claims, marriage, disputed sex and missing persons. In criminal courts - it is required in cases of absconding soldiers and criminals, persons accused of assault, rape, murder, etc., impersonation and interchange of babies in hospitals.² In the dead it is needed for:³ the ethical and humanitarian need to know which individual has died, especially for the information of the surviving relatives.

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The use of prints as a mean of personal identification is one of the common methods in forensic anthropology and the most popular prints are fingerprints. Even the fingerprints of twins are not similar.¹ Fingerprints of an individual are unique and remain unchanged from womb to tomb.⁴ Theory of uniqueness is the scientific principle behind finger print analysis to convince the court of law. Galton classified the types of finger prints depending upon their primary pattern as loops, whorl, arches and composite.⁵

The second prints of interest is 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.⁶ The pattern of the furrows is unique and individualistic and can be used in identity fixation.⁷

Classification of Fingerprints

In the Henry system of classification, there are three basic fingerprint patterns: Loop, Whorl and Arch, which constitute 60–65%, 30–35% and 5% of all fingerprints respectively. There are also more complex classification systems that break down patterns even further, into plain arches or tented arches, and into loops that may be radial or ulnar, depending on the side of the hand toward which the tail points. Whorls may also have sub-group classifications including plain, accidental, double loop, peacock's eye, composites and central pocket loop.⁸

LIP Print Classification (Suzuki and Tsuchihashi Classification - 1971).⁹

These authors considered six different types of grooves, as seen below

Classification	Groove type
Type I	Complete vertical
Type I'	Incomplete vertical
Type II	Branched
Type III	Intersected
Type IV	Reticular pattern
Type V	Irregular/other types

Materials and Methods

All the subjects were apparently healthy students of L.V.D College, in the age group between 18 to 28 years and native of Raichur district. Study period was one year i.e December 2013 to November 2014.

Sample size is 210 students. Students with permanent scar on any of the fingers, hand deformity due to injury, Birth defect or disease of the hands, Cases where there was any evidence of disease and injury of the lips that was likely to cause a change in the lip prints (dry lips, cleft lip, lip pits, lacerations and scars) are excluded from study group. Materials Required: Self-inking pad, Brown and red coloured lipstick, Lipstick applicator, Cellophane tape, White chart paper, Magnifying lens, Tissue Paper (for cleaning).

Recording of fingerprints: A self-inked pad was placed on a wooden table. The palmar aspects of the distal phalanges of a person's right hand were inked by applying firm pressure on the ink pad starting from the little finger. The unglazed white bond paper was applied firmly over a wooden pad. Then the bond paper which was divided into two (right and left), and each further into five columns marked as thumb, index, middle, ring and little. The finger prints were taken in the respective columns on the bond paper. The same procedure was done for recording the finger prints of left hand. Thus, finger prints of both hands will be obtained and recorded and classified as per Henry classification of the various finger patterns into four main types: Loops, Whorls, Arches and Composite.

Recording of Lip prints: The subject was asked to open the mouth and lipstick was applied in a single motion, evenly the vermilion border on the upper lip, then on the lower lip. The subject was asked to rub his or her upper and lower lips together. This helped to spread the lipstick evenly on all parts of the lips. The surface of the lipstick was wiped clean with a tissue paper prior to each use for hygienic purposes.

A strip of cellophane tape was cut, the subject was asked to open mouth slightly, and to keep mouth stationary during the procedure. The glued portion of the cellophane tape was applied on the lower lip. It was held in place, applying gentle and even pressure for a few seconds, to allow the print to form on the tape. Then the tape was carefully lifted from the lip, from one end of the strip to the other, avoiding any smudging of the print.

The strip of cellophane tape was held up against light to determine its quality. If the print was not satisfactory, the above steps were repeated. If the print was satisfactory, then the strip of cellophane tape was stuck on to a piece of white bond paper and

pressed gently over the paper with a finger in order to obtain a smooth print. This procedure ensured that the lip print did not get smudged.

The above steps were repeated for the upper lip, and the strip of cellophane tape with the upper lip print was stuck just above the lower lip print, on the same piece of bond paper. The subject was provided with tissue paper to clean the lips.

The right and left sides of the print were marked on the piece of bond paper with a pencil. Then a line was drawn at the centre of the lower lip print, running vertically downwards to a point just below the cellophane tape. 5 mm on either side of this line, two parallel lines were drawn and joined together to the central line at its lower end. These lines demarcated the middle 10 mm of the lower lip, which was the area to be studied. In order to study the lip prints, the paper with the lip print was placed under the magnifying lens and the middle 10 mm of the lower lip was studied. The grooves in this area were classified according to Tsuchihashi’s classification.⁹

For classification, the middle part of the lower lip (about 10 mm wide) was taken as the study area, as proposed by Sivapathasundharam et al.¹⁰ Since this fragment is almost always visible in any

trace, the determination of the pattern depends on numerical superiority of the line properties in this area. Age, sex and blood group of the students was noted down.

Statistical analysis: Descriptive statistics comprising proportion and percentage shall be used to describe the data. Chi-square of proportion shall be used to compare the statistical significance of difference between the various proportions in the study.

Results

In Table 1 when compared to other types of lip prints, distribution Type IV lip print pattern in lower lip Right quadrant shows more predominance in fingerprint pattern of Whorls (40.8%) followed by Loops (36.8%) and Arches (34.4%). In Table 2 when compared to other types of lip prints, distribution of Type IV lip print pattern in lower lip Left quadrant shows more predominance in fingerprint pattern of Whorls (38.5%) followed by Arches (37.5%) and Loops (36%). The finger print patterns show high statistical significant association with Lower Lip Right quadrant (P=< 0.0001) in Table 1 and Lower Lip Left quadrant (P=0.016) in Table 2.

Table 1: Correlation of the pattern of Lip prints in Lower Lip Right quadrant to Finger print patterns

		Lower Lip right						
		I	I'	II	III	IV	V	Total
F P P	Loop	258	212	145	102	550	229	1496
	%	17.2%	14.2%	9.7%	6.8%	36.8%	15.3%	100.0%
	Whorl	70	59	58	20	207	93	507
	%	13.8%	11.6%	11.4%	3.9%	40.8%	18.3%	100.0%
	Arch	21	19	7	8	33	8	96
	%	21.9%	19.8%	7.3%	8.3%	34.4%	8.3%	100.0%
	Composite	1	0	0	0	0	0	1
	%	100.0%	.0%	.0%	.0%	.0%	.0%	100.0%
	Total	350	290	210	130	790	330	2100
	%	16.7%	13.8%	10.0%	6.2%	37.6%	15.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	41.097 ^a	15	.000
Likelihood Ratio	43.336	15	.000
Linear-by-Linear Association	.003	1	.953
N of Valid Cases	2100		

6 cells (25.0%) have expected count less than 5.

The minimum expected count is .06.

Table 2: Correlation of the pattern of Lip prints in Lower Lip Left quadrant to Finger print patterns

		Lower Lip Left						
		I	I'	II	III	IV	V	Total
	Loop	284	180	147	99	539	247	1496
	%	19.0%	12.0%	9.8%	6.6%	36.0%	16.5%	100.0%
F	Whorl	63	75	66	13	195	95	507
	%	12.4%	14.8%	13.0%	2.6%	38.5%	18.7%	100.0%
P	Arch	22	15	7	8	36	8	96
	%	22.9%	15.6%	7.3%	8.3%	37.5%	8.3%	100.0%
P	Composite	1	0	0	0	0	0	1
	%	100.0%	.0%	.0%	.0%	.0%	.0%	100.0%
	Total	350	290	210	130	790	330	2100
	%	16.7%	13.8%	10.0%	6.2%	37.6%	15.7%	100.0%
Chi-Square Tests								
		Value	df	Asymp. Sig. (2sided)				
Pearson Chi-Square		29.068 ^a	15	.016				
Likelihood Ratio		28.560	15	.018				
Linear-by-Linear Association		.052	1	.820				
N of Valid Cases		2100						

6 cells (25.0%) have expected count less than 5. The minimum expected count is 0.06.

Discussion

Similar studies were done by various authors and their observations were as follows: In the study by Adamu et. al, the association between lip prints and finger print was done, the result shows that left thumb shows statistically significant association with LRM ($\chi^2 = 7.95$, $P = 0.0002$) and LLL ($\chi^2 = 5.42$, $P = 0.02$) and there was no statistically significant association with the rest of the compartments.¹¹

The study by Nandan SR et. al revealed higher prevalence of Type I lip print pattern with loop finger print pattern in females 21.31% (13/61) and Type II lip print pattern with loop finger print pattern in males 14.75% (9/61). The association of Type III lip print pattern with loop finger print pattern by Chisquare test showed statistical significance ($P = 0.05$). The Chi-square analysis of Table 4, shows Chi-square value is 27.205, Yates' Chi-square value 21.45, Yates' $P = 0.667$, degree of freedom is 25 and $P = 0.345$ suggesting the association is statistically insignificant.¹²

The study by Pranitha R et. al observed that the Inter-group comparison between two groups:

loop finger print pattern- Type 5 lip print pattern combination (25.9%) showed no statistical analysis significance.¹³

A. Nagasupriya et. al in their study they observed that the overall correlation of lip prints with finger prints in females, reticular and vertical lip print patterns show statistical significance. Vertical lip pattern associated with arch fingerprint pattern shows high statistical significance ($P = 0.009$) followed by reticular lip print pattern associated with whorl fingerprint pattern ($P = 0.05$).¹⁴

Nagasupriya A, Dhanapal R, Reena K, Saraswathi TR and Ramachandran are of the opinion that, correlative study between the lip print and finger print will be very useful in forensic science for personal identification.¹⁴

MetgudR, Kaur M, Naik S, Tak A, Patel S observed in their study in Gujrati Population concluded that correlation between lip prints and finger prints for gender identification was statistically significant. In females, branched lip pattern associated with loop (0.002) and arch (0.003) finger print pattern and

vertical lip pattern associated with whorl finger print pattern (0.041) showed significant results. In males, reticular lip pattern associated with whorl finger print pattern (0.0037), vertical lip pattern associated with arch (0.0081) and whorl (0.014) finger print, and branched lip pattern associated with arch (0.041) finger print pattern showed significant results.¹⁵

Conclusion

In our study we observed that, the finger print patterns show high statistical significant association with Lower Lip Right quadrant ($P < 0.0001$) and Lower Lip Left quadrant ($P = 0.016$). Similar observations were made by various authors, suggesting that finger print pattern and lip prints in combination, have a significant value in identity fixation.

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