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ORIGINAL ARTICLE

CORRELATION BETWEEN LIP PRINTS AND FINGER PRINTS IN GUJRATI POPULATION-A FORENSIC STUDY

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ABSTRACT:
Background: Personal identification is becoming increasingly important not only in legal medicine but also in criminal investigation. Cheiloscopy and Dactyloscopy both are forensic investigation technique that deals with the identification based on lip traces and finger prints. Both are genetically determined and remain stable over passage of time. They are Unique to an individual, therefore lip print and finger prints can be useful in forensic investigation and can be correlated for the purpose of better identification. **Aim & objectives:** This study was planned to analyze the predominant pattern of lip and fingerprints in males and females and to establish a correlation between lip print and finger printand their role in gender identification. **Materials and methods:** Subjects included 200 Gujarati male and female students aged between 18 to27 years studying in Pacific Dental College, Udaipur . Brown/pink colored lip stick was applied on the lips. Lip prints were traced in the normal rest position, using cellophane tape. The imprint of the left thumb was taken on a white chart sheet and visualized using magnifying lens. **Results:** In our study we found that correlation between lip prints and finger prints for gender identification was statistically significant.
Keywords: Cheiloscopy, dactyloscopy, lip prints, finger prints.

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INTRODUCTION

Fingerprints are considered to be the most reliable criteria for personal identification and reliable evidence in court law. In the past decades, lip-print studies (Cheiloscopy) attracted the attention of many scientists as a new tool for human identification in both civil and criminal issues. Individual identification is an important and challenging task in forensic examination, which is based on scientific principles. The first study on the lip print was carried out in Hungary in 1961. Tsuchihashiand Suzukiestablished that the arrangement of lines on the red part of the human lip is individual and unique (Tsuchihashi Y 1974, Suzuki Ket al 1970, Suzuki Ket al 1970).Dental surgeon play an active role in various objectives of forensic dentistry like age and sex determination, personal identification of unknown deceased person, analyzing bite marks as evidence, participating in mass disaster, giving evidence in child abuse etc. Dental Surgeon's role in individuals identification and criminal investigation is very much imperative as his/her evidence would be very much useful in law and justice.

Wrinkles and grooves Sulci laborium are on the labial mucosa that form a characteristic pattern which is called as lip prints. The study of lip prints is known as cheiloscopy, named by Tsuchihashi as 'sulci labiorum rubrorum'. The skin on the palmar and plantar surface is wrinkled, with narrow minute ridges which are known as friction ridges. A finger print is an impression of these friction ridges. Study of finger prints is known as Dermatoglyphics (Srilekha Net al. 2014). Cheiloscopy and Dactyloscopy is studybased on, lip traces and finger prints, respectively, which are genetically determined and remain stable over life time. They are unique to every individual, therefore can be useful in forensic investigation and can be correlated for the purpose of personal identification. The current study was undertaken to observe the correlation between lip prints and finger print

pattern in sex determination and to determine the pattern predominance in Gujarati population.

AIM & OBJECTIVES

This study intended to analyze the predominant pattern of lip and fingerprints in males and females and to correlate lip print and finger print for gender identification.

MATERIALS AND METHODS

Lip prints and finger prints were recorded from 200 students of Pacific Dental College,Udaipur, aged between 18 to 27 years. Brown/pink colored lip stick was applied on the lips. Lip prints were traced in the normal rest position, with the help of cellophane tape. The imprint of the right thumb was taken on a white chart sheet and visualized using magnifying lens.Lip prints and finger prints were analyzed. Statistical analysis was done with chi square test.

CLASSIFICATION

Lip prints were recorded based on the citeria byNagasupriya et al as follow (Nagasupriya et al. 2011)

"Type I – Vertical pattern (Grooves running vertically to the full length or partially across the lips.
(Figure-1)

Type II – Branched pattern (Grooves exhibiting branching)"
(Figure-2)

Type III- Reticular pattern (Grooves intersecting or criss –crossing one another) (Figure-3)

Finger prints were recorded based on the criteria by Michael Kuckenas follow (Kucken M et al. 2005)

1. Loop pattern (Figure-4).
2. Arch pattern (Figure-5).
3. Whorl pattern (Figure-6).

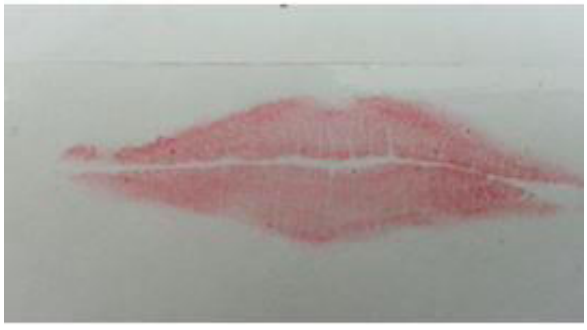

Figure 1: Vertical pattern

Figure 2: Branched pattern

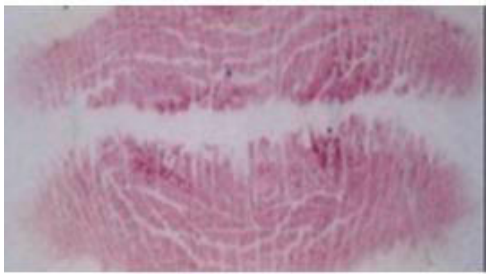

Figure 3: Reticular pattern

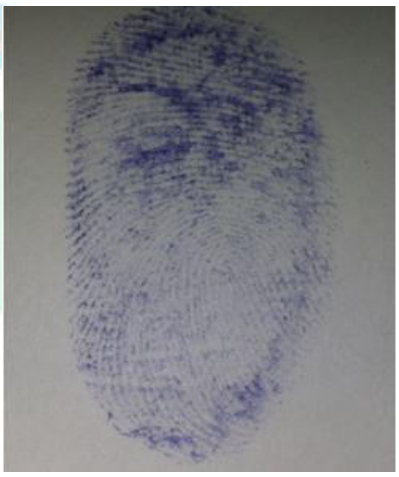

Figure 4: Loop pattern

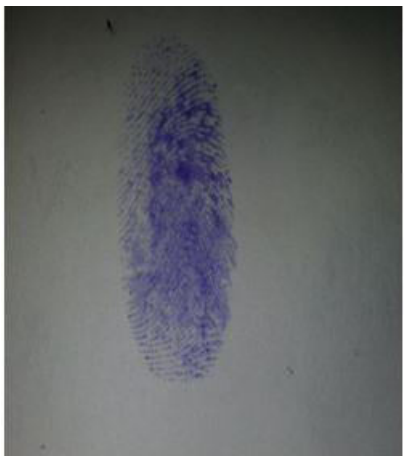

Figure 5: Arch pattern

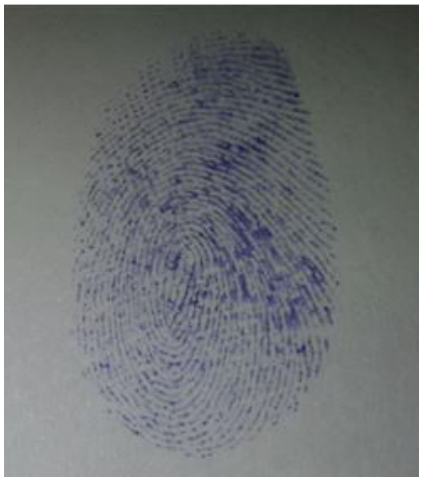

Figure 6: Whorl pattern

RESULTS

In this study 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, reticularlip 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.

Table 1: Lip prints in both males and females

Pattern	Females	Males
vertical	52	42
branched	36	54
Reticular	12	4

Table 2: Finger prints in both females and males

Patterns	Females	Males
Arch	22	24
Loop	42	26
Whorl	36	50

Table 3: Correlation of lip prints with finger prints in females

LIP PRINTS	FINGER PRINTS						TOTAL
	LOOP		ARCH		WHORL		
	%	P value	%	P value	%	P value	
VERTICAL	26(50%)	0.174	10(20%)	0.297	16(30%)	0.041	52
BRANCHED	16(45%)	0.002	6(17%)	0.003	14(38%)	0.067	36
RETICULAR	0	NILL	6(50%)	0.191	6(50%)	0.311	12
TOTAL	42		22		36		100

Table 4: Correlation of lip prints with finger prints in males

LIP PRINTS	FINGER PRINTS						
	LOOP		ARCH		WHORL		
	(n)%	p value	%	P value	(n)%	P value	Total(n)
VERTICAL	12(28%)	0.255	10(24%)	0.0081	20(48%)	0.014	42
BRANCHED	14(26%)	0.066	12(22%)	0.041	28(52%)	0.136	54
RETICULAR	0	NILL	2(50%)	0.0983	2(50%)	0.0037	4
TOTAL	26		24		50		100

DISCUSSION

"Personal identification is very much necessary for unknown deceased person in homicide, suicide, mass disasters, accidents etc. It is also necessary for living individuals like missing person due to amnesia and culprits hiding his/her identity. In dead persons, usually the personal identification is made by comparing an already existing ante mortem record with that of post mortem records whose identity is required. In live persons if the patterns bank is available where the data is collected and recorded, it will be useful for identifying the individual. One of the most emerging methods of human identification, which originated from the criminal and forensic practice, is human lips recognition[5]. In 1932, Edmond Locard, one of the criminologists recommended the use of lip prints in personnel identification and criminalization (Verma P et al. 2013).

"Various studies have been done till now on lip prints for gender identification"

"Sharma et al conducted a cheiloscopy study at Meerut and concluded that undetermined lip pattern in males, vertical and partial vertical lip patterns were common in females (Sharma P et al. 2009). Gondivkar et al in their study found that criss cross lip pattern was common in males and branched lip pattern was common in females (Gondivkar et al. 2009)Relating to all these study , the present study revealed that ,branched lip patternis most common in males followed by verticaland reticular lip pattern and vertical pattern is most predominant pattern in females followed by branched and reticular pattern.

In our study , it was found that reticular lip print pattern were most commonly associated with whorl finger prints pattern in male and in female branched lip print pattern were commonly associated with loop finger print pattern. In contrast to present study, Neha et al in their study on correlation between lip and finger prints in sex determination found that the most predominant lip pattern was associated with the most predominant finger print pattern in both male and female groups.[10] But in our study most predominant lip print was not associated with the most predominant finger print in males and females. This could be due to small sample size used in the study.

Verma Pet al conducted a study in Sriganganagar, (Rajasthan) and they found branched type lip pattern was most common (47.6%) followed by intersecting pattern (23.1%), followed by vertical, partial length groove, reticular, and undetermined type. Our findings were on partial accordance with the study of Verma P et al and suggested that branched lip pattern was more common among various patterns followed by vertical and reticular lip pattern was least common in females and branched lip pattern was common in males. So lip prints can be used as an aid for gender identification (Verma P et al. 2013).

A Nagasupriya et al conducted the study in Andhra Pradesh and he concluded that in males, branched lip pattern associated with arch finger print was found to be highly significant, this was followed by loop finger print pattern (P=0.005) and whorl finger print pattern in females, vertical lip pattern associated with arch finger pattern showed highly significant, this was followed by reticular lip pattern associated with whorl finger pattern. In the study conducted by Patel S[11] et alin boys and girls from the Udaipur concluded that, for boys the most prominent lip pattern was found to be Type I (complete vertical-30%) ,where as the most prominent lip pattern found in girls was Type II (branched-42%) ,on comparing the boys and girls group type II (branched-34%) lip print was found to be the most frequent pattern[5].However in our study conducted in Guajarati population we observed that reticular lip pattern associated with whorl finger print pattern (50%)is most prominent whereas in females branched lip pattern associated with loop(45%)finger print pattern was most observed (Nagasupriya et al. 2011).

Bharadwaja A et al found that in finger print loop type is more common followed by whorls (35.83%) and arches but this is in contrast to our study in which, whorlfinger print pattern is most common followed by loop and then arch finger print pattern (Bharadwaja et al. 2004)

Srilekha et al conducted a study to know the correlation between lip print pattern, finger print pattern and ABO blood group and they didn't find any significant association between the three parameters. In our study we only associated finger prints and lip prints. Individually most common finger prints are loop pattern in female and whorl pattern in males. With the association we found thatin male, whorl pattern is most common followed by loop and then arch pattern and in females loop pattern is most common followed by whorl and arch pattern (Srilekha et al. 2014)

Mutalik et al found no correlation between lip prints, finger prints and palatal rugae patterns. In contrast to, we found a significant correlation in the combination of lip prints and finger prints both in males and females (Mutalik et al.2013)

CONCLUSION

Although there are various studies undertaken on finger prints and lip printsalone for forensic investigation, very few studies have been done till now to correlate between lip prints and finger prints. Correlation between lip prints and finger prints in our study showed significant results .Thereforethis can be a major breakthrough in criminal investigation.These combinations can be used not only for identification of the individual but also can serve as critical evidence in crime.

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