The Study of Lip Prints in Sex Determination and Personal Identification

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Abstract

Introduction: Cheiloscopy, the study of lip prints, is an upcoming tool for the identification of persons. The lip print of every person is unique and can be used to determine the personal identity and sex of the individual.

Aim: The aim of the study is to evaluate the scope of cheiloscopy for the purpose of sex determination and personal identification

Materials and Methods: The study was conducted on 200 individuals (100 males and 100 females) aged 18-40 years by applying and even coat of lipstick and obtaining the lip print on a cellophane tape. The lip print pattern was subsequently examined with the help of a magnifying glass for uniqueness of difference between male and female.

Results: The analysis of the data shows that lip prints are different for different individual and also among male and female individuals.

Among 100 males, Type III pattern was most common and Type II pattern was dominant among 100 females.

Conclusion: From the study it can be said that lip prints can be used as an adjunct for the purpose of sex determination and personal identification

Key words: Cheiloscopy, lip prints, sex determination

Introduction: Human identification is one of the most challenging subjects that man has confronted with. Human identification is based on scientific principles mainly dental records, finger prints and DNA comparisons.[1,2] These serve as permanent records. The sophisticated molecular biology techniques are not always employed due to their expenses and lack of availability. Hence in this situation easier but reliable methods like lip prints can be employed. [3]

The grooves present on human lips (sulci labiorum) are unique to each person and can be used determined identity.[4]

Lip prints are normal lines line and fisheries in the form of wrinkles and grooves present in the zone of transition of human lip, between the inner labial mucosa   and outer skin examination of which is known as cheiloscopy. This is unique for individuals as finger prints.[5]

In 1902, the biological phenomenon of systems of furrows and prints o the human lip was first noted and described by anthropologist R.S Fischer. However, until 1950 they were not assumed to have any forensic use. In 1970, Suchhiahashi Y.T examined person lip prints at the department of Forensic Odontology at Tokyo University and establishment that the arrangements of lines and prints

on the lips is individual and unique for each human being [6,7].

Cheiloscopic techniques have an equal value in relation to other types of forensic evidences for personal identification[8]

In a crime scene investigation, lip prints can link a subject to specific location if found on cloths or other subjects such as glasses, cups, or even cigarette butts.[9]

Analysis of the lip prints left at the scene of crime and their comparison with those of suspected person may be useful for identification.[10]

The main objective of the present study was to ascertain whether the lip prints behold the potential for sex determination of a person and their role in personal identification.

Material& Methods: The present study has been conducted on total of 200 subjects, 100 females and 100 males who were randomly selected.

All participants were briefed about the purpose of the study and written consent was obtained from each of the participant.

Permission to conduct study was taken from the time bound ethics committee of the institution.

Inclusion criteria: 1. Subject willing to participate

2. Subjects between age group 18-40 years.

3. Subjects free from scars or lesion on lips

Exclusion Criteria: 1. Subjects not willing to participate

2. Subjects with deformities of lips like cleft lip, ulcers, traumatic injury inflammation or orthodontic treatment.

3. Subjects allergic to lipstick.

Materials used: 1. A dark colored lipstick

2. White bond paper

3. Cellophane Tape

4. Magnifying Glass (I0X)

5. Pen for labeling the individuals details

Methods: The Dark colored lipstick was applied by research personnel with a single stroke, evenly on the vermillion border and the subject was asked to rub the both the lips to spread the applied lipstick. After about 2 minutes the lip impression was made on the strip of cellophane tap on the glued portion which was then stuck to white bone paper which served as permanent record.

The impression was subsequently visualized under magnifying glass of 10X

The lip prints were interpreted based on the classification proposed by Suzuki and Tscuchihashi in 1970, which is as follows

Type I: A clear cut groove running vertically across lip

Type I ': Partial length groove of Type I

Type II: A branched pattern

Type III: An intersected groove

Type IV: A reticular pattern

Type V: Other patterns

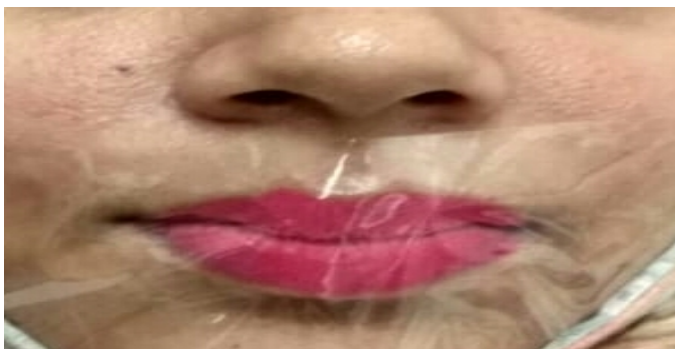Fig 1: Armamentarium used

Fig 2: Application of lipstick

Fig 3: Lip impression taken on cellophane paper

Fig 4: Cellophane tape stuck on white paper
Statistical analysis

The data was coded and entered into Microsoft Excel spreadsheet. Analysis was done using SPSS version 20 (IBM SPSS Statistics Inc., Chicago, Illinois, USA) Windows software program. Descriptive statistics included computation of percentages. Chi-square test used for qualitative analysis of the data. Level of significance was set at ($p \leq 0.05$).

Table 1

Variables	VG		BG		IG		RG		Undetermined	
	N	%	N	%	N	%	N	%	N	%
Positive	48	24.0	51	25.5	48	24.0	30	15.0	23	11.5
Negative	152	76.0	149	74.5	152	76.0	170	85.0	177	88.5
Total	200	100.0	200	100.0	200	100.0	200	100.0	200	100.0

Table 1: shows the positive percentage in different lip patterns with Vertical groove(24%), Branched groove(25.5%),Intersected groove(24%),Reticular groove(15%) & undetermined as 11.5%

Table 2

Variables	VG		Total	p-value
	Positive	Negative		
Male	19	81	100	
	19.0%	81.0%	100.0%	
Female	29	71	100	(0.098) NS
	29.0%	71.0%	100.0%	
Total	48	152	200	
	24.0%	76.0%	100.0%	

NS:-No Significance

Table 2 shows there is no significance between the Vertical group pattern among Males and Females

Table 3

Variables	BG		Total	p-value
	Positive	Negative		
Male	26	74	100	
	26.0%	74.0%	100.0%	
Female	25	75	100	(0.871) NS
	25.0%	75.0%	100.0%	
Total	51	149	200	
	25.5%	74.5%	100.0%	

Table 3 shows there is no significance between the Branched group pattern among Males and Females

Table 4

Variables	IG		Total	p-value
	Positive	Negative		
Male	27	73	100	
	27.0%	73.0%	100.0%	
Female	21	79	100	(0.321) NS
	21.0%	79.0%	100.0%	
Total	48	152	200	
	24.0%	76.0%	100.0%	

Table 4: shows there is no significance between the Intersected group pattern among Males and Females

Table 5

Variables	RG		Total	p-value
	Positive	Negative		
Male	16	84	100	
	16.0%	84.0%	100.0%	
Female	14	86	100	(0.692) NS
	14.0%	86.0%	100.0%	
Total	30	170	200	
	15.0%	85.0%	100.0%	

Table 5 shows there is no significance between the Reticular group pattern among Males and Females

Table 6
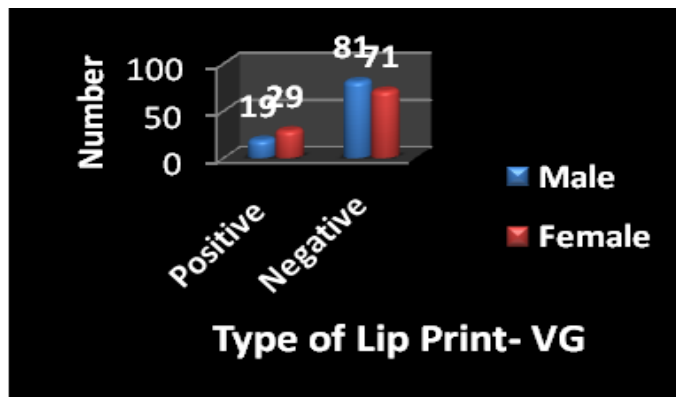
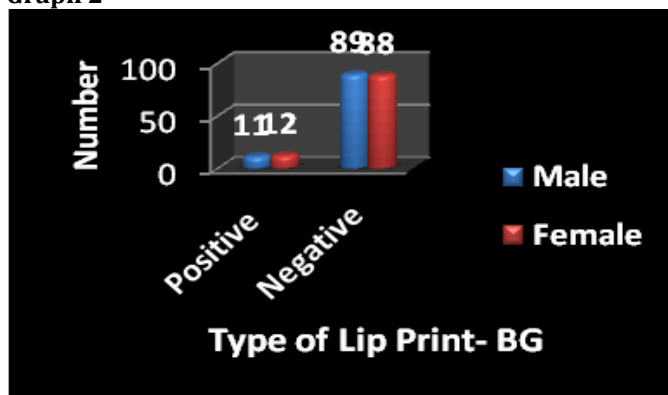| Variables	Undetermined		Total	p-value
	Positive	Negative		
Male	11	89	100	
	11.0%	89.0%	100.0%	
Female	12	88	100	(0.825) NS
	12.0%	88.0%	100.0%	
Total	23	177	200	
	11.5%	88.5%	100.0%	

Table 6 shows there is no significance between the Undetermined group pattern among Males and Females
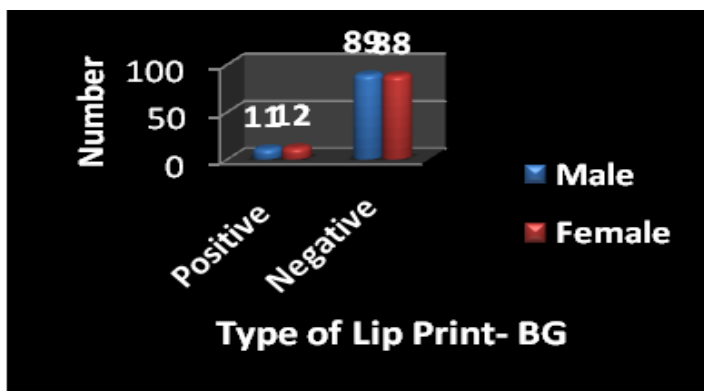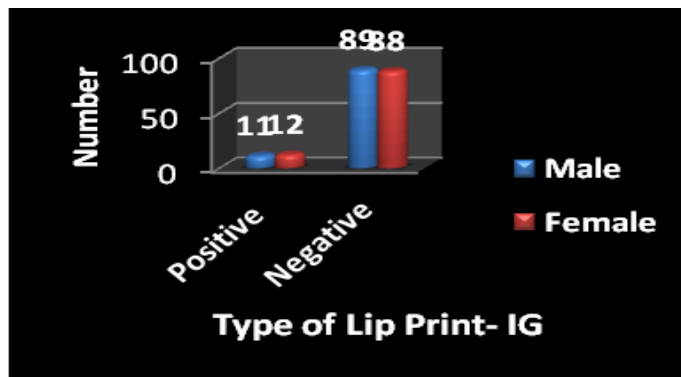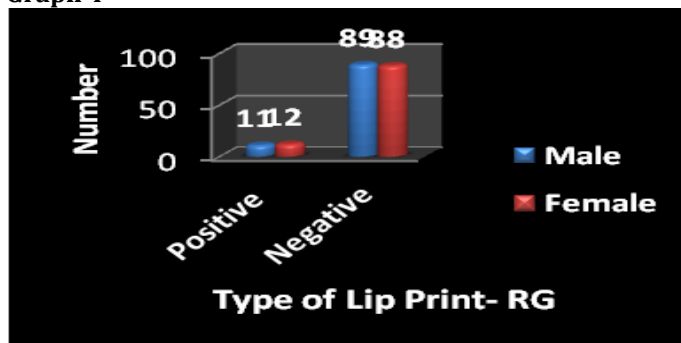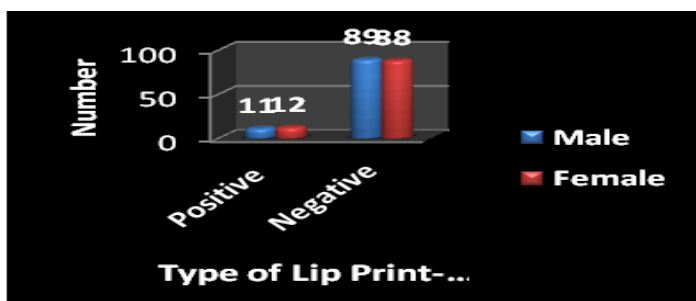

Graph 1

Graph 2

Graph 3

Graph 4

Graph 5

Graph 6

Graph (1-6) : Among Males: Positive Vertical groove was seen in 19%.Positive Branched grooves was seen in 26% ,Positive Intersected grooves in 27% .Positive Reticular groove in 16% and positive undetermined in 11%. Among Females: Positive Vertical groove was seen in 29% , Positive Branced groove in 25% , Positive Intersected groove in 21% ,Positive Reticular grove in 14% and Positive Undetermined in 12%

Results

The present study revealed that lip prints are unique to individual and no to / more individuals had similar type of lip print pattern.

The most predominant pattern in the entire study was –

Among 100 male subjects – Type III 14% (28) was predominant followed by Type II 13%(26) and Type I 9.5%(19)

So the most common lip pattern among males was Type III

Among 100 Female subjects – Vertical groove was seen in 13.5% (27) branched groove 14.5% (29), intersected 9% (18) reticular groove 7% (14) and undetermined in6% (12) individual

Table 7: Showing distribution of lip prints among two genders:

	VG	BG	IG	RG	Undetermined
M	19	26	28	16	11
F	27	29	18	14	12

Table 8 : Lip prints gender classification:

	Gender		Total
	Male	Female	
VG	19	27	46
BG	26	29	55
IG	28	18	46
RG	16	14	30
Undetermined	11	12	23
Total	100	100	200

Discussion

In Forensic identification, teeth have been proven to be a valuable source due to their distinctive features and ability to resist extreme conditions. However, in some particular cases their can be other crucial data available which can aid in identification process. Presence of soft oral and peri oral prints such as lip prints at crime scene can from basis for evidence so as to number of people involved, presence or absence of a subject and sex of an individual.[11]

Lip print pattern is identifiable as early as 6th week of intrauterine life. Lip pattern is unique for each of examined individuals even in twins and family relatives (10).Thus it can be said that lip prints do have potential for used as corroboratory evidence in criminal investigations.

In our study among 100 male subjects Type III pattern was more common while Type II pattern among 100 female subjects. Our study is in accordance with those of Govindkar and Indurkar, who observed lip print pattern in (70 males and 70 females) with results of Type II pattern (37.06%) dominant in females while Type III pattern (51.05%) more common in males.[12]

The results of our present study are also in agreement with those of Junaid et all who observed lip prints in (20 males and 20 females) and observed that Type II pattern (51.25%) was more common in female while Type III pattern (41.25%) in males.[13]

Suzuki and Tsuchihashi (1970) conducted a study on Japanese families and concluded that lip prints are unique and permanent to an individual. Our study also demonstrated that each individual had a distinct lip pattern.[14]

Thus lip prints are unique for every persons and show differences according to race and ethnic origins of a person.

Conclusion

Lip print analysis holds a conceivable pattern to determine the sex of individual as they remains stable over time and unique to individuals .[13]If the sex of an individual is known it is easy to short list the array of suspects with motive of crime.It thus seem to promise to go one step further closer to truth. [15]

Our study has proved cheiloscopy as promising supplementary tool that holds the potential to identify the sex of an individual.

However large studies involving a large population with varied ethnic origin will add more value to this useful tool of identification.

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