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Cheiloscopy: Frequency of Pattern in different Quadrant in females

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Abstract

Cheiloscopy is a forensic examination technique that associate with identification of individuals based on lips traces marks on evidences. The goal of this study was to establish the individuality of lip prints and to look out for any new character which helps in personal identification. For the present study lip prints of 50 females of 18-25 years of age (having full dentition) were collected the lip prints were then studied for the pattern and characteristic features present at its quadrant for analyzing variations, and to determine the most general pattern in the study population. The statistical calculation after study estimated that Simple Bifurcation is more prominent in upper lip with 56% and Simple Bottom Bifurcation is prominent in lower lip with 68%. However calculation shows that A Line Like (I) feature is most common, when both upper and lower lips are taken into consideration with 44% presence. On extensive of lip prints samples, a new character "A Bar" denoted as "x" in the script was found in both upper and lower lip with a frequency of 14% and 16% respectively. The present study is an attempt to propose a better method of personal identification based on lip prints for forensic investigation.

Keywords: Lip prints**,** cheiloscopy, bifurcation, statistical calculation, forensic investigation.

Introduction

Lip prints are usual outlines and cracks, which can be seen like lines and rucked present on human lip. The study and analysis of lips known as cheiloscopy[1]. The groove appear on the red part of human lips are unique and use to determine the identity of person. The study of these grooves or furrow present at the region of transition of exterior skin and inner skin and inner labial mucosa is known as cheiloscopy[2]. As fingerer prints are unique for individuals. Lip prints can be used for individual identification and criminal investigation in forensic dentistry[1]. Lip prints well-thought-out marvel event was first understand by anthropologist R. Fischer, He became first to describe lip prints[2]. This is unique for individuals, as finger prints[1]. Because the lip prints of the alike individuals were explored every month for three years to understand whether the lip prints are permanent or not. No positive results any change during this three years[3]. Lip prints are uniform throughout life and shows presence or absence of person at crime scene[4]. It is being used to understand the condition on the basis of evidence closeto the crime scene for identifying number of persons involved, their nature and sex also the type of crime committed during the time of crime[5]. Investigator officer may found evidence as per use of odontology, anthropometry, fingerprints, and furthermethods that decidesex, height, approximate age and blood grouping. Now a days, however, investigator officers can also depend on lip prints to identify promising suspects or to supporting evidence found in specific investigations[6]. As I realise Human identification is a worldwidemethod based on scientific principles, mainly involving fingerprinting, and biometrics. Just like these techniques the lip print is also use to identify the pattern present on the red part of the lip and considered as an important tool of personal identification. In addition Lip-prints, cells and tissue can be found at crime side it may be source of DNA. This evidence is analysed in criminal laboratory and outcome may be satisfactory criminal[7].

Material and Methods

The study was accompanied on 50 females in the age group of 18 - 25 whose origin from North Indian population. Those individual who suffered with defects of the lip were omitted because they are not suitable for the comparison with the other individual who is showing clarity in their lip print pattern.

These are the following materials which are required at the time of collecting the lip print pattern. Lipsticks: Bright colors and non-glossy lipsticks were applied as it gives optimum print visibility. Mainly Revlon lipstick was used. Cellophane Tape: Transparent glued on one side, with 0.9 mm width cellophane tape was used, which was sufficient to the print of the lip at a time. Scissors. Bond paper (70 GSM). A foldable magnifying lens which could be placed over the print, was used instead of usual hand-held lens as it ensure a study view of the lip print and also let the hands free to note down the type of lip print. Tissue paper. The card was placed on a raised thick book, because of that way nose won't come in between.

Method: Lip print was divided into four Quadrants (imaginary) on a sheet and a big plus sign was made. One by one the

Quadrants was observed and the type of pattern was noted down like figure-1. The combined pattern of the entire four Quadrants was the lip print pattern of that person and was matched while identifying an individual similarity like fingerprint.

Lips of the subject were scrubbed by cotton bolls then the lipstick was applied to the subject in a single motion, uniformly on the lips, and told her to rub bothlips together gently to spread the lipstick uniform. A white bond paper was put before the subject and was asked to give a roll print on the white paper in which person starts to give the pattern from one corner of the lip and rolled up to the other corner of the lip, and maintaining contact with the paper (figure 2). The mouth should be closed and stationary during the procedure. The methodology is same as employed by Domiaty MAE. et all in 2010[8]. The subject's serial number, name, age were written on the rear end of white paper for recording purpose. The print was taken then subsequently magnified using hand magnifier. With the help of magnifying glass the lip print was observed for characteristics which is present on lip as well as showing its uniqueness.

Lip print was also made on a cellophane tape on glued portion based on the study of Bajpai M. et all in which the subject was trained to open the mouth. The lipstick was applied in a single motion, uniformly on the lips[9].

The subjects were requested to rubgently their lips together to apply the lipstick uniform. A ten cm longcellophane tape, was cut with scissors. The subjects were requested to relax the lips and keeping the mouth stationary also closed during the procedure. The glued portion of the cello tape was applied on both upper and lower lip together. It was held in place, with even pressure for a few seconds and applying gentle. Then the cellophane tape was recondite lifted from the lips, from side to side, also avoiding any smudging of the print. The cellophane was attached to white bond paper. This served as a permanent record.

On the basis of this pattern we identify that the all subject were different on fissure and their criss- cross line. These pattern are used as a personal identification.

Right upper lip Quadrant 1	Left upper lip Quadrant 2
Right lower lip Quadrant 3	Left lower lip Quadrant 4

Figure-1
Four quadrants of lip prints

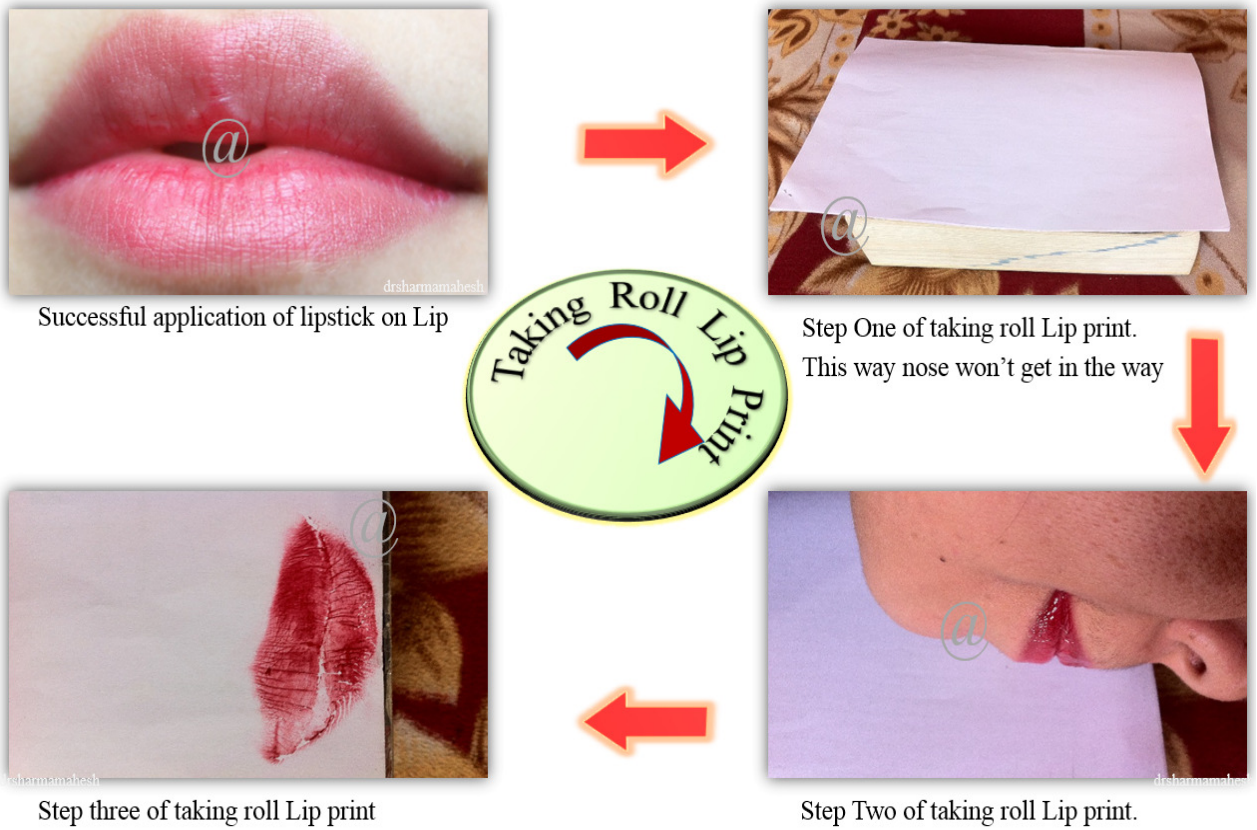

Figure 2
The procedure of taking lip prints

The use of fingerprints in identifying a person is probably the most popular method but the use of lip prints (cheiloscopy) merely exit as a methodology in textbooks. Research and information about the use of lip print pattern (LPP) as evidence in individual identification in scarce. Dentistry has much to law enforcement agencies in the uncovering and solution of crime. Apart from restorations, Soft tissues and teeth of the oral cavity may be extremely helpful in personal identification. The present study was conducted to access the quadrant wise identification of 23 lip print pattern shows in (table-1). The subject lip print was collected and photographed to analyze the pattern. On the basis of this we observe unique pattern in each individuals lip print (figure 3). The number of lines and furrow seen on the each persons were noted. The lip print found were given unique symbol or coded and written on paper along with their name of respective individuals. For classification, the middle part of the lip 10-mm wide was chosen as study area as proposed by Sivapathasundharam B. et all in[10]. The grooves in eachquadrant of lip was recorded and the grooves were recognize as per to Kasprzak's classification from 23 patterns. In the study, this work followed proposedstudy of Jerzy Kasprzak as the classification of patterns of the lines on the lips[11].

Results and Discussion

The lip print pattern collected from 50 female subject which was carefully examined by the magnifying lenses, flash magnifier and magnifying glass with various magnifications. We analyze that the pattern which are present on the human lip were unique as well as we observed a fusion of `different pattern in every quadrant of lip. The pictorial representation (figure 4 (A to E) was used to show the presence of all 23+1 (new pattern) characters in sample of 50 female lip prints with multicolor coding which are specific for individual characters. The circles which are half up filled shows presence of respective character in upper part of lip print. The circle which are darken in lower half with respective colors shows presence of those particular character in lower half of the lip. The circles which are colored as a full circle shows the presence of common character in both upper and lower part of lip.

The above graphical representation shows , that there are presence of 24 characters in 4 Quadrant of lip print, however there are some common characteristics for example a, b, d are few character which are present in different Quadrant of lip print.

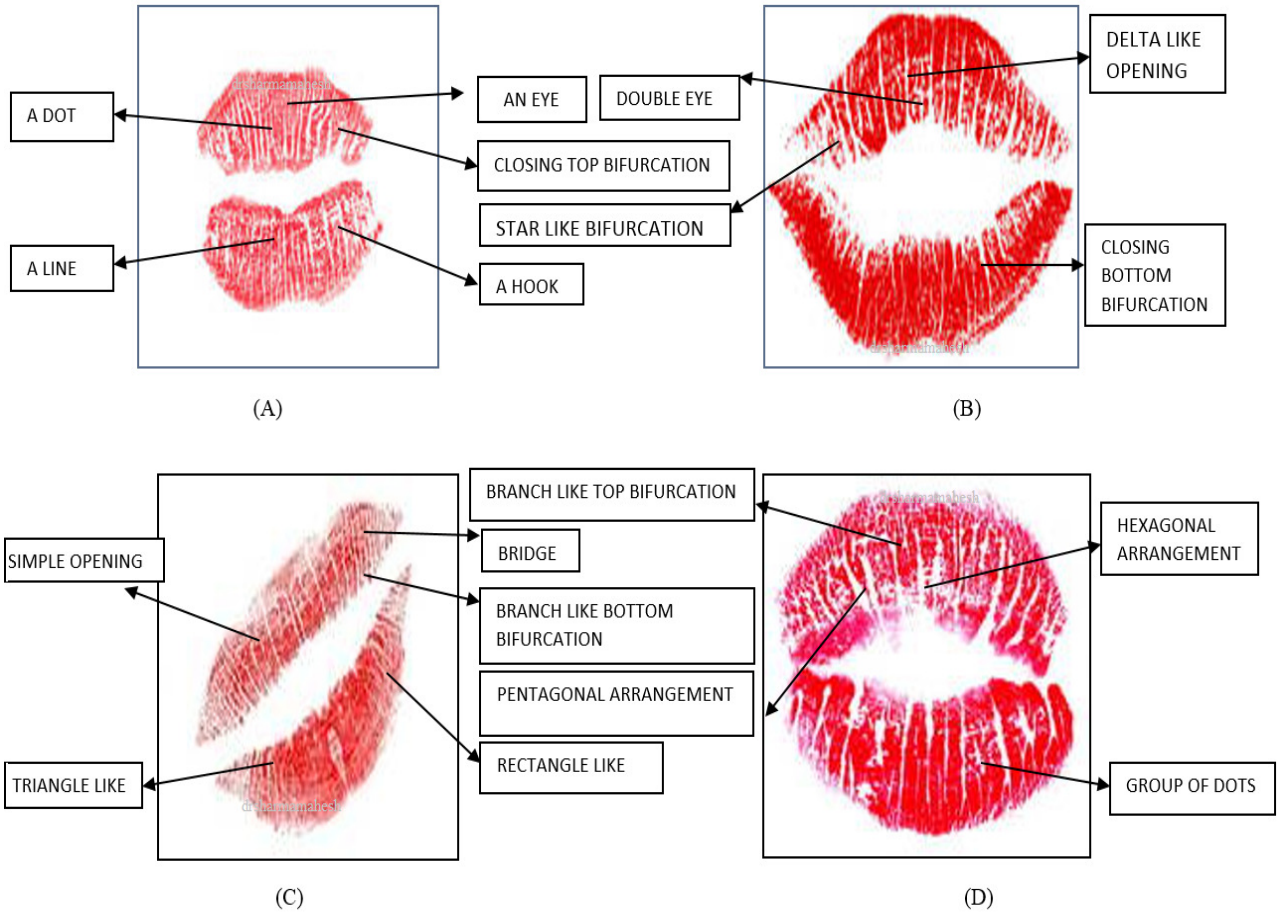

Figure 3 (A-D)
Representation of different characters on Lip

Table-1
Twenty three lip print characters and its symbol

Symbol used	Characteristic features	Symbol used	Characteristic features
A	Bridge	m	Crossing Like
B	Rectangle like	n	An Eye
C	Simple Top Bifurcation	o	A Hook
D	Simple Bottom Bifurcation	p	A Line
E	Closing Bottom Bifurcation	q	A Dot
F	Closing Top Bifurcation	r	A Group
G	Star Like Bifurcation	s	A Double Eye
H	Branched Like Top Bifurcation	t	A Fence
I	Branched Like Bottom Bifurcation	u	A Double Fence
J	Simple Opening	v	A Pentagonal
K	Delta Like Opening	w	A Hexagonal Arrangement
L	Triangle Like		

On the basis of study of 50 samples of female the following observations were made. (table-2). The similar observation was made by Amith HV, in their work and stated that 'A line' pattern is the most prominent character in both part of lip in females(39%)[12], which was observed in present study with (41%) frequency distribution in females. (table-2). Simple Bottom Bifurcation was found prominent in lower lip with (68%) frequency distribution during the study, however Study of lip print on 64 Japanese subject conducted by Tsuchihashi, Y. and Suzuki, K. in 1970. They found that 'crossing line' was the most frequent with (64.6%) of cases[13] which contrasts the finding of present study,but it signifies the variation on pattern on different races and population. Study conducted by Vahnawala SP. and Prakash DK. on 100 Indian subject used Suzuki's classification[14] which was also used in current study, however they observed that 'a line' is the most frequent (46.5%), which was also observed in the present study with (41%) frequency distribution. Bindal U. et all in 2009 observed that simple top bifurcation with (66.83%) frequency distribution in females is most common pattern prevailed which was in accordance[15] with the present study with (56%) of frequency distribution.

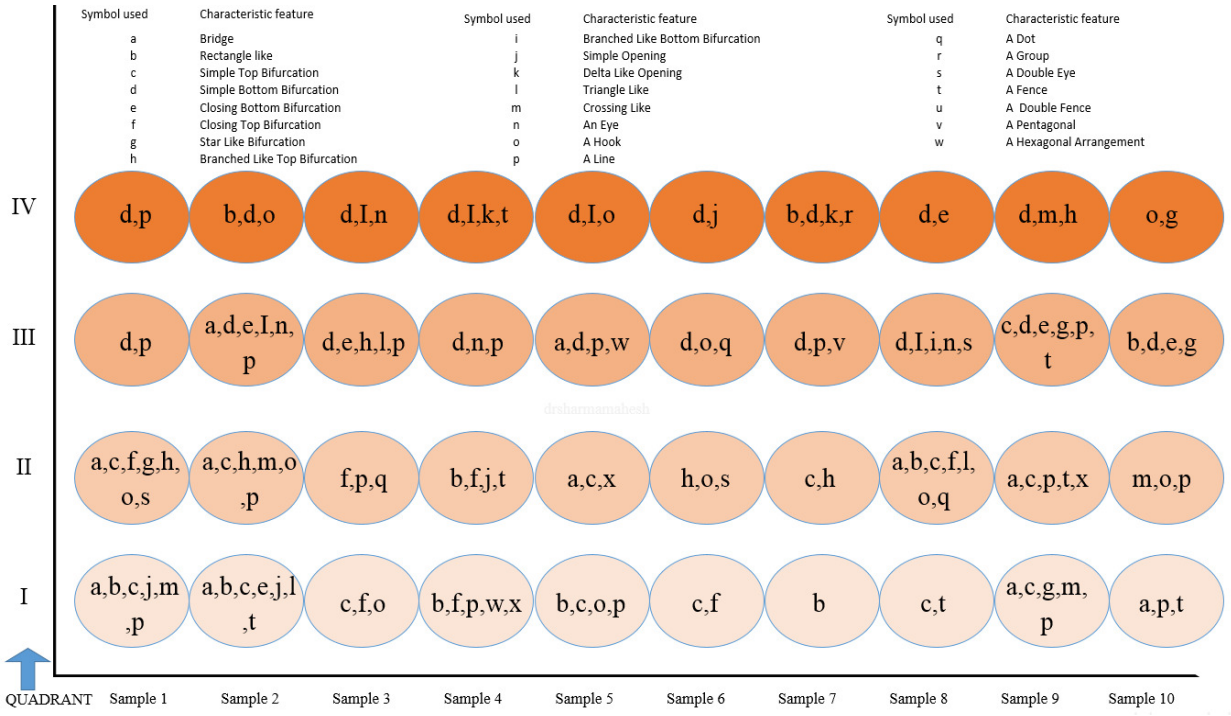

Figure 4 (A)
Distribution of characters in different quadrant of Lip print sample 1 to 10.

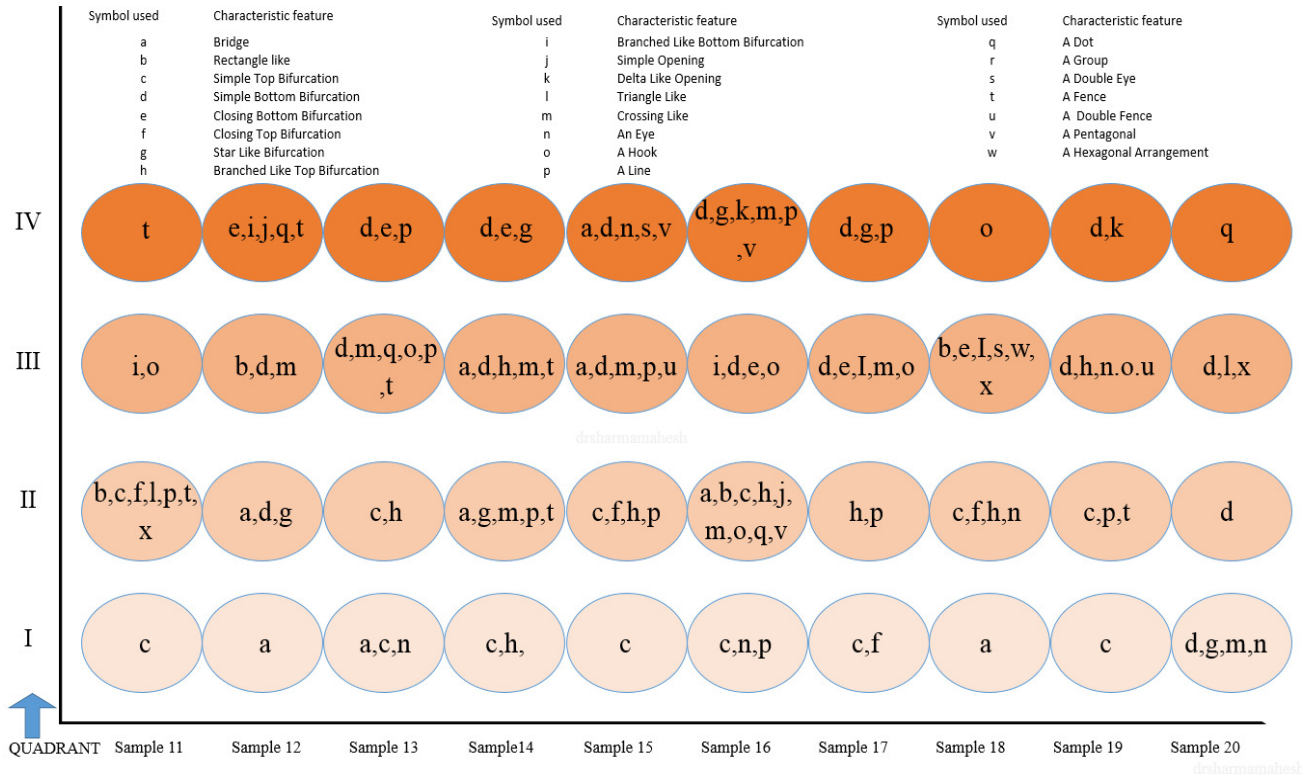

Figure 4 (B)
Distribution of characters in different quadrant of Lip print sample 11 to 20

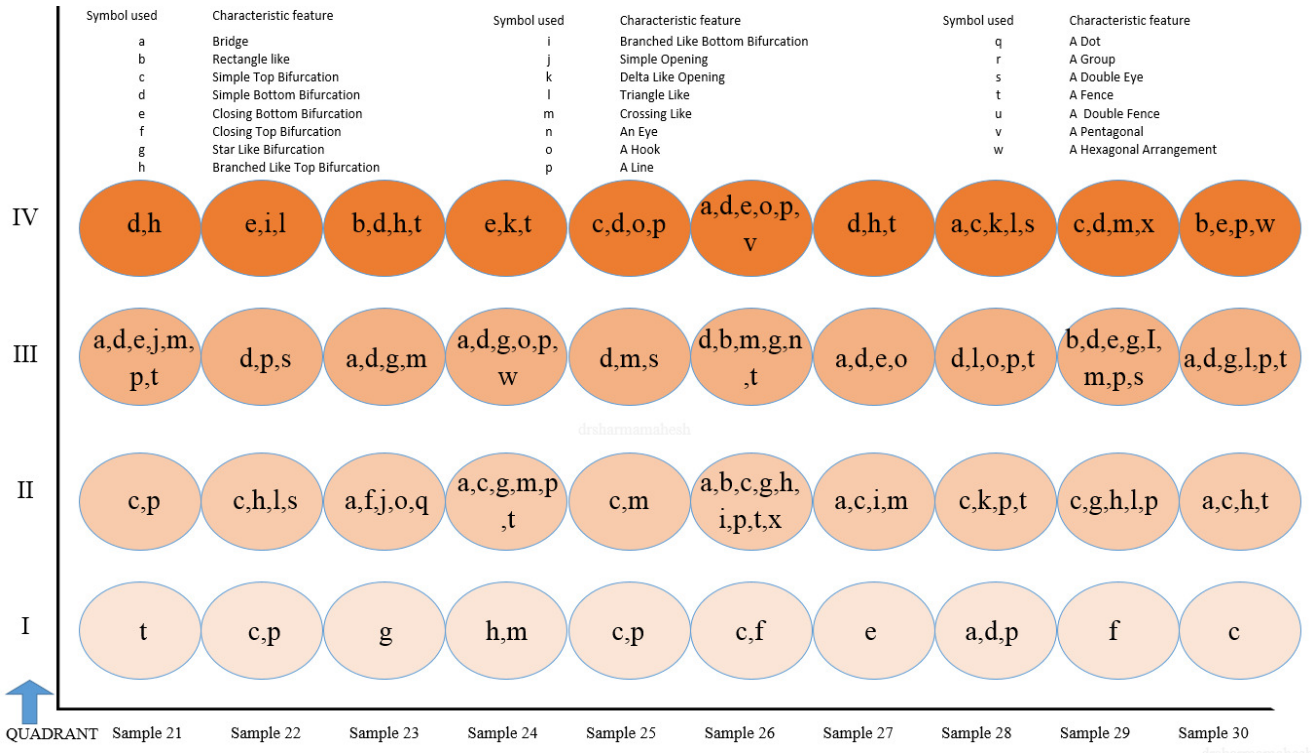

Figure-4(C)
Distribution of characters in different quadrant of Lip print sample 21-30

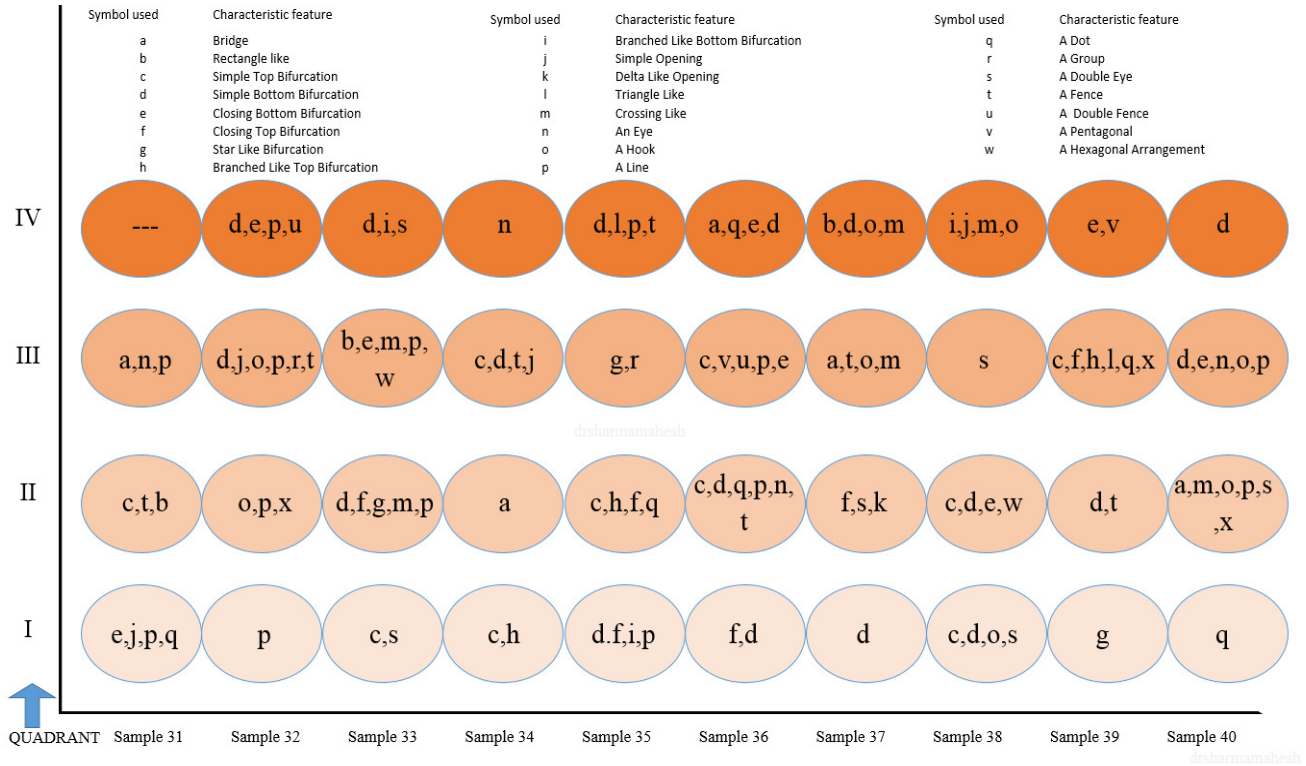

Figure-4(D)
Distribution of characters in different quadrant of Lip print sample 31 to 40

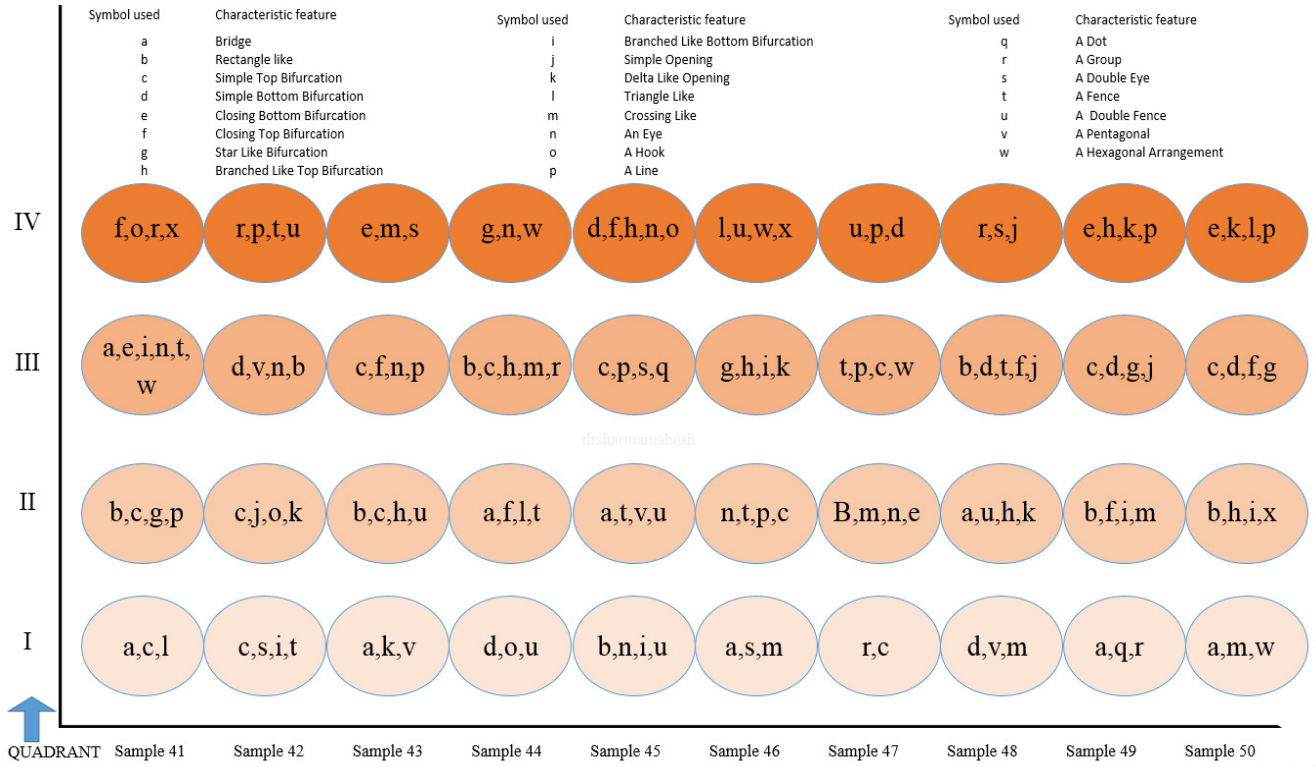

Figure 4 (E)
Distribution of characters in different quadrant of Lip print sample 41 to 50

Table-2
Frequency of characters in Lip prints of female samples

Characteristics	Upper	Lower	Both
a-Bridge	34%	10%	20%
b-A Rectangle like	24%	20%	6%
c-Simple Top Bifurcation	56%	12%	14%
d-Simple Bottom Bifurcation	6 %	68%	12%
e-Closing Bottom Bifurcation	2%	50%	4%
f-Closing Top Bifurcation	38%	12%	2%
g-Star like bifurcation	14%	20%	12%
h-Branch like top bifurcation	40%	18%	2%
i-Branch like bottom bifurcation	16%	30%	0%
j-A simple opening	12%	12%	0%
k-Delta like opening	6%	18%	2%
l-A triangle like	10%	16%	6%
m-Crossing line	22%	20%	14%
n-An eye	14%	28%	2%
o-A hook	12%	24%	20%
p-A line	8%	20%	41%
q-A dot	14%	8%	4%
r-A group of dots	4%	18%	0%
s-A double eye	10%	18%	8%
t-A fence	20%	16%	20%
u-A double fence	8%	10%	0%
v-A pentagonal arrangement	8%	14%	2%
w-A Hexagonal arrangement	6%	20%	0%
x- A Bar	14%	12%	0 %

From the study, it was found that Rolled-print yields better result and have ease of access when compared with other methods.

Lipstick print left at the scene of a crime can be a valuable piece of trace evidence. Moreover it was observed that a Red color lipstick leaves enhanced characters, when compared with other type of color.

The statistical calculation as shown in table 2 estimate that SIMPLE TOP BIFURCATION (y) is more prominent in upper lip with 56% and SIMPLE BOTTOM BIFURCATION is prominent in lower lip with 68%. However calculation shows that A Line Like (I) feature is most common, when both upper and lower lips are taken into consideration with 44% presence.

A Bar (x) with symbol (-) was found in both upper and lower lip with 14% and 16% of distribution respectively.

Discussion: The most commonly used techniques like the fingerprints, DNA and dental identification continues. It is recognized that due to both lip grooves, their special features and palatal rugae can be used successfully in human identification[12]. This study was supported to calculate the frequency of pattern and their variation in female lip print samples. In the present study the simple top bifurcation is most prominent in upper lip and simple bottom bifurcation is most common in lower lip. Similar to a study in female type II branched was prominent according to Gondivkar, SM. and et all in 2009. Lip prints of 50 female samples were taken and observed every month. The lip print pattern showed consistency with any changes in their pattern, the lip prints were noted in calm and closed position. This may be due to the fact that the uniqueness of lip prints depends upon the relaxation of muscle to produce a particular pattern[10]. Similar result was seen in a study in which have shown though lips grow with age, the lip print invariably remains the same[16].

In the present study, no two lip print patterns are showing similarities and used as a personal identification, this uniqueness is also proposed by Tsuchihashi, Y. in 1974[17]. In present study the most common lip pattern was bifurcation, however Study of lip print on 64 Japanese subject conducted by Tsuchihashi, Y. and Suzuki, K. in 1970found that 'crossing line' was the most frequent with (64.6%) of cases which contrasts[13] the finding of present study, but it signifies the variation on pattern on different races and population. This particular aspect of cheiloscopy is currently in its developing stage of investigation. Further detailed examination of these lip prints characters found on different quadrants were encoded a to z during the study. The following table shows different character used to encode 24 different characters which were observed during study.

Conclusion

In present work Lip print of 50 different female subjects were taken with the help of red colour lipstick by different methods. On the basis of observation made on lip prints of 50 female subjects and from the previous study, it has been suggested that lip prints are unique, and no two people can have similar pattern of lip print. Hence, they are individual characteristics, and different for different individual. During course of work it was observed that Roll Lip print proved best method for taking lip print from subject due to ease of access and pronounced feature. The observation made during study also reveals that simple top bifurcation and simple Bottom Bifurcation is one of the robust characters of lip print. The statistical calculation after sample collection estimates that Simple Top Bifurcation (y) is more prominent in both upper and lower lip with 56% in upper lip and 68% on lower lip. However calculation also shows that A Line Like (I) feature is most common, when both upper and lower lips are taken into consideration with 44% presence. A new character A Barlike (-) was found during course of work. Thus, the study may help to add certain new aspects to the use of the lip prints in forensic practice. Since lip prints behold the potential for individual identification, the study of lip prints needs to be developed further to prove its use as an effective tool for identification, such as fingerprints. Although lip print identification has been applied by courts in isolated cases, further studies need to be carried out on a larger sample size, preferably of different races to find the pattern of lip print distribution among individuals of different races and nations. Results, if significant, can be of help in establishing nationality

or racial origin of an individual, especially, in modern scenarios where international and intercontinental travelling and mixing is common.

Table-3
Distribution of characters in different quadrants of Lip print

Sample	Quadrant I	Quadrant ii	Quadrant iii	Quadrant iv
1	a,b,c,j,m,p	a,c,f,g,h,o,s	d,p	d,p
2	a,b,c,e,j,l,t	a,c,h,m,o,p	a,d,e,I,n,p	b,d,o
3	c,f,o	f,p,q	d,e,h,l,p	d,I,n
4	b,f,p,w,x	b,f,j,t	d,n,p	d,I,k,t
5	b,c,o,p	a,c,x	a,d,p,w	d,I,o
6	c,f	h,o,s	d,o,q	d,j
7	B	c,h	d,p,v	b,d,k,r
8	c,t	a,b,c,f,l,o,q	d,I,i,n,s	D,e
9	a,c,g,m,p	a,c,p,t,x	c,d,e,g,p,t	d,m,h
10	a,p,t	m,o,p	b,d,e,g	o,g
11	C	b,c,f,l,p,t,x	i,o	T
12	A	a,d,g	b,d,m	e,I,j,q,t
13	a,c,n	c,h	d,m,q,o,p,t	d,e,p
14	c,h,	a,g,m,p,t	a,d,h,m,t	d,e,g
15	C	c,f,h,p	a,d,m,p,u	a,d,n,s,v
16	c,n,p	a,b,c,h,j,m,o,q,v	i,d,e,o	d,g,k,m,p,v
17	c,f	h,p	d,e,I,m,o	d,g,p
18	A	c,f,h,n	b,e,I,s,w,x	O
19	C	c,p,t	d,h,n.o.u	d,k
20	d,g,m,n	D	d,l,x	Q
21	T	c,p	a,d,e,j,m,p,t	d,h
22	c,p	c,h,l,s	d,p,s	e,i,l
23	G	a,f,j,o,q	a,d,g,m	b,d,h,t
24	h,m	a,c,g,m,p,t	a,d,g,o,p,w	e,k,t
25	c,p	c,m	d,m,s	c,d,o,p
26	c,f	a,b,c,g,h,i,p,t,x	d,b,m,g,n,t	a,d,e,o,p,v
27	E	a,c,i,m	a,d,e,o	d,h,t
28	a,d,p	c,k,p,t	d,l,o,p,t	a,c,k,l,s
29	F	c,g,h,l,p	b,d,e,g,I,m,p,s	c,d,m,x
30	C	a,c,h,t	a,d,g,l,p,t	b,e,p,w
31	e,j,p,q	c,t,b	a,n,p	-
32	P	o,p,x	d,j,o,p,r,t	d,e,p,u
33	c,s	d,f,g,m,p	b,e,m,p,w	d,I,s
34	c,h	A	c,d,t,j	n
35	d.f,i,p	c,h,f,q	g,r	d,l,p,t
36	f,d	c,d,q,p,n,t	c,v,u,p,e	a,q,e,d
37	D	f,s,k	a,t,o,m	b,d,o,m
38	c,d,o,s	c,d,e,w	S	i,j,m,o
39	G	d,t	c,f,h,l,q,x	e,v
40	Q	a,m,o,p,s,x	d,e,n,o,p	d
41	a,c,l	b,c,g,p	a,e,i,n,t,w	f,o,r,x
42	c,s,i,t	c,j,o,k	d,v,n,b	r,p,t,u
43	a,k,v	b,c,h,u	c,f,n,p	e,m,s
44	d,o,u	a,f,l,t	b,c,h,m,r	g,n,w
45	b,n,i,u	a,t,v,u	c,p,s,q	d,f,h,n,o
46	a,s,m	n,t,p,c	g,h,I,k	l,u,w,x
47	r,c	B,m,n,e	t,p,c,w	u,p,d
48	d,v,m	a,u,h,k	b,d,t,f,j	r,s,j
49	A,q,r	b,f,i,m	c,d,g,j	e,h,k,p
50	A,m,w	b,h,i,x	c,d,f,g	e,k,l,p

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