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LIP FORENSICS; CHEILOSCOPIC PATTERN AMONG POPULATION OF PUNJAB, PAKISTAN.

Shirza Nadeem[1], Gulmeena Manzoor[2], Sara Pervez[3]

1. MBBS, DMJ
Associate Professor
Department of Forensic Medicine & Toxicology
University Medical & Dental College, Faisalabad.
2. MBBS
House Officer
Allied Hospital, Faisalabad.
3. MBBS
House Officer
Allied Hospital, Faisalabad.

Correspondence Address:
Dr. Shirza Nadeem
Associate Professor
Department of Forensic Medicine & Toxicology
UMDC, Faisalabad.
shirzanadeem@hotmail.com

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ABSTRACT… Personal identity is an attribute of a mankind which makes him or her unique. Cheiloscopy is one of the sciences which is used to study and examine the lip prints pattern in order to establish the personal identity in Forensic Medicine. **Objective:** To categorize lip patterns in female population of different divisions of Punjab, Pakistan according to Suzuki and Tsuchihashi's classification. **Study Design:** Descriptive, Cross-sectional study. **Setting:** The present study was conducted on 357 female medical students of 1st, 2nd and 3rd year of University Medical and Dental College, Faisalabad in the department of Forensic Medicine and Toxicology. **Period:** March-June, 2018. **Materials and Methods:** After obtaining informed consent students were asked to stand erect and their lip prints were taken on the glass slide. Next carbon black powder was dispensed on the slide and the latent lip print pattern was obtained. The slide was preserved by using cellophane tape and lip print patterns were scanned. These patterns were then categorized according to Suzuki and Tsuchihashi's classification by using Software Adobe Photoshop version 6.0. **Results:** The results showed that most participants were from central Punjab (70%) followed by Southern Punjab (19%), Western Punjab (9.6%) and Northern Punjab (1.4%). The most common lip print pattern was Type I (66%), second was Type II (17.3%), then Type IV (7.1%), after that Type III (5.1%), Type I'(2.5%) & last was Type V (1.7%). **Conclusion:** The most common lip print pattern in females of Punjab, Pakistan is Type I while the least common is Type V.

Key words: Cheiloscopy, Forensic Identification, Lip Prints, Personal identity, Rugoscopy.

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INTRODUCTION

Personal identity is an attribute of a mankind which makes him or her unique. So identifying a human being is of prime importance because every individual has diverse characteristics.[1,2] There are many tools of personal identification in forensic medicine such as dactylography, rugoscopy, DNA fingerprinting and cheiloscopy.[3]

Cheiloscopy is the science which is used to study and examine the lip prints pattern in order to establish the personal identity in Forensic science. It is one of the important means of recognition of a person.[4] Its practical application is in plane crash and burn cases where data cannot be collected through other commonly applied methods.[5] It is also collected by the crime scene examiners when they find lip prints on the cigarette butts, glasses, clothing, cups, windows and on doors as a trace evidence.[6,7]

Lip pattern printing is considered one of the surest, easiest and less time taking methods of personal identity due to the fact that lips naturally have special lines and grooves which varies among individuals and populations.[8]

There are certain conditions which may affect the appearance of lip prints pattern. For instance, it is recommended to take lip prints within 24 hours after death. The pattern also depends upon the opening and closing of the mouth.[9]

There are many variations in the pattern of lip prints that's why scientists have studied it broadly. As a result, many classifications were devised such as Santos, Suzuki and Tsuchihashi, Renaud's and Kapserzak. However, Suzuki and Tsuchihashi's

classification is most commonly used. R. Fischer was the first to describe the presence of ridges on the lips' red part. Edmond Locard suggested using this field of science but the idea using it as a tool of personal identity was given by Le Moyne Snyder.[5,6,10] Since then, researchers have been extensively studying it as a personal identity tool. But in Pakistan very few studies have been conducted on cheiloscopy but no study has been done in Faisalabad so far.

OBJECTIVE OF STUDY

To categorize lip patterns in female population of different divisions of Punjab according to Suzuki and Tsuchihashi's classification.

MATERIALS AND METHODS

This cross-sectional study was conducted on 357 female students of MBBS 1st year, 2nd year & 3rd year of University Medical and Dental College Faisalabad belonging to different divisions of Punjab. An informed written consent was taken from the participants before obtaining their Lip prints. To study the lip print variation among females of different divisions of Punjab, we analysed them according to Suzuki and Tsuchihashi's classification.

INCLUSION CRITERIA

1. Participants who gave their voluntary informed consent.
2. Participants having no deformity of lips.

EXCLUSION CRITERIA

1. All the participants having any deformity of lips, scar marks, cuts, wounds, ulcers, and any disfigurement etc. were excluded.
2. Participants residing other than the province of Punjab.

MATERIALS

Hand gloves, glass slides, cellophane tape, powdered Carbon black powder, spatula, tissue papers, A-4 size papers, HP Scanjet 200, Software Adobe Photoshop version 6.0.

METHOD

White sheet of paper was divided into four equal quadrants; left upper, right upper, left lower and right lower and was marked as LU, RU, LL, & RL respectively. The demographic data of each participant was taken regarding their name, age, class & area of residence.

After informed consent the lips were cleaned with tissue paper. The students were asked to stand erect against the wall in a relaxed position & to pout their lips a little. This helped in enhancing lip prints in all the four quadrants of the lips. Then a clean glass slide was pressed against the lips with slight pressure for once. Carbon black powder was dispensed over the side of glass slide where lip prints had been obtained. The excess powder was dusted off. The glass slide was then placed on the pre marked white sheet of A-4 size paper. The slide was cautiously placed in a specific position on the paper so that the lip prints were divided into the four quadrants. The slide was then preserved with the cellophane tape. Care was taken to avoid air bubbles and folds while conserving the glass slide.

After collecting data, each sample was coded with number. These were then scanned with the help of HP Scanjet 200. The scanned prints were then analysed on Adobe Photoshop version 6.0 software. (Figure-1)

Figure 1. Lip print analysis on adobe photoshop software

The lip prints were studied according to the Suzuki and Tsuchihashi's classification. The predominant pattern which was on each quadrant was considered in our study. According to this classification lip patterns can be classified as: Type I: Clear cut vertical indentations across the lips. Type I': same as type I but do not cover

the whole lip. Type II: divided indentations. Type III: criss-cross indentations. Type IV: Reticular indentations. Type V: indentations do not fall in any category and undifferentiated morphologically. (Figure-2 to 5).

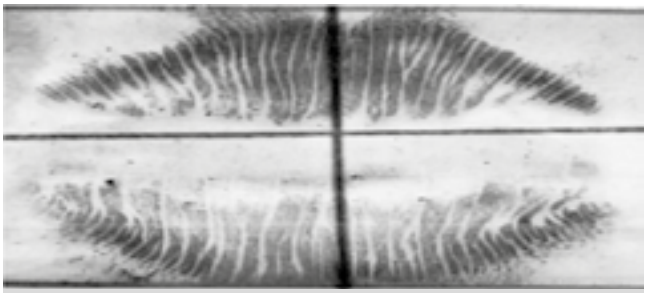

Figure-2. Type I: Long Vertical

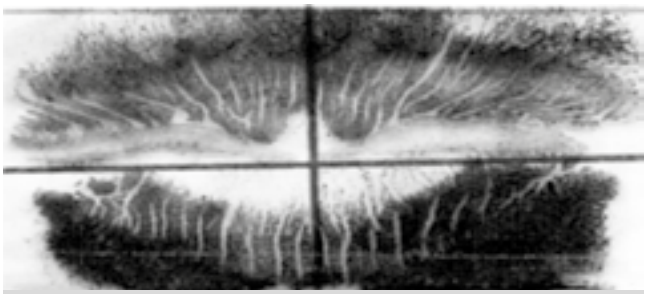

Figure-3. Type I': Short Vertical

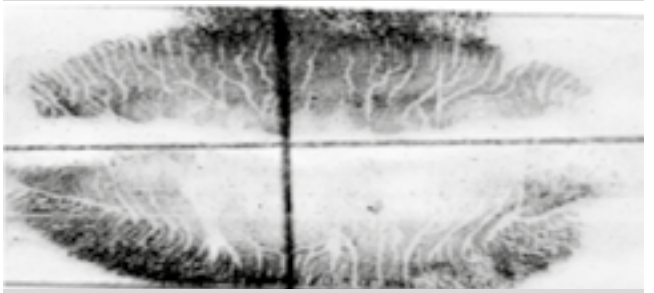

Figure-4. Type II: Branching

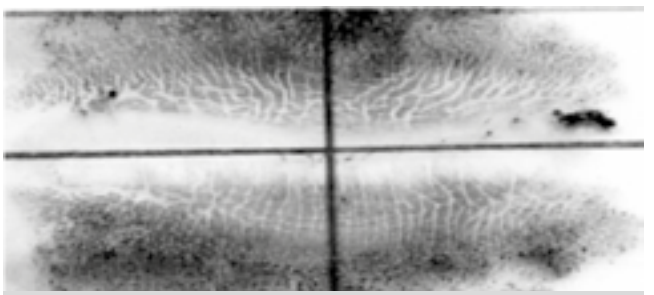

Figure-5. Type IV: Reticular

STATISTICAL ANALYSIS

The Frequency distribution of lip print patterns among different divisions of Punjab was calculated by using statistical package for social sciences SPSS version 20.

RESULTS

357 students voluntarily participated in our study whose age range was from 18 years to 22 years. Out of them four lip prints were incomprehensible so those were excluded from the study, thus making a total of 353 cases.

The results of our study showed that most of our participants were from Central Punjab (70%), followed by Southern Punjab (19%) and Western Punjab (9.6%) while least number of cases were from Northern Punjab (1.4%) as shown in Figure-6.

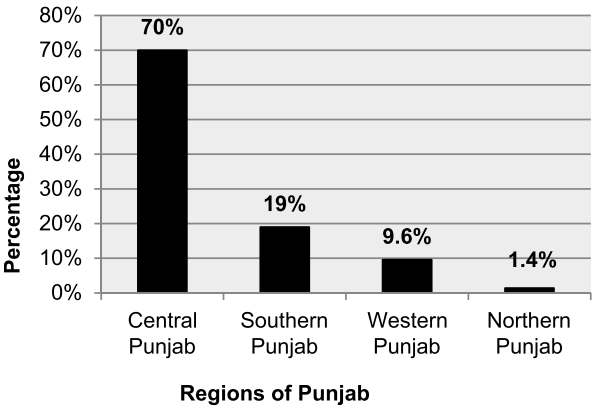

Figure-6. Distribution of studied cases according to regions of Punjab, Pakistan

Figure-7 represents the percentage distribution of lip prints which indicate that most frequent lip print pattern in the study sample according to Suzuki and Tsuchihashi classification was Type I with 66%, followed by Type II (17.3%), while least common was Type V (1.77%).

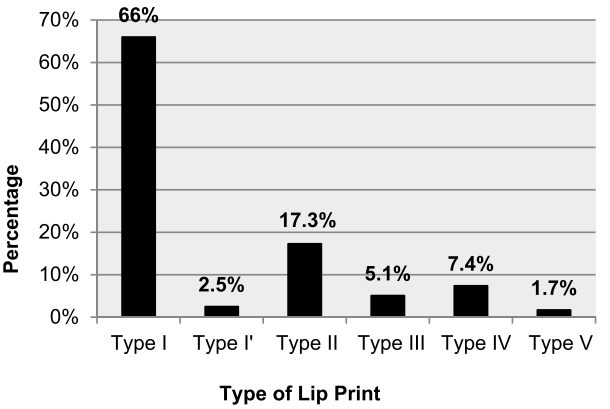

Figure-7. Distribution of types of lip prints in the studied group according to Suzuki and Tsuchihashi classification

Region of Punjab	Type I n (%)	Type I′ n (%)	Type II n (%)	Type III n (%)	Type IV n (%)	Type V n (%)
Central Punjab	160 (64.8)	7 (2.8)	42 (17)	15 (6.1)	19 (7.7)	4 (1.6)
Northern Punjab	2 (40)	0	2 (40)	0	1 (20)	0
Western Punjab	24 (70.6)	1 (2.9)	6 (17.6)	0	2 (5.9)	1 (2.9)
Southern Punjab	47 (70.1)	1 (1.5)	11 (16.4)	3 (4.5)	4 (6)	1 (1.5)

Table-I. Frequency distribution of number & percentage of lip print patterns according to regions of Punjab, Pakistan in the studied group

Our observation revealed that Type I lip print was commonest in all regions of Punjab except for Northern region as shown in Table I. In Northern Punjab, the frequency of Type I was equal to Type II. Another interesting finding in Table I is that Type II lip print turned out as the second most common type in all regions of Punjab, Pakistan.

DISCUSSION

Cheiloscopy plays a very significant role in investigation, differentiation and recognition of a person. A lip print pattern that is obtained from the crime spot can help us in determining the type of crime, number of perpetrators, their sex, professional habits and abnormalities in the lips.[6] Our lips contain salivary and sweat glands while sebaceous glands are present at junction of upper and lower lips that leads to development of latent lip prints.[3,7,11] According to a study conducted in Nigeria, the author gave an example of a researcher who identified the criminal from latent lip prints.[12] We also used the technique of latent lip prints in our study.

Our study illustrated that Type I was the most predominant lip print pattern which is followed by Type II, Type IV, Type III, Type I′ and Type V among females in different regions of Punjab, Pakistan. These results are consistent with data obtained from studies which were done in different states of India including Uttar Pradesh[3,7], Maharashtra[13] and Chhattisgarh[14] in which Type 1 was found to be the commonest one. Our results also match those observed in earlier studies done in Lahore, Pakistan.[8,9,15] The probable reason for the same results is due to same environmental conditions, genetic makeup and ethnicity.[7]

However, our results are in contrast to the studies done in Nigeria,[12] Iran,[16] Egypt[17] & few states of India.[1,2] Type V was the most common lip print pattern in Nigeria & Iran[12,16] while Type IV was commonest in Egypt.[17] Interestingly, our finding is contrary to a study which was conducted in 2017 at Karachi (Pakistan) by Sara Gardezi *et al,*[18] which concluded Type I as the least common pattern of lip print while it is most common in our study. These contrary results are probably due to different geographical location and environmental factor.[16]

We also categorized females in our study according to different regions of Punjab which are Northern Punjab, Southern Punjab, Western Punjab and Central Punjab. These regions include nine divisions namely Faisalabad, Sargodha, Gujranwala, Bahawalpur, Dera-Ghazi Khan, Sahiwal, Lahore, Multan and Rawalpindi. Central Punjab includes Faisalabad, Gujranwala, Lahore, and Sahiwal divisions. Rawalpindi is included in Northern Punjab. Sargodha is included in Western Punjab. Multan, Dera Ghazi khan and Bahwalpur is included in Southern Punjab.[19]

The current study found that most common type in females of all regions of Punjab, Pakistan is Type I. Our results also support the findings of previous researches which were done in Lahore division (Central Punjab), Pakistan.[8,9,15] So this can be inferred that factors like geographical location, ethnicity, and environmental conditions can influence the final outcome. Unfortunately, no studies are done in other regions of Punjab, Pakistan.

During the categorization of lip prints in our study it was observed that no two lip prints were identical confirming the exclusivity of cheiloscopy as reported by many other studies as well.[1,2,5,12,16,17] However, it was observed that during our study

there was inconsistency while classifying the lip patterns by different researchers & even by same researcher at different time. This is probably due to lack of researchers' practice and experience in studying lip print patterns.

CONCLUSION

The most common lip print pattern in females of Punjab, Pakistan is Type I while the least common is Type V.

RECOMMENDATIONS

- Further research is required to study the lip pattern variation and sex determination in different regions of Pakistan.
- Training workshops should be arranged for Forensic professionals to have hands-on experience regarding studying & classifying lip print patterns.

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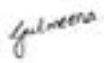
AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Shirza Nadeem	Principal investigator involved in Literature search, Results interpretation, Data analysis & Proof reading.	
2	Gulmeena Manzoor	Co-investigator involved in data collection, Literature review & scientific writing.	
3	Sara Pervez	Co-investigator involved in data collection, Literature review & scientific writing.