

# Frequency of Different Cheilosopic Patterns Among Young Pakistani Population

Different  
Cheilosopic  
Patterns Among  
Young Pakistani

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## ABSTRACT

**Objective:** To determine the frequency of different lip patterns among the young Pakistani population.

**Study Design:** Descriptive, cross-sectional study.

**Place and Duration of Study:** This study was conducted at the Department of Forensic Medicine & Toxicology, QAMC/ Bahawal Victoria Hospital, Bahawalpur from 01.07.2021 to 31.12.2021.

**Materials and Methods:** A total 203 of medical students 18-30 years of age of either gender were selected. Subjects with previous lip surgery, lip trauma and any lip deformity were excluded. In this research, non-glossy and dark coloured lipstick was utilized to obtain the lip prints of the subjects. The lipstick was smeared in a uniform pattern on the cleaned lip using a swap. The smear settled for a minute, and then lip print was collected using tape, and applied to the lip from right to left. For all samples, the cellophane tape was removed in one swing and stuck to an A4 paper. Collected lip prints were studied and analysed through standard scientific procedures to obtain results.

**Results:** Mean age was  $24.17 \pm 2.87$  years. Out of these 203 subjects, 110 (54.19%) were males and 93 (45.81%) were females with a male to female ratio of 1.2:1. In this study, the most common lip patterns found were Type I (26.11%) and Type II (20.69%), followed by Type I' (18.72%), Type III (18.23%), Type IV (10.34%) and Type V (5.91%). **Conclusion:** This study concluded that cheiloscopia might provide valuable information in the identification of an Individual.

**Conclusion:** The study concluded that in the young Pakistani population lip patterns found were Type I (26.11%) and Type II (20.69%), followed by Type I' (18.72%), Type III (18.23%), Type IV (10.34%) and Type V (5.91%). So, it is concluded that cheiloscopia and its study in varying avenues might provide valuable information with regard to the identification of an Individual.

**Key Words:** Cheiloscopia, Identification, Gender

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## INTRODUCTION

Every human being is born with certain peculiar features which differentiate him from every other human being ever born. These features make the basis for identification. Identification of an alive or dead individual human is based on the fundamental theory that every individual is unique.

A person can be identified subjectively by external features such as facial features, shape and colour of iris, height, weight, the colour of hair or any particular

birthmark. Photographs of individuals and morphological data has traditionally been kept in records especially in criminal records where a mug shot of a person is taken where his height and facial features are recorded but all these features are not reproducible and cannot yield authentic results in most cases. So, more precise methods are required for forensic identification. Various unique features have been identified in human beings which have been traditionally used to document the identity of individuals. Fingerprints are the most common method used for identification and this is because every person has different fingerprints. Advancement in biological research has identified even more accurate and authentic methods of identification. In the late twentieth century, research led to DNA mapping of humans and it has been established that this is the most accurate method as the uniqueness of human beings is based on differences at the genetic level. All other unique features develop from genetic peculiarities in the genome. DNA can also be obtained from the dead and even decomposed dead bodies for the purpose of identification. The technique used to identify individuals by DNA is known as DNA fingerprinting. DNA fingerprinting not only requires expensive

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technology but also highly trained personnel. A developing country like Pakistan doesn't have the resources to apply such sophisticated and advanced techniques routinely. Various other unique features which may be utilized for identification has been recently described but many of these methods like frontal air sinus pattern and skull suture pattern need complex technology like x ray, CT scan and expensive equipment. An identification method which is to be used routinely should not only be accurate but also be simple, less expensive and readily available. Identification of the individuals is becoming more important not only in legal medicine but also in crime scene investigation and Genetic Research<sup>1</sup>. The fingerprint-based identification system was introduced in India in 1858 by Sir William Herschel for the first time. This method is the most widely used method. But it has certain limitations as well. In civil cases, with advancing age fingerprints diminish and failure to match fingerprints leads to legal disputes. Moreover, skin conditions like leprosy and amputation of the limb may lead to the inability of matching fingerprints. In criminal cases, criminals are well aware of methods to avoid leaving their fingerprints on the crime scene. Therefore, in this technological age, the identity of an individual can be determined by a combination of different methods. The identification process, based on the combination of different methodologies, makes the identification process of individuals relatively flawless<sup>2</sup>. Due to the high cost and availability of the required technology, modern molecular biological techniques are not always a source identification process. Therefore, in such circumstances, a reliable technique like lip prints can be utilized<sup>3</sup>. The wrinkle pattern on the lips is a similar feature to the figure prints of the individual. Various elevations and grooves form a distinctive pattern on the lip's external surface, named "lip prints", which are unique and do not change during the entire life of the human. Lip prints are not affected by age making them a better choice. In addition to this, there is no chance of losing this identification method due to any amputation. As it is a less common method, criminals can unintentionally leave his lip prints in the crime scene. Lip prints can be easily collected at the crime scene from various objects like cups, clothing, glasses, cigarettes etc<sup>4,5</sup>. Fischer was the first who described the lip prints in 1902. However, its use for the identification of individuals was first recommended in France by Locard and Synder also endorsed it<sup>6,7,8</sup>. Dr. Santos in 1966<sup>9,10,11</sup> classified the wrinkles on lips as "simple and compound". The simple was then further categorized as a "straight line, an angled line, a curved line and a sine-shaped one". Similarly, the compound was further subdivided into "bifurcated, trifurcated, and anomalous groups". Santos also classified the lip based on thickness<sup>12</sup> as "a thin, medium, thick, and mixed type". The author also

reported multiple types of commissures like "horizontal, flat, and elevated"<sup>13</sup>. According to the shape and grooves, followings are the six types of lip prints as shown in Figure 1.

According to the study<sup>8</sup>, Type III (20%) and Type IV (20%) are the most common lip patterns in males compared to females who have lip prints of Type I and Type I' (25% each). The Forensic Sciences Laboratory in Bangalore has classified the microstructural, wrinkles and grooves, and macro-structural, size and shape, patterns of lips<sup>14</sup>. Similarly in Korea, forensic investigators are using biometric systems including the lip prints in personnel identifications<sup>15</sup>. Many authors think that a smear from a lip print contains DNA evidence to identify a suspect<sup>16</sup>. In 1998, Ehara and Marumo reported in a study that "lipstick smears are frequently encountered in forensic science laboratories as one of the most important forms of transfer evidence. Lipstick smears on suspects' clothing can indirectly prove a link between the suspect and a female victim and smears left on cigarette butts, glasses or cups can prove a link between a suspect and a crime scene." In another research focused to obtain DNA from porous surfaces described the lips prints DNA attempts as "The developing of latent lip prints on porous surfaces is more recent than that for fingerprints. The first research showed that traditional reagents used for fingerprints are not successful. It has recently been determined that lysochromes (Sudan Black) are quite effective in developing recent latent lip prints, as well as older ones, on porous surfaces. Once the print has been detected, a trace is available from which to procure cell remains that can supply enough DNA to be analysed by the polymerase chain reaction technique. The results of this study indicate that latent prints on paper and developed with Sudan Black can be used as a potential DNA source for forensic identification"<sup>17</sup>. Very few studies have been conducted international and no local study is available on this with a large sample size, so the main aim of my study was to determine the frequency of different lip patterns between males and females in the local population. The results of my study will provide information regarding sex determination by lip prints and also provide stats regarding different lip patterns in both sexes. This information will help to identify the gender information at the crime scene.

## MATERIALS AND METHODS

**Study Design:** Descriptive, cross-sectional study.

**Setting:** Department of Forensic Medicine, QAMC/Bahawal Victoria Hospital, Bahawalpur.

**Sample Size:** The calculated sample size is 203, with 95% confidence level, 3% absolute precision and taking type V pattern in females as 5%.<sup>8</sup>

**Sampling Technique:** Multistage sampling, a stratified random sampling technique was used to divide samples of 203 into different groups. The target population for

this study was students in the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and final years of QAMC. Proportional allocation was made 55 for was classified according to its total strength as follows; First year = 339/1664 x 203 = 41. Second-year = 333/1664 x 203 = 41. Third year = 331/1664 x 203 = 40. Fourth year = 326/1664 x 203 = 40. Final year = 335/1664 x 203 = 41. After making strata, a simple random sampling technique was applied to collect the desired number of students.

**Inclusion Criteria:**

- a. Medical students of age 18-30 years.
- b. Both genders.

**Exclusion Criteria:**

- a. Subjects with previous lip surgery, lip trauma and any lip deformity (assessed on history).
- b. Subjects not willing to be included in the study.

**Data Collection Procedure:** A total of 203 subjects fulfilling the inclusion criteria were selected after approval from the ethical review committee of BVH. Informed written consent was taken from each subject. Nonglossy and dark coloured lipstick were utilized to obtain the lip prints of the subjects. The lipstick was smeared in a uniform pattern on the cleaned lip using a swap. The smear was allowed to settle for a minute, after which lip print was collected using a transparent tape applied to the lips in a direction from right to left. For all samples, the tape was removed in one go and saved on A4 paper. Samples of the lip prints were collected by the researchers themselves. Patterns of lip prints were noted as a pre-operational definition. All the findings were recorded on proforma.

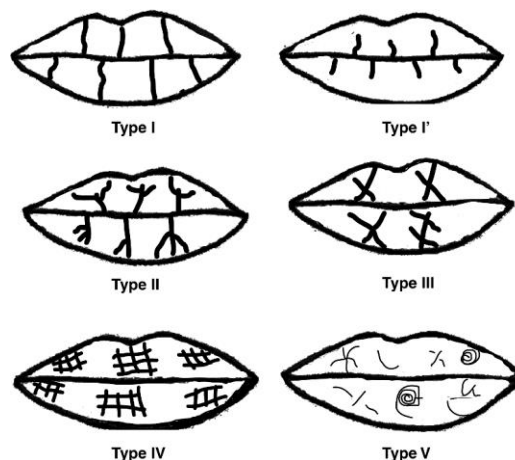
**Data Analysis Procedure:** All the information was entered into SPSS 22.0 and was analysed through its statistical package. Quantitative variables like age were presented as mean and standard deviations while qualitative variables like gender, area of residence (Punjab/Sindh/KPK/Balochistan/Kashmir) and different lip patterns (I/ I'/II/III/IV/V) were presented as frequency and percentage. Effect modifiers like age, gender and area of residence (Punjab/Sindh/ KPK/ Balochistan/Kashmir) were controlled through stratification. Post-stratification chi-square test was applied to see their effect on different lip patterns and p-value.

**RESULTS**

**Table No.1: Distribution of subjects according to lip pattern (n=203)**

Lip pattern	No. of subjects	%age
I	53	26.11
I'	38	18.72
II	42	20.69
III	37	18.23
IV	21	10.34
V	12	5.91

The age range in this study was from 18 to 30 years with a mean age of 24.17 ± 2.87 years. The majority of the subjects 133 (65.52%) were between 18 to 25 years of age. Out of these 203 subjects, 110 (54.19%) were males and 93 (45.81%) were females with a male to female ratio of 1.2:1.



**Figure No.1: Suzuki and Tsuchihashi classification of lip prints**

**Table No.2: Stratification of different lip patterns with respect to gender**

Different lip patterns	Male n=110	Female n=93	p-value
I	Yes	34	0.090
	No	76	
I'	Yes	17	0.195
	No	93	
II	Yes	30	0.012
	No	80	
III	Yes	16	0.140
	No	94	
IV	Yes	09	0.271
	No	101	
V	Yes	04	0.135
	No	106	

**Table No.3: Stratification of different lip patterns with respect to the area of residence**

Different lip Patterns	Punjab n=126	Sindh n=16	KPK n=23	Balu-chistan N=11	Kashmir N=27	p-value
I	Yes	39	05	03	01	0.182
	No	87	11	20	10	
I'	Yes	22	03	07	02	0.648
	No	104	13	16	09	
II	Yes	26	04	06	01	0.034
	No	100	12	17	10	
III	Yes	21	00	05	01	0.027
	No	105	16	18	10	
IV	Yes	10	01	02	05	0.003
	No	116	15	21	06	
V	Yes	08	03	00	01	0.087
	No	118	13	23	10	

In this study, the most common lip patterns found were Type I (26.11%) and Type II (20.69%), followed by Type I' (18.72%), Type III (18.23%), Type IV (10.34%) and Type V (5.91%).

Stratification of different lip patterns with respect to gender is shown in Table 2.

Table 3 has shown the stratification of different lip patterns with respect to the area of residence.

## DISCUSSION

Lip prints can be used for identification as every individual has unique lip prints and they do not change throughout life. Identification through lip prints does not require any expensive equipment and not even highly specialized technical staff. A lip print at the crime scene can offer a clue to answer various questions like the crime type, the number of criminals involved, sexes of suspects, habits, the pathological changes of lips and occupational traits. Suzuki and Tsuchihashi reported cases where lip prints were useful in the identification of criminals. Literature review shows that lip prints are as good as fingerprints in the identification process when there are no other sources of identification are available<sup>19</sup>.

Research studies regarding the use of lip prints as evidence of racial discrimination are inadequate. In study<sup>20,21</sup>, Type II and III were the most predominant pattern among Indian and African males whereas Type I was the most predominant pattern among both Indian and African females. The results of the study are in line with our results presented in Table I. Similarly, Manypady, in a comparative study of lip prints of Indian and Chinese individuals results that Type II patterns are more common among Indians<sup>22</sup>. Results reported by the Nagpal et al. also showed that Type III as most common lip pattern in Malaysian males whereas Type I and Type I' are predominant in Malaysian females. Our study also noted Type I as the most frequent pattern in both sexes. The stratification of results of different lip patterns on basis of gender, ethnicity, age and area of residence can be further done on larger scale to collect data which can be used in crime scene investigations.

## CONCLUSION

The study concluded that in the young Pakistani population lip patterns found were Type I (26.11%) and Type II (20.69%), followed by Type I' (18.72%), Type III (18.23%), Type IV (10.34%) and Type V (5.91%). So, it is concluded that cheiloscapy and its study in varying avenues might provide valuable information with regard to the identification of an Individual.

### Author's Contribution:

Concept & Design of Study: Hira Munir, Hira Anjum  
 Drafting: Hafiza Naima Anwar  
 Data Analysis: Hafiza Naima Anwar

Revisiting Critically: Hira Munir, Hira Anjum  
 Final Approval of version: Hira Munir

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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