

Original Research Paper

Cheiloscopy: A Tool for Personal and Forensic Identification

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Abstract

Skin over the lips is known to have patterns of ridges and furrows, study of which is known as cheiloscopy. Besides the traditional methods of identification like finger printing, sex determination, age determination, anthropometry and DNA analysis, cheiloscopy is gaining popularity among researchers because of a hassle free methodology and reliable results with developments in the fields of Forensic Medicine and Odontology, proving itself as a credible method of identification. To study the significance of studying lip prints in personal identification, a study of lip prints was conducted in Department of Anatomy, in collaboration with Department of Forensic Medicine, Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha; on 100 undergraduate medical students aged between 17 to 20 years. The lip prints were studied with the help of a magnifying lens using Suzuki and Tsuchihashi classification. The study concluded that lip prints are unique for every individual, and cheiloscopy can be practised as a reliable method for personal and Forensic identification.

Key Words: Lip Prints, Cheiloscopy, Identification, Odontology

Introduction:

Lip prints are normal lines and fissures in the form of wrinkles and grooves present in the zone of transition of human lip, between inner labial mucosa and outer skin, and are based on physical properties of an individual.

The study of lip prints is known as "Cheiloscopy", derived from Greek words "cheilos" meaning "lips" and "eskopein" meaning "to see". It is an emerging and credible method of individual identification, based on the fact that the pattern of lines on the red part of lips is unique for each human being.

Tsuchihashi Y. [1] named the wrinkles and grooves on lips as "sulci labiorum rubrorum". The figure formed by these sulcies called "figura linearum labiorum", which means "lip prints". The study of finger print pattern has always been more popular among researchers; however the study of lip prints is gaining more popularity and credibility in forensic medicine and odontology with evolution of technology.

The five basic types of lip prints used by Forensic scientists are:

- Diamond grooves
- Long vertical grooves
- Short vertical grooves
- Reticular grooves
- Branching grooves

Fischer in 1902 was the first anthropologist to describe the furrows on the red part of the human lip. However in 1932 Edmond Locard, renowned French criminologist recommended the use of lip prints in personal identification and criminal investigation.

In 1950, Synder reported in his book 'Homicide Investigation' that the characteristics of the lip formed by lip grooves are individually distinctive as the ridge characteristic of finger prints, therefore making it significant in personal identification.

Japanese doctor Suzuki [2] in 1970 examined 107 Japanese female aged 20-36 and simplified the classification of lip prints into five main types:

- **Type 1(a)** – Lip with clear cut grooves running vertically over the lips.
- **Type 1(b)** – Partial length grooves (do not cover entire breadth of lip)
- **Type 2** – Branched grooves.
- **Type 3** – Intersected grooves (like crosses).
- **Type 4** – Reticular pattern (wire mesh).
- **Type 5**– All other pattern (irregular non-classified)

Tsuchihashi [3] studied lips in 1364 persons in 1974 and was convinced that of their

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value in personal identification, and proposed the following classification pattern:

Type I– Clear cut vertical grooves that run across the entire lip

Type I^l– Similar to type I, but do not cover entire lip

Type II– Branched grooves (branching Y shaped)

Type III– Criss-cross pattern, reticular grooves

Type IV – Undetermined

Materials and Methods:

The study was conducted in the Department of Anatomy in collaboration with the Department of Forensic Medicine and Toxicology, Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha; where the lip prints of 50 male and 50 female MBBS students of 17 to 20 years of age were analysed.

The lip prints of this group were taken in the beginning, and after one year of last print for consecutive 2 years after the commencement of the study. Care was exercised to select individuals having no lesions on the lips. Individuals with known hypersensitivity to lipsticks were not included in study.

The following materials were used for recording the lip prints:

- A dark colour frosted lipstick
- Thin bond paper
- Magnifying lens
- Scale
- A piece of cardboard
- Two clips
- Pen, Pencil
- Tissue paper

A dark colour lipstick was applied with a single stroke evenly on the vermilion border. The subjects were asked to rub both the lips to spread the applied lipstick. After about two minutes a folded white paper inserted between the lips and asked to press on it. Then a paper was taken out and unfolds it to study the print.

Observations and Results:

In present study 100 individuals, comprising 50 males & 50 female students of 1st M.B.B.S. of age group 17 to 20 years were included. The lip prints were recorded and analysed, and it was found out that no two lip prints were identical.

In our study among Males, Intersecting grooves were the commonest in all four quadrants (41.5%), followed by Short Vertical grooves (40%), Long Vertical grooves (34%), and branched groove (29%). Reticular pattern (10.5%) is least commonly seen among males. (Table 1)

Among Females, the commonest pattern observed in all four quadrants was Intersecting grooves (39.5%), followed by Long Vertical grooves (32%), Short Vertical grooves (27.5%), Branched groove (18%) and Reticular pattern (12.5%). (Table 1) This study observed no changes in the lip prints after a year of last print, taken over two consecutive years.

Discussion:

The wrinkles and grooves on labial mucosa, called as sulci labiorum form a characteristic pattern called as lip prints and the study of which is referred as 'cheiloscopy'.

Lip prints are very useful in personal identification as well as forensic identification invaried situations like homicides, suicides, accidents, mass disasters and in establishing criminal responsibility of a suspect.

A study conducted by Tsuchihashi [3] on lip prints of 64 Japanese subjects consisting of 22 males & 42 females aged between 20-30 years concluded that intersecting groove was the commonest in both sexes, followed by long vertical groove, short vertical groove, branched groove, and reticular pattern was the least frequent of all.

Shivapathasundharam B et al [4] observed that the intersecting pattern (resembling type I in Suzuki's classification) was most common (43.33%) while the reticular pattern (resembling type IV in Suzuki's classification) was least commonly seen (10.71%). Some studies establish the importance of gender difference in the observed patterns of lip prints.

According to a study by Sonal-Nayak [5] type I and type II^l patterns were dominant in females, while type III and IV pattern were dominant in males. Nagpal Bhuvan et al [6] concluded that type I and type I^l patterns are commonest in females, while Verghese AJ et al [7] found type IV predominant among females. There were slight variations observed in males.

In another study conducted by Vahanwala S P, [8] it was observed that all four quadrants having similar type of patterns were predominantly seen in female subjects, whilst different patterns were observed in all quadrants among males.

Conclusion:

In the present study, we used magnifying glass to observe the lip prints and it was found that no two lip prints matches with each other. No changes were observed in consecutive prints taken after one and two years of first lip print at the commencement of the study. So it may be established that lip prints are

different in every individual, and does not change with time so it can be used for personal identification as well as forensic investigation.

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Fig. 1: Diamond Grooves



Fig. 2: Long Vertical Grooves

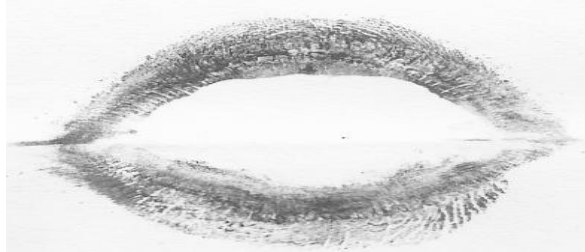


Fig. 3: Short Vertical Grooves

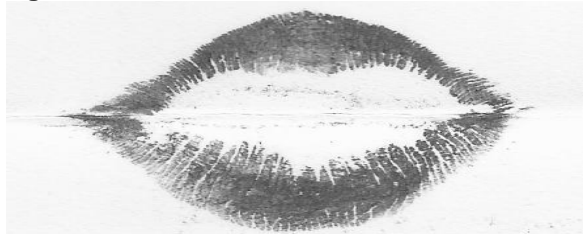


Fig. 4: Reticular Grooves

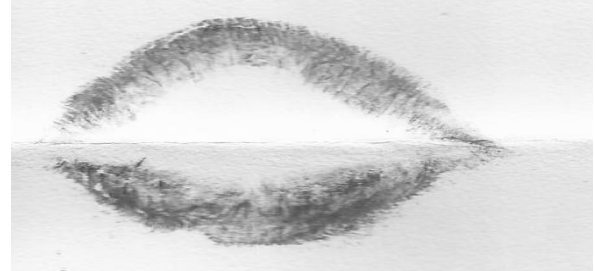


Fig. 5: Branching grooves

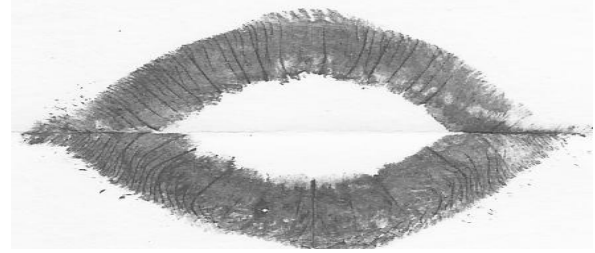


Fig. 6: Intersecting Grooves



Fig. A: Quadrants and Patterns used for Analysis

(Patterns: I - long vertical groove; II – Short vertical groove; III – Intersecting groove; IV – Branched groove; V – Reticular pattern)

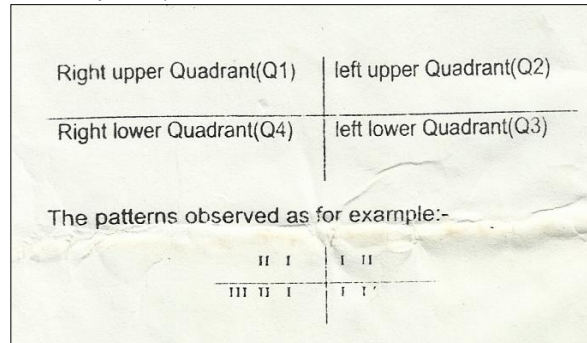


Table 1: Sex wise Distribution of Various Types of Lip Prints

Lip Print Pattern	Male (200 Quad.)	%	Female (200 Quad.)	%	Total (400 Quad.)	%
Long Vertical Grooves	68	34	64	32	132	33
Short Vertical Grooves	80	40	55	27.5	144	36
Intersecting Grooves	83	41.5	79	39.5	162	40.5
Branched Groove	58	29%	36	18	94	23.5
Reticular Pattern	21	10.5	25	12.5	46	11.5