

Original Research Article

Lip Print Analysis and Changes Over Passage of Time Among Southern Rajasthan Population

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Abstract

Background: Lip print patterns have been used as markers of personal identification since long duration. Cheiloscopy involves the establishment of personal identity based on the examination of skin fold pattern over the lips. The present study was conducted to determine the gender differences and changes over the time exist in lip print pattern among the selected study population. **Methods:** The study was conducted on 50 subjects (25 males and 25 females), aged from 18 to 65 years, from Southern Rajasthan population, India. A dark-colored lipstick was applied with a single stroke and the subjects were asked to rub both the lips to spread the applied lipstick, after which a lip print was made on a thin bond paper. The lip prints were studied with magnifying lens. The subjects were recalled after 6 months for a recording of their lip prints as per the established methodology. **Results:** The commonest lip print pattern observed in the study was type I (44%). The commonest lip print pattern among males was Type I (36 %) and the order of other lip prints seen were type I', III, IV, II, V. Among females the commonest lip print pattern was type II (32 %) and the order of appearance of other lip prints was type IV, III, I', I, V. **Conclusion:** The study concluded that every person has unique lip print pattern and gender differences are present in the lip print patterns. Also, there was no change in lip print patterns as time passes.

Keywords: Cheiloscopy, Lip Prints, Personal Identification.

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Introduction

Personal identification is a process which is based on scientifically evidenced methods and procedures. These include anthropometrical data, gender, fingerprints, blood grouping and finally DNA fingerprinting[1]. A subspecialty of forensic dentistry evolved to aid in determining the identity of an individual based on dental/oral characteristics such as bite marks, palate pattern and lip prints. The latter came to be known as Cheiloscopy[2,3]. Cheiloscopy involves the identity establishment based on skin fold pattern over the lips and has been scientifically proven to be unique among different individuals. The applications of Cheiloscopy have been seen in civil and criminal matters[4]. Lip prints are seen to form as early as six weeks of intrauterine life and once completely formed are known to remain permanent throughout life. However definitive evidence in permanent status is lacking still. There have been changes in lip print patterns seen in cases of trauma, pathology, burns, venereal diseases etc[5]. There are reported studies on the gender differences among the lip groove patterns of individuals. Lack of comprehensive database is a

major roadblock in the progression and establishment of Cheiloscopy as a distinctive supporting branch in criminalistics and forensic sciences[6]. So, present study was conducted to determine the commonest lip print pattern among selected population, evaluate the variation in lip print patterns and gender-wise comparison of lip print patterns as well as to note any changes in pattern as time passes.

Methodology

The study was conducted on 50 subjects (25 males and 25 females), aged from 18 to 65 years, from Southern Rajasthan population, at the Geetanjali Medical College, Udaipur, Rajasthan. The study was performed over a period of twelve months. The individuals with inflammation, trauma, malformation, deformity, surgical scars and other pathology of lips were excluded for the study. Institutional ethical clearance and informed consent of the subjects were taken before starting the study. The materials used in present study were Lipstick, lipstick applicator, adhesive transparent tape, white office copy paper/bond paper and magnifying glass were used. A 4"x10" strip of thin bond paper was fixed on the cardboard of same size with the help of the clips. The paper was then labelled with name, age, sex, occupation and address of the subject to be filled after taking the lip prints. Before the application of the lipstick the subject was asked to thoroughly clean and dry the lip. A dark-colour, non-glossy, non-persistent lipstick was applied with a single motion evenly on the lips. The subject was asked to rub his/her lips together to spread the lipstick evenly. During the application of the lipstick the subject was asked to sit erect and with the mouth closed and lips slightly opened such that the lips appeared relaxed and puckered. The cardboard

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bearing the bond paper was then pressed to the subject's lips with the central portion of the lips dabbed first and then pressed uniformly up to the left and right corners of the lips. Three impressions were taken on the same strip of paper side by side by applying the same amount of pressure and without further any addition of lipstick. The first two impressions of the lips were taken by the method described above and the third impression was taken by folding the strip of paper and then pressed between the two lips so as to cover the entire red portion of the lips. Then the print was assigned the respective name, age and sex. These prints were study carefully with the help of a magnifying lens. Lip prints were recorded in a way resembling a dental formula as commonly used in dental clinics for e.g. Right upper Quadrant (RUQ), Left upper Quadrant (LUQ), Right lower Quadrant (RLQ) and Left lower Quadrant (LLQ). The lip print patterns were analysed using classification of Suzuki and Tsuchichashi⁷ as follows: - (fig.1)

I. Type I – The clear-cut vertical grooves that run across the entire lips

II. Type I' – Grooves similar to Type I but do not cover the entire lip

III. Type II – Branching Y- shaped pattern.

IV. Type III – Crisscross pattern.

V. Type IV – Reticular

VI. Type V - Miscellaneous

Statistical Analysis

SPSS software, version 20 has been used for data analysis. To identify the predominant lip pattern, the percentage calculation method was used. One-sample T test was applied to identify the statistical significance within the different types of lip pattern with P value <0.05.

Observations and Results

The commonest lip print pattern observed in the study was type I lip print pattern (fig.2) comprising of 44% (n=22) subjects. The other lip prints in order of appearance were type III > II = I' > IV > V. (table-1)

The commonest lip print pattern among males was Type I holding a 36 % occurrence rate (n= 9), the order lip prints seen were type I' > III > IV > II > V. (table-1)

Among females the commonest lip print pattern was type II holding a percentage of occurrence of 32 % (n=8). The order of appearance of other lip prints was type IV > III > I' > I > V. (table-1)

There was a statistically significant difference in lip print pattern among males and females in the subject population with a p value <0.05 at 95 % Confidence interval.

The subjects were recalled after 6 months for a recording of their lip prints as per the established methodology. None of the subjects showed any changes in lip prints due to passage of time.

Table 1: Frequency of Lip print patterns in male and female subjects

Lip print Pattern	Male (%) (n=25)	Female (%) (n=25)	Total (%) (n=50)
I	36 (n=9)	08 (n=2)	44 (n=11)
I'	28 (n=7)	12 (n=3)	40 (n=10)
II	08 (n=2)	32 (n=8)	40 (n=10)
III	12 (n=3)	20 (n=5)	32 (n=8)
IV	12 (n=3)	24 (n=6)	36 (n=9)
V	04 (n=1)	04 (n=1)	8 (n=2)

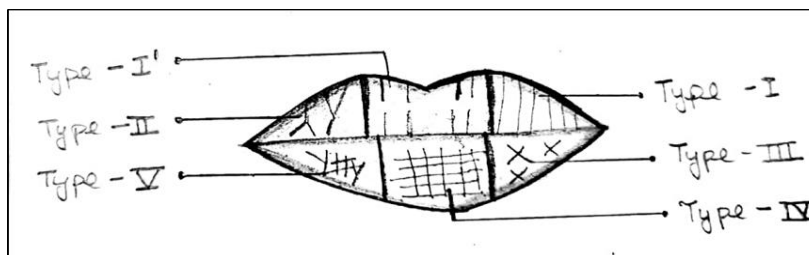


Fig 1: Suzuki and Tsuchichashi classification of lip prints

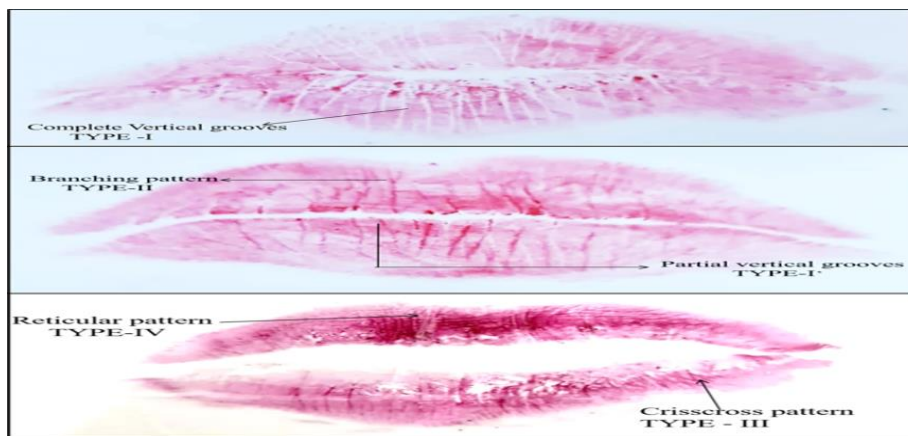


Fig 2: Lip print patterns in study subjects

Discussion

Cheiloscopy involves the establishment of personal identity based on the examination of skin fold pattern on the red part of the human lips and is an important tool in forensic sciences like fingerprint and DNA analysis. Globally, a number of studies have reported a variance in prevalence of lip print patterns in their selected population sub groups. The present study was conclusive in stating the despite the commonality, no two individuals exhibited a similar lip print pattern in all four quadrants. This is in concurrence with a number of studies wherein the authors have collaborated on the uniqueness of lip prints.⁸⁻¹⁰ The present study determined that the commonest lip print pattern in the entire population was Type I, while the least common was Type V. Maheswari TU et al¹¹ conducted a study on Indian students and determined that the commonest pattern was type II and least common was Type V which is not similar with our study.

We are not in concurrence with studies on north Indian and Rajasthani population by S Timsinha et al¹² and Padmavathi BN et al¹³ wherein the authors determined Type IV to be the commonest pattern. The present study showed a statistically different pattern between males and females. This is in concurrence with studies by various authors who have stated that gender determination can be made by use of Cheiloscopy^[8-15]. Mamandras AH et al^[16] stated that growth or linear changes will not affect lip print pattern and that once formed, lip prints retain their pattern permanently. This is in agreement with our study wherein we did not find any changes as time passes. In contrast Randhawa K et al^[17] stated that lip prints do change over time in their selected population, however we did not concur with their observations.

Conclusion

Lip print pattern is unique to individuals and no two individuals have the same lip print pattern. The gender disparity showed that females and males have a distinct difference in patterns and this can possibly be utilised as a tool for gender determination. Also, there was no change in lip print patterns as time passes. So the lip print pattern is a reliable tool in forensic investigation for personal identification.

Limitations

The study is limited by a small sample size, however a larger study base with a wider demographic distribution can be used for further confirmations.

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