

Assessment of Lip Print Patterns in South Indian Population-Role in Forensic MedicineG Venkat Rao^{1*}, G Kiran²¹*Professor, Department of Forensic Medicine and Toxicology, SVS Medical College, Mahabubnagar, Telangana State, India.*²*Associate Professor, Department of Oral & Maxillofacial Pathology, Government Dental College & Hospital, Hyderabad, Telangana State, India.***ABSTRACT**

Background: Forensic Medicine specialty mainly deals with medico-legal aspects. Lip prints like finger prints are individualistic and heritable. The pattern of lip print can be used as material evidence in solving medico-legal issues. **Aims and Objectives:** To identify the predominant pattern of lip prints in South Indian (Telangana State) population. **Materials and Methods:** We carried out study on 300 students (100 males and 200 females) in a Medical and a Dental institution in the state of Telangana, South India. After thoroughly cleaning the lips of the subjects, lipstick was applied uniformly. The impression of lip prints were taken on the glued portion of cellophane tape and then it was stuck on to a white bond paper. Then the obtained pattern of each of these lip prints were analyzed using a magnified hand lens and categorized into groups according to the classification of Suzuki and Tsuchihashi. **Results:** We found Type IV lip print pattern to be the most common in males and Type I in females. Type I pattern predominated in overall sample followed by Type I'. **Conclusion:** We found that the pattern of lip prints were unique to each and every individual.

Key words: Medico-legal, Forensic Medicine, Lip prints, South Indian Population**Introduction**

Personal identification is one of the main aspect in crime investigation and forensic medicine specialty. It is helpful in finding culprits who hide their identity. Personal identification can be achieved by conventional methods like visual recognition of person, his/her clothing, jewelry etc. But these methods are not reliable. Latest technology has helped us in identifying individuals by bite marks, lip prints, DNA analysis etc[1,2].

Tsuchihashi named the wrinkles and grooves present on the lips as 'sulci labiorum rubrorum'. Lip prints are the imprint produced by these wrinkles and grooves, and cheiloscropy is the method of examination of these imprints. Cheiloscropy can help in personal identification by studying characteristic arrangement of

lip prints as it is thought that like finger prints, lip prints are also unique to each person[1-3].

The word cheiloscropy is derived from Greek word 'chelios' meaning 'lips' and 'skopein' meaning 'see'. Few studies have been conducted in the past determining the pattern of lip prints in a defined population. These studies have a limitation of identifying imprints only on the red portion of lips. Now with improved techniques and methodology this limitation has been overcome. The other methods of obtaining evidence like visual identification of person, photographs etc are not reliable [4, 5]

Coward et al suggested that the lip print patterns are genetically determined. The fact that these remain stable even after years, they are valuable as forensic research tool dealing with the personal identification[6]. Cheiloscropy is similar to dactyloscopy as both are consistent, stable and allow establishing a classification i.e. these imprints recover even after undergoing alterations like minor trauma, inflammation and infections like herpes[5,6]. But studies have shown that major trauma to the lips may alter the pattern and morphology of lip prints[6-8]. Studies have also shown

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the importance of lip prints in identification of gender of individual. We carried out our study to determine the most common patterns of lip prints in South Indian population.

Material and Methods

Present study was conducted on 300 students (male to female ratio being 1:2) in a Medical and a Dental institution in the state of Telangana, South India.. The students were aged between 17-25 years studying MBBS and BDS. A good rapport was established with them. They were explained the purpose of study and prior written informed consent was obtained from all of them.

Exclusion Criterion: Students with malformation, trauma, surgical scars or any other anomaly of the lips and individuals who are hypersensitive to lipstick were not included in this study.

Armamentarium: A dark colored lipstick, cellophane tape/scotch tape, White bond paper, and magnifying lens.

Methodology

Students were asked to clean their lips thoroughly with soap and water. Then starting at the midline moving laterally, lipstick was applied uniformly on the lips. Using a cellophane tape lip prints of both lips together were taken on its glued portion. The cellophane tape along with the lip impression was then stuck on the A4 sheet. Then these prints were stuck on to a white bond paper. As lip prints in the center of the lower lip will be very clear than in the impressions compared to those near the corners. The observed lip prints were classified according to Suzuki and Tsuchihashi classification (Table 1) [9].

Table 1: Classification of lip prints according to Suzuki and Tsuchihashi classification

Type of Lip Print	Pattern
Type I	A clear-cut groove running vertically across the lip
Type I'	Partial-length groove of Type I
Type II	A branched groove
Type III	An intersected groove
Type IV	reticular pattern
Type V	Other patterns

The data obtained was tabulated and analyzed statistically for number and percentage using EPI-Info statistical software version 6.

Results

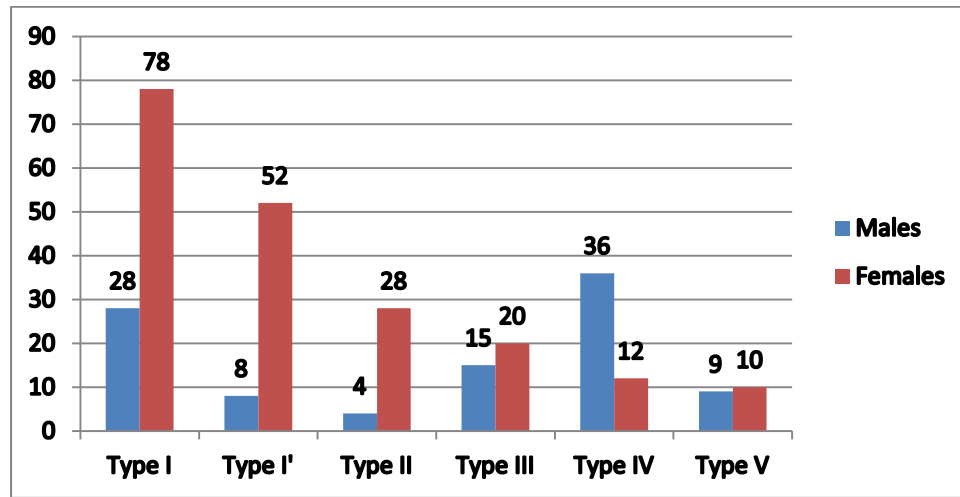
We found that no two lip impressions were similar, and no two individuals had a same type of lip print pattern. The most common pattern in males was Type IV followed by Type I, whereas Type II was the least common pattern. The most common pattern in females

was Type I followed by Type I', whereas Type IV was the least common pattern. Overall Type I was most common pattern, followed by Type I', whereas Type V was the least common pattern (Table 2, Graph 1).

Table 2: Distribution of Type of lip prints

Lip Print Pattern	Males		Females		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Type I	28	28 %	78	39%	106	35.33%
Type I'	8	8%	52	26%	60	20%
Type II	4	4%	28	14%	32	10.66%
Type III	15	15%	20	10%	35	11.66%
Type IV	36	36%	12	6%	48	16%
Type V	9	9%	10	5%	19	6.33

Graph 1: Distribution of Type of lip prints



Discussion

Recently soft tissue features like lip prints and finger prints have been used extensively for personal identification and sex determination. Lip prints may appear in various patterns like vertical, horizontal intersecting, and branching. These patterns are unique to individuals, and the study of these patterns is known as quilloscopy/cheiloscopy[1,10].

History

Fischer (1902) an anthropologist first described about furrows on the red part of lips. Later Edmond Locard (1932) was the first author to recommend the use of lip prints in criminal investigation. Synder (1950) suggested that like finger prints, lines and fissures over lips (lip prints) are also unique and individualistic. Martin Santos (1961) carried out the first study on the lip prints in Hungary. Suzuki (1967) carried out the first detailed study on the lip prints and their role in Forensic Medicine. Kajuo Suzuki and Yasuo Tsuchihashi (1971) carried out study to determine the pattern of lip prints in Japanese population and suggested that the lip print patterns are heritable and unique, which was further confirmed by Tsuchihashi in his longitudinal study[11,12]. Several studies were also carried out by researchers from India and other countries on morphology of lip prints and their role in Forensic medicine like determination of race and sex, crime investigation etc. Recently lysochrome dyes are being used for colorless lip prints[12-15]. Ehara and Marumo suggested that lip prints are usually left at the

crime scene and help to identify the suspect, thus help in solving medico-legal cases. Generally, lip-prints are left on glasses, cups or cigarettes which experts collect at the crime scenes. Apart from lipsticks, dyes like Nile red have been used to obtain lip imprints. These dyes are visualized under ultraviolet or blue light[15-17].

The aim of our study was to identify the predominant patterns of lip prints in South Indian population. We found that Type I pattern to be the most common pattern, followed by Type I', whereas Type V was the least common pattern. Nagaraj et al in their study conducted in North Bengaluru population found that Type IV was the most common lip print pattern, followed by Type II pattern[1]. Khanapuri et al found Type II /branched pattern and Type III/intersected pattern as the most predominant pattern in the people of Karnataka[18]. Whereas Patil et al. found Type IV /reticular pattern as the most predominant pattern in people of North Karnataka[19]. Sharma et al conducted study in Rajasthani population and found that that Type IV was the most common lip print pattern, followed by Type I pattern[11]. Augustine et al in conducted study in Aurangabad, Maharashtra and found that that Type III was the most common lip print pattern, followed by Type II pattern[20]. Whereas Costa et al conducted study in Portuguese population and found that that Type II was the most common lip print pattern. They found Type III pattern to be common in males and Type II in females[21].

Studies have shown that lip prints show differences among people of different races and

gender. These patterns show variations in people of different countries and also among different regions of same country. Hence lip print patterns can be used as an identification tool in the field of Forensic medicine and dentistry[18-20].

Limitations:

1. The difficulty to identify the patterns.
2. Lip patterns may change following any major trauma to the lips.

Ours is the first study done to determine lip print patterns in Telangana state population. We suggest further studies in varied regions with a larger sample to establish that lip prints are unique like finger prints and can be used as an aid in solving medico-legal cases.

Conclusion

We carried out our study to determine lip print patterns in South India population. We found that no two individuals have similar lip print impressions. We conclude that lip prints are unique to individuals and may help in personal identification. Our study provides a baseline data for further future studies in cheiloscropy.

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