

Lip Prints - An Aid in Individual Identification: A Study to Assess the Uniqueness of Lip Prints

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Abstract

Identification of a Human Being is an extremely important process based on scientific principles, which mainly in the present scenario involves finger printing. The main point used in the analysis of finger prints is the accepted theoretical knowledge of its Uniqueness in each individual that can be used as a piece of evidence in the court of law. Similarly, research in the recent years has proved that even the lip prints are unique of an individual and hence apart from the conventional methods like finger printing, they also behold the potential for identification purpose. Thus, lip prints can be used to verify the presence or absence of a person at the scene of crime. According to the recent literature available, there have been numerous number of cases that have been solved by means of Chelioscopy. **Aims:** To assess the Uniqueness of Lip Prints in different individuals. **Methods and Materials:** Dark shaded lip stick, Cellophane tape, White paper, Scissors, Magnifying lens, sanitary tissues. In this study a total of 100 subjects having no deformity or scarring of the Lips were selected. These subjects were asked to give their impressions of their lips with two different shades of lipstick. These two hundred impressions were then randomly shuffled and given to three different observers who were asked to match these Lip Prints. **Result:** After assessment of the lip prints Quadrant wise, two of the observers were able to correctly match 80% of the Lip Prints and one was able to correctly match 88% of the two set of Lip Prints. **Conclusion:** A high percentage of correctness indicates that the Lip Prints are quite Unique of each Individual.

Keywords: Cheiloscopy; Lip prints; Forensic dentistry; Anthropometry.

Introduction

Today, we live in a world where we are surrounded by crime all around us. Crime that

range from a simple Robbery to the banging of the twin towers by the so called uncouth criminals using Passenger Planes. In India as well as the other parts of the world, the crime rate has been steeply rising for the past many years. The modern day criminals make use of the most technologically advanced and sophisticated technical measures to commit their crime, to put the forensic scientist, police and the public off the scene. The problem with

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the current scenario however lies in the fact that as the crime scene investigation procedures are becoming more scientific and advanced, criminals themselves are evolving novel techniques to beat them.

Because of the increasing awareness and the availability of more audio-visual resources of that of Television and Internet, the awareness of fingerprints has become extremely high among the criminals and thus there are innumerable number of offences that are committed with a deliberate attempt of not to leave behind any fingerprint at a crime scene. In such a scenario, it becomes imperative for the Forensic Expert to tap every corner, and use each and every resource at their disposal to solve the crime and thus the scenario has become more challenging than ever in this civilized modern world.

Identification of a person is of paramount importance in a medico-legal investigation. Finger-prints analysis, DNA Analysis are by far one of the most commonly used methods that are being employed by the court of Law now a days out of which one of the best and most often used is fingerprints which was used in India for the first time in India in 1858 by Sir William Herschel.[1] However, in the recent past, Forensic Odontology has seen to play an important role in the identification of human remains whose use can be found at

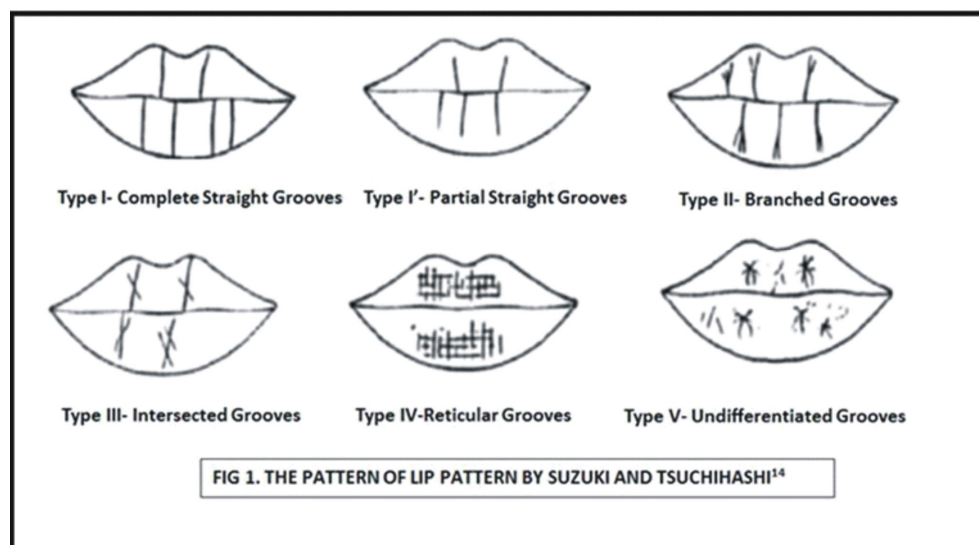
innumerable places in History even dating back since the 49 A.D.

Cheiloscopy can be defined as a method of identification of a person based on characteristic arrangement of the lines that appear over the red part of lips or it can also be defined as the science dealing with the lines that appear on the red part of lips.[2] Cheiloscopy is a forensic investigative technique that deals with recognizing and identifying lip traces for the identification of humans.[3]

Tsuchihashi Y. was the first to point out that the wrinkles and grooves that are present over the ruddy part and the zone of transition of the human lips have not been assigned any anatomical names. Therefore, he named these grooves as "sulci labiorum rubrorum" and the figure that is formed by these sulci was termed as "figura linearum labiorum", which in Japanese means "lip prints".[4] Cheiloscopic techniques like any other investigative technique have an equal value in relation to the other types of forensic evidences for personal identification.[5,6]

The biological phenomenon of systems of furrows on the red part of human lips was first noted by anthropologists. They were first described in the year 1902 by R. Fischer.[2,3] In 1932, Edmond Locard,[7] who was perhaps

Figure 1: The Pattern of Lip Pattern by Suzuki and Tsuchihashi



one of France's greatest criminologists, recommended the use of lip prints for the identification of a person. Until 1950,[2,3] however, anthropology merely mentioned the existence of the furrows without suggesting a practical use for the phenomenon. The idea of using lip prints for identification was first suggested by Le Moyne Snyder.[8-11] He introduced a case in which lip prints helped the crime scientists in an unusual way.

Dr. Martins Santos in 1960[9-11] proposed that these lip characteristics could be used in personal identification and devised a simple system for classifying lip prints. It was in Hungary during 1961 that the first research in Europe was carried out in the subject of lip prints. The examination started after lip traces had been found on a glass door at the scene of a murder. At this time, the usefulness of the lip traces for criminalistic identification was proven.[2,3]

Since 1950, the Japanese have carried out extensive research in the matter. Apart from Santos' classification, two Japanese scientists, Yasuo Tsuchihashi and Kazuo Suzuki,[9-12] had been investigating forensic odontological relations of the female lips and lipstick. They said that there was an individual specificity in the morphology of the lip grooves.

In 1971, Kazuo Suzuki and Yasuo Tsuchihashi[8,12] carried out many more investigations, which also included uniovular twins. Suzuki and Tsuchihashi divided the lips into four quadrants and formulated their own classification of 6 different types of grooves. (Fig 1) They demonstrated that no two lip prints manifested the same pattern. Only the lip prints of uniovular twins were extremely alike, and that their characteristics could have been inherited from either parent. This was further confirmed by Tsuchihashi[8,13] by conducting a study which included 1364 persons and their family groups. These results further added strength to the theory of the heredity of lip prints. He also found that the lip prints did not change over a period of time. He also found that following trauma to a lip, it resumed its groove pattern after healing.

Study

A Study was carried out in Department of Oral Medicine and Radiology, to assess the actual Uniqueness of these Lip Prints after approval of Institutional Ethical Committee. All the participants were briefed about the purpose of the study and written informed consent was obtained from each of the participants. This study was conducted on hundred subjects. Care was taken to select individuals having no lesion, whether active or passive on the lips. Individuals with known hypersensitivity to lip stick were not included in the study.

Objectives

To assess the Uniqueness of the Lip Prints in different Individuals.

Materials Used

- ◆ Dark shaded lip stick
- ◆ Cellophane tape
- ◆ White paper
- ◆ Scissors
- ◆ Magnifying lens
- ◆ Sanitary tissues (to wipe the lip stick)

Methodology

The lipstick was applied by the research personnel with a single stroke, evenly on the vermilion border. (Fig 2-5) The subject was asked to rub both the lips to spread the applied lip stick. After two minutes, a first lip impression was made on the strip of cellophane tape which was then sticks to white thin bond paper which served as the permanent record. In a Similar Manner another Lip Print was taken exact the same way as the 1st Impression only with a different shade of Lipstick. Every individual had thus given us a set of two impressions both in a

Figure 2: Normal Lips Cleaned Properly with Tissue Paper

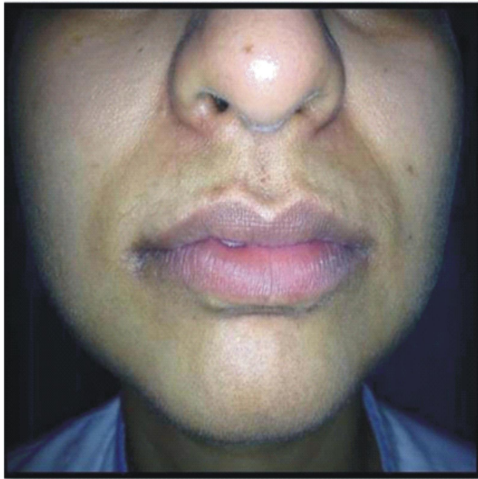


Figure 3: Lipstick Applied

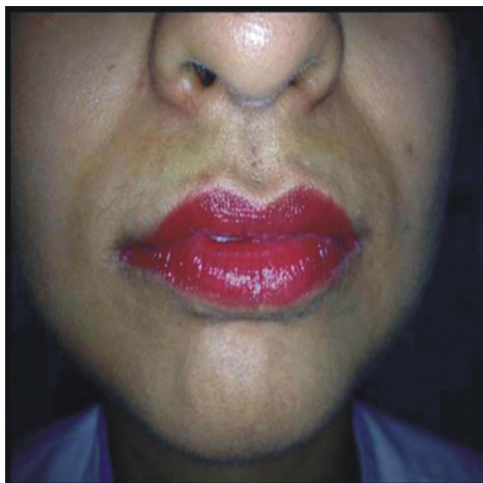


Figure 4: Transparent Cello Tape being Directly Applied over the Lip to Lift the Lip Print

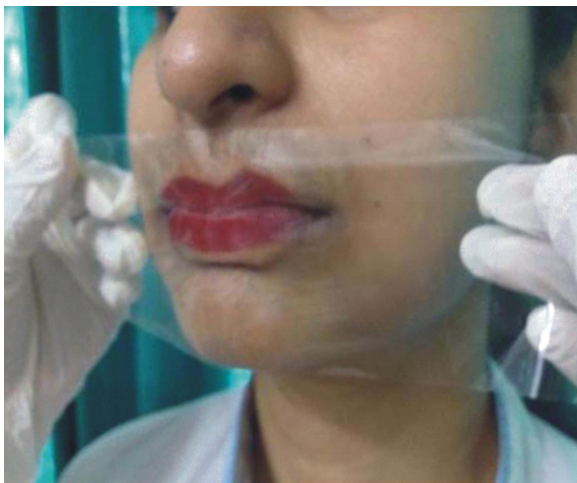


Figure 5: Tape is then Directly Stuck over a White Paper



different color. After all the Impressions were collected, a random coding was done in which the Lip Print of the Red shade was given the codes starting with X, and thus was called the X- Series and the second shade that of Purple shade was given codes starting with R series. Following the Alphabet a set of 2 random unique Number was given to each shade. At the end of the sample collection, we had a final list in which it was mentioned that which code of the X series and R Series belonged to one person. For example, R 17 and X 04 belonged to the same person; R 01 and X 56 belonged to the same person. (Fig 6) And thus a Master List was prepared which would not be shown to the people who were going to evaluate the Lip Prints. Now, the 3 Evaluators were given these 2 set of Lip Prints (one of the Red shade and the other of Purple shade; i.e. a total of 200 Impressions and they were asked to match the R series with that of the X series. The observers divided the Lips into 6 segments and they analyzed the Fissures and Grooves for each Segment and started to match the R Series with that of the X Series. (Fig 7)

Result

1st Individual correctly matched 80/100 correctly; a correct percentage of 80%.

2nd Individual correctly matched 80/100 correctly; a correct percentage of 80%.

3rd Individual correctly matched 88/100

Figure 6: Same Lip Print taken in 2 Different Shades

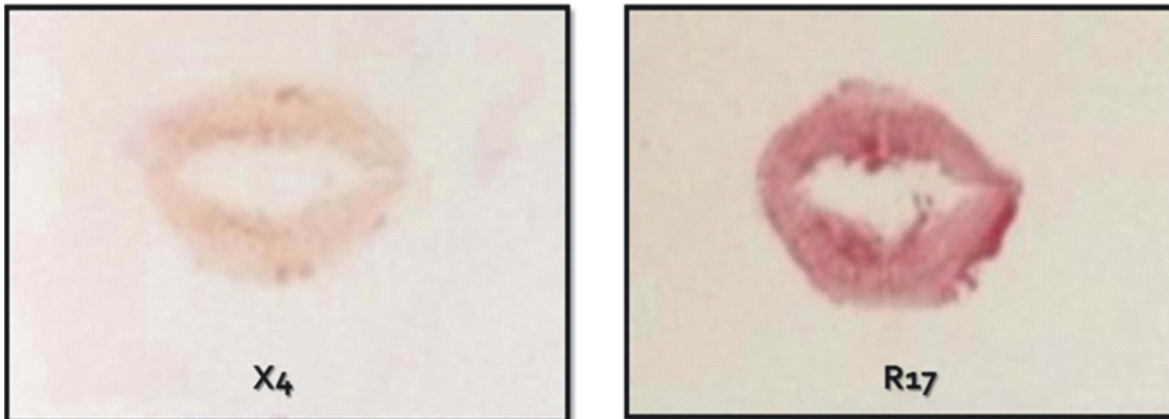
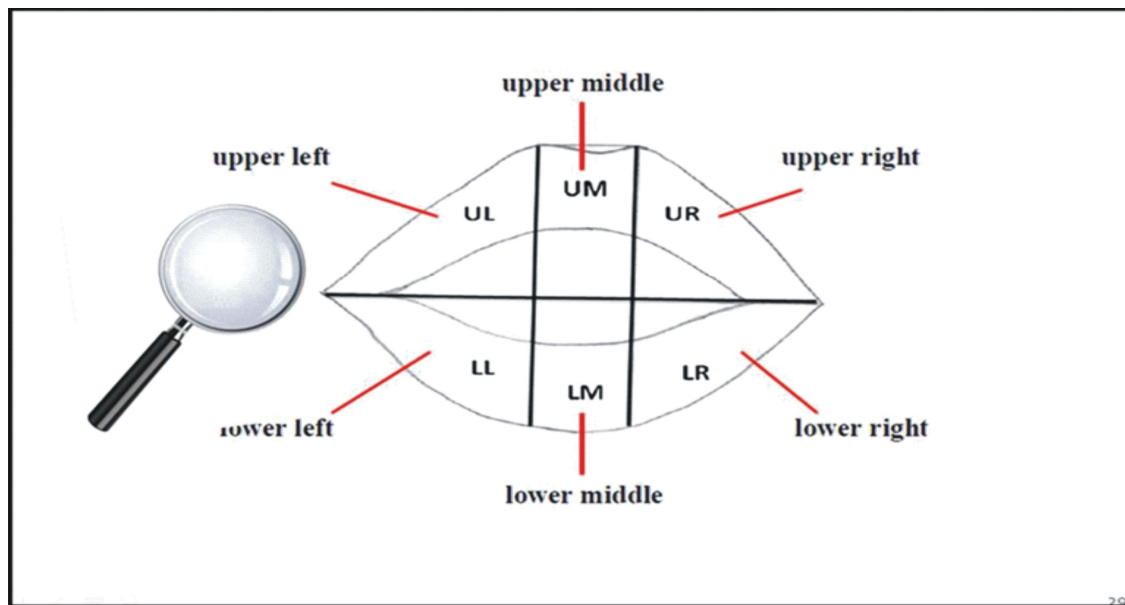


Figure 7: Evaluation of each Lip Print was done Quadrant Wise by the Evaluators



correctly; a correct percentage of 88%.

Discussion

During the years 1985–1997, cheilosopic techniques had been used in 85 cases, including 65 burglary cases, 15 cases of homicide, and 5 cases of assault. In 34 cases the identification was positive, which means that cheilosopic techniques were equal in value to other types of forensic evidence and has also been used in evidence for presentation in court.[2,3]

In India and other countries, several researches started to take place during the

period of 2000–2010. Different aspects of the lip prints like morphological patterns, sex determination[17,18] using lip prints among different groups of population were studied.

However much more research is still required in regards to this field and studies should be undertaken in order to make a newer and a more comprehensive classification system, as the existing widely used system by Suzuki and Tsuchihashi, does not take into account all the various types of patterns occurring on the lips. In the wake of recent technological advancements in Forensic Investigations, further research must be undertaken by Engineers and Scientists to invent some sort of Scanners that could help

in lifting of Lip Prints accurately and develop new softwares for their Analysis.

Conclusion

Even though the in our study, Impressions were not taken by, nor were they Analyzed by a Professional Forensic Odontologists, our Percentage of Correctness was extremely high establishing the Uniqueness of the Lip print Patterns in each Individual. With these results, it is clearly evident that Lip prints are characteristic of an individual and behold a potential in individual identification, much like the Finger Prints. Also, studies have shown that Lip prints are consistent for an individual for life time.^{15,16} thus further validating their uses in Forensic Investigations. However it must not be thought at this stage that lip prints are as good in identification as fingerprints. But it can be definitely used when no other traditional methods of identification are available.

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