Estimating the Age of an Individual by Analyzing the Lip Print Through Suzuki and Tsuchihashi's Classification

Aakash S

Department of forensic science technology, Aarupadai veedu medical college and Hospital, School of allied health science, Vinayaka Mission Research Foundation-DU, Puducherry campus.

Abstract

A forensic examination method called cheiloscopy uses the ridges and grooves on lips to distinguish between forensic instances and those that are not. The goal of the study is to identify the common lip print pattern and its variations across different age groups using Suzuki and Tsuchihashi's kinds classification. Totally 180 participants were split into three age groups (Groups 1: 21–30, Group 2: 31–40, and Group 3: 41–50). The study area is located in a small part of Puducherry. Subsequently, the lip prints were photographed and stored for digital analysis. To enhance visualization, the lip print photographs were uploaded onto Adobe Photoshop 2019, and filters were applied to identify the patterns. Concluding this study, the identification of age groups among individuals might be facilitated through the recognition of these six patterns. This capability will aid in categorizing people in the event of a disaster or explosive case. Since every person has a unique lip print, it is elementary to identify, document, and analyze these patterns when using digital picture analysis.

Keywords: Cheiloscopy, digital analysis, pattern recognition.

1. Introduction:

The forensic method of identifying people based on the distinctive patterns of their lip prints is called forensic cheiloscopy, or lip print analysis. It's crucial to remember that, even though lip prints can be extremely valuable as evidence, they are not as commonly utilized or trustworthy as fingerprints because of things like variations in lip morphology and the possibility of distortion in lip prints left at crime scenes. Consequently, rather than being the main means of identification, lip print analysis is sometimes employed as a supplemental technique in forensic investigations. Similar to fingerprints, lip prints act as a unique method of identification because each person's pattern of lip wrinkles indicates their uniqueness. (Devaraj Patil, (2013)). Cheiloscopy of lip prints is primarily divided into six patterns. Clauco martin santos classification, Suzuki and Tsuchihashi's lip print classification, Renaud lip classification, Afchar-bayat classification, Kasprzak classification. A formal technique called cheiloscopy, sometimes referred to as quiloscopy, is used to identify people based on the distinctive pattern of lines on their lips. An anthropologist named Fischer originally described this method by examining the ridges and indentations on the red portion of human lips. Edmond Lochard pioneered the use of lip prints for identity and criminal prosecution(K. Randhawa, 2011 Dec; 29(2)). Scientific procedures such as DNA comparison, dental records, and fingerprints are used to identify humans; but, because of their high cost and limited

availability, modern molecular biology techniques are rarely used. In forensic dentistry, lip prints can be used as important evidence if careful investigation yields new information. If a person has left lip markings on exhibits like glassware, clothing, tissues, and napkins, these can be utilized to determine whether or not they are a suspect in a crime because of their lifelong consistency (Ambrish Kaushal, 2020). Although lip print patterns are still being studied, there is still no universally accepted standard. Tsuchihashi's four-quadrant approach shows many designs on a single lip. The primary aim of this research is to approximately estimate age and describe it through six types of patterns. While lip prints are commonly employed for sex determination and categorization, this study demonstrates their significant role in age estimation.

Here is the classification is explained,

Classification applied: 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-A reticular groove, TYPE V-Unidentified or other patterns

2.   Materials and Methodology:

There were 180 participants in the current study (30 male and 30 female). The samples were divided into three age groups.

- Group 1 (Ages 21-30) = 30 males and 30 females
- Group 2 (Ages 31-40) = 30 males and 30 females
- Group 3 (Ages 41-50) = 30 males and 30 females

The required supplies included gloves, clear cellophane tape, white paper, tissue, scissors, and dark lipstick with a lipstick brush. Before collecting lip prints, participants were briefed on the study's objectives and asked for their consent. Individuals with congenital deformities, lip inflammation, or injuries were excluded from volunteering. A strip of cellophane tape was pressed onto the lips to imprint the lip shape created using a dark lipstick brush, ensuring careful application of pressure. After numbering the lip print and placing it over white paper, analysis, and examination were conducted using Adobe Photoshop.

2.1   Difference between Normal and Adobe image:

The collected image is drawn through Adobe software to add filters and for the analysis process. Here, the images are selectively uploaded to determine what kind of pattern they belong to. If the prints are smudged or unrecognizable, they are not taken.

Here, the step-by-step analysis of lip print patterns.

- ➢ The samples that were collected were uploaded to Adobe Photoshop 2019 for further study for the purpose of identifying the six lip print patterns.
- ➢ For a clear perspective, the uploaded image has been cropped and zoomed in.
- ➢ Using the adjustment option, the sample is filtered.
- ➢ Properties are changed to achieve the perfect level of sample view quality.
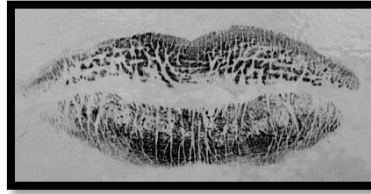
Figure 01

Figure 02

Figure 01 is the image of a patent lip print, that was taken from an individual, Figure 02 implies the filtered image that was uploaded on Adobe Photoshop 2019.

3.   Result:

The analysis of age-related lip patterns revealed distinct characteristics for each pattern. Lip prints from individuals aged 21 to 50 were examined utilizing six specific patterns.

- Ages 21 to 30 have a 31.6% prevalence of Type IV.
- Ages 31 to 40 have a 38% prevalence of Type II
- Ages 41 to 50 have a 43% prevalence of Type III

3.1   Observation and Interpretation

By looking at the total outcome, the tabulations show the percentage rate that was determined using a straightforward percentage approach to find the noteworthy pattern in a specific age range. As this study has shown, computation aids in determining significance when dealing with a normal proportion. A layperson may simply obtain and use the software that was used to properly analyse all six categories. This observation demonstrates the variations in lip print types. Typically, these six categories are employed to examine the distinctions between males and females. These patterns, however, are employed in this work to estimate the absolute calculation procedure and interpret the age. Furthermore, the sex difference exhibits fluctuations when observed.

The majority of the dominant females in type III are between the ages of 21 and 30, whereas the dominant females in type III are seen to be between the ages of 31 and 40 and 41 to 50. The number of distinctive patterns in type III is higher in females.

Table 1 Shows the total number of samples

Age	21-30	31-40	41-50
No. of lip prints	60	60	60
Total = 180			

Table 2- Age group 21 to 30

S.NO	MALE	FEMALE	TYPES	OBSERVATION
1.	3	3	TYPE I	10%
2.	2	0	TYPE I'	3.3%
3.	9	5	TYPE II	24%
4.	7	6	TYPE III	22%
5.	7	12	TYPE IV	31.6%
6.	2	4	TYPE V	10%

The most common pattern in both males and females in the 21-30 age range is Type IV (31.6%), followed by Type II (24%), Type III (22%), Type I' (3.3%) and were Type I and Type V are the same (10%).

Graph 1: Shows significant difference in age group of 21-30
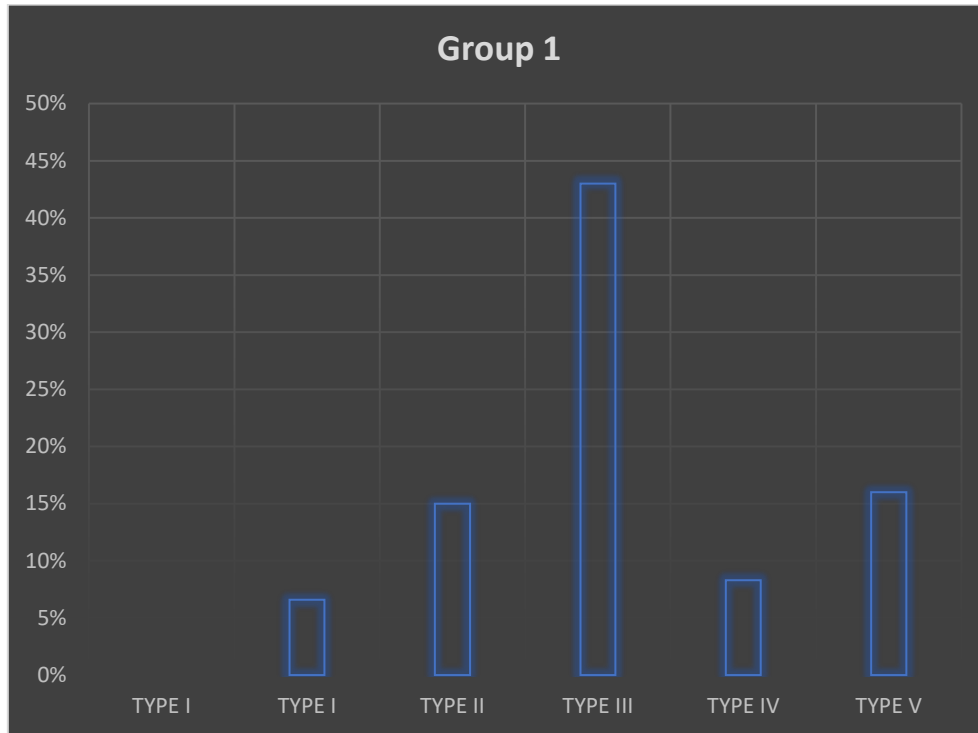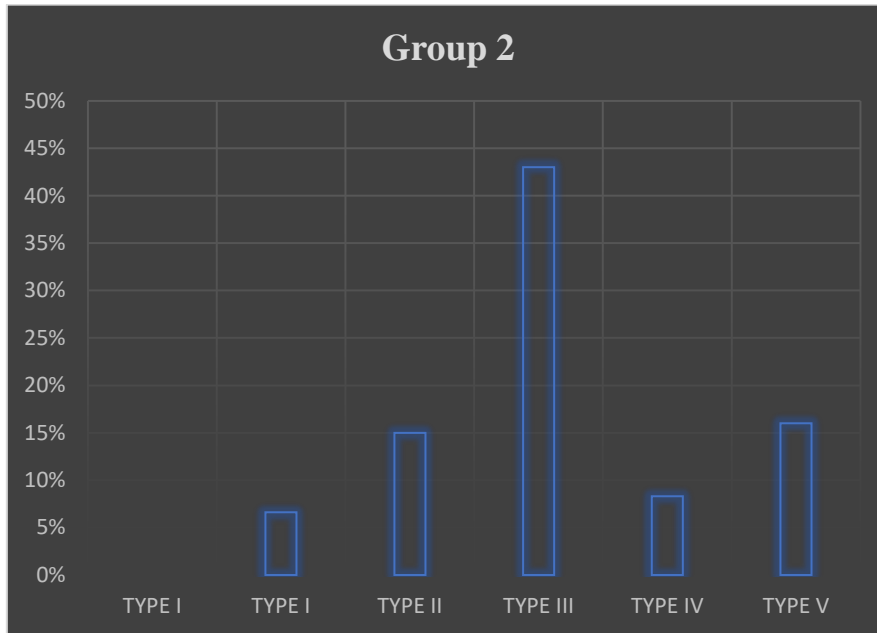

Table 3- Age group 31 to 40

S.NO	MALE	FEMALE	TYPES	OBSERVATION
1	0	2	TYPE I	3.3%
2	2	0	TYPE I'	3.3 %
3	11	12	TYPE II	38%
4	12	9	TYPE III	35%
5	3	5	TYPE IV	13%
6	2	2	TYPE V	4%

Type II (38%) is the most common pattern in both males and females between the ages of 31- 40. Type III (35%), Type IV (13%), Type V (4%), Type I and Type I' (3.3%) are the next most prevalent patterns.

Graph 2: Shows significance in age group 31-40

Table 4- Age group 41 to 50

S.NO	MALE	FEMALE	TYPES	OBSERVATION
1.	0	0	**TYPE I**	0%
2.	0	4	**TYPE I'**	6.6%
3.	6	3	**TYPE II**	15%
4.	11	15	**TYPE III**	43%
5.	3	2	**TYPE IV**	8.3%
6.	10	6	**TYPE V**	16%

In the 41–50 age range, Type III (43%) is the most common pattern in both males and females, followed by Type V (16%) and Type II (15%), Type IV (8.3%), Type I's (6.6%) and Type I is (0%)

Graph 3: shows the significance in age group 41-50
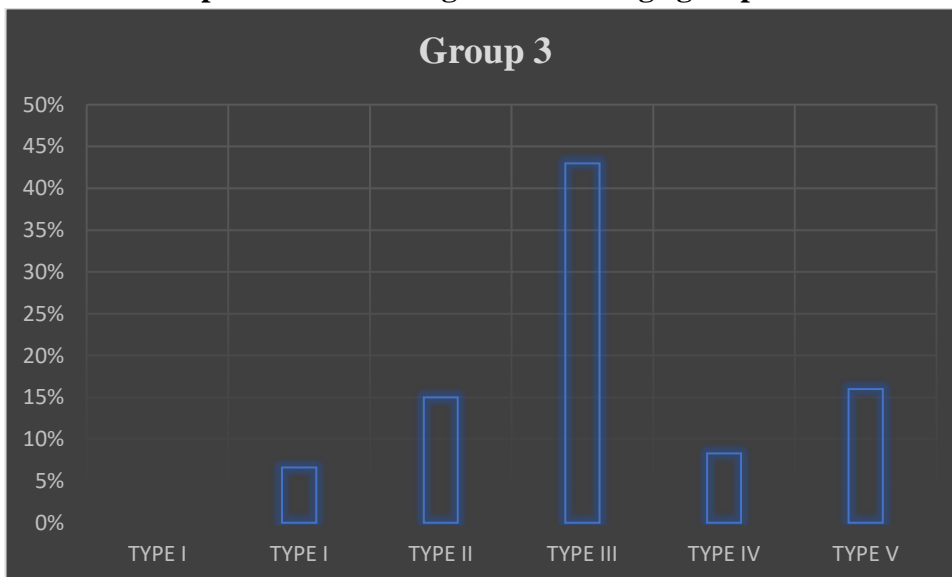
4. Discussion:

An emerging technique in criminal investigation is cheiloscopy. One potential method for improving human identification is cheiloscopy. While lip prints are commonly utilized for identification and proof, they can also be used for task detection as a source of criminalistic and logistical data. Based on a lip print found at the crime scene, assumptions can be made regarding the nature of the incident, the number of participants, the sexes involved, the cosmetics used, the habits of the suspects, their occupations, and the pathological alterations to the lips themselves. The lack of a compelling rationale for reliability makes lip print analysis techniques variable around the globe. Furthermore, there is little proof of cheiloscopy on deceased individuals. According to the literature on the study of lip prints on living people, lip print analysis on the deceased should be practiced as it can help with crime scene investigation. Criminals strive to hide who they are and try to remove the fingerprint pattern from their fingers by removing the flesh, applying corrosives, or creating self-inflicted wounds. It is doubtful that criminals will perform these kinds of manipulations on their lips. Therefore, obtaining the lip prints of every person who is accused and comparing them to the objects discovered at the crime site may provide proof beyond a reasonable doubt that someone was there. Once it is established that a suspect was present at the scene, the following investigations become easier. Consent was acquired when participants became aware of the objective.

5. Conclusion:

Two advantages of employing digital technology for lip print picture analysis include better visuals and easier recognition in addition to capturing the lip print pattern. The sex difference, distinctiveness, and pattern recognition are investigated and thoroughly analysed based on previous studies. However, the age estimation and absolute results of age determination are presented in this work. We conclude after analysing the main patterns. This work will assist us in the future in comprehending the age disparity in a typical computational study (Percentage Calculation). Cheiloscopy also functions well for permanently storing the data needed to preserve a person's antemortem records. The study's conclusions might be useful even though using lip prints to identify people becomes important for forensic investigations or in other situations. In conclusion, lip prints, like fingerprints, are a trustworthy way to identify a person and can be used as proof.

References

1. Devaraj patil, Rekha Hiremath, Anand Mugadlimath. A study of lip print among North Karnataka
   people. International journal of biomedical and advance research (2013) 04 (09): 619-622.
2. K. Randhawa, R. S. Narang, P. C. Arora. Study of the effect of age changes on lip print pattern and its reliability in sex determination. J Forensic odontostomatol.2011 Dec; 29(2): 45-51.
3. Yendriwati, Joe JW, Fitri AR. Lip print as a method for forensic identification on Malaysian with Chinese ethnicity. J. Evolution Med. Dent. Sci. 2019;8(37): 2831-2835.
4. Archana Alzapur, Rajani S. Nagothu, Hima B Nalluri. Lip prints- A study of its uniqueness among students of Mediciti Medical college. Indian J clin Anat Physiol. 2017 Jan-Mar; 4(1): 68-70.
5. Saraswathi TR, Gauri Mishra, Ranganathan K. Study of lip prints. Journal of Forensic Dental Sciences / January-June 2009 / Vol 1 / Issue 1: 28-31.
6. Manickam Selvamani, Meghala Priya, P., Nandini, D. B. et al. 2016. "Study of lip print pattern in kerala sample population", International journal of current research, 8, (11), 41279-41282.

7. Makesh Raj LS, Sai Krishna P, Shankar KA, Jude J, Jai Santhosh Manikandan V, Priyadarshini T. Lip Prints and Gender Identification. IOSR Journal of dental and medical sciences 15(10): 112-115.

8. Kasprazak J. Possibilities of cheiloscopy. Forensic Sci Int. 1990;46: 45-51.

9. Cheiloscopy: A Vital Tool in Forensic Investigation for Personal Identification in Living and Dead Individuals Ambrish Kaushal, Mamta Pal, Year: 2020, Volume: 5, Issue: 2, Page: 71-74.