

## A Comparative Study On Cisgender And Transgender Individuals With Cheiloscopy

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KEYWORDS	ABSTRACT:
Cheiloscopy, Eunuchs, Cis genders, Sulci Labiorum Rubrorum, Suzuki's classification	<p><b>INTRODUCTION:</b> Lip print evaluation, or cheiloscopy, is growing in popularity in forensic science to recognize individuals. This study bridges the gaps in prior studies by employing transgender data and quadrant analysis, providing thorough insights into the use of cheiloscopy for forensic identification. Conclusions show the significance of regional and gender-based differences while illustrating the consistency of dominating lip print patterns across populations.</p> <p><b>AIM &amp; OBJECTIVES:</b> To study the morphological pattern and classification of lip prints among males, females, and transgender individuals. 1. To compare lip prints of males, females, and transgender individuals. 2. To classify the obtained lip prints according to Suzuki's classification. 3. To identify which type is more predominant in males, females, and transgender individuals.</p> <p><b>CONCLUSION:</b> In this study, the findings of earlier research investigations correlate with cheiloscopic patterns seen in a modern population sample. According to the current study, Type I (54.3%) and Type II (37.7%) are more common in females, but Type II (45%) and Type III (42.3%) are more common in males. Additionally, Type II was the most common pattern (16.6%) determined by transgender data, which was excluded in previous studies. While Type I is common in females, with some regional differences, Type II and Type III are similarly dominant in males, based on an unbiased review of previous research. In addition, Type V is consistently rarely seen across all categories, as determined by the study. The current study's forensic relevance is increased using quadrant-wise analysis, which offers an extensive understanding of lip print dispersion patterns.</p>

### INTRODUCTION

Cheiloscopy is the study of lip prints and patterns. It was thought of as a method of person identification based on the characteristic arrangement of lines appearing on the red parts of the lips. Tsuchihashi named the wrinkles and grooves visible on the lips as 'Sulci Labiorum Rubrorum' [3,4] and the resulting pattern as 'FiguraLiniaLabiorumRubrorum' [3,4]. Lip prints are unique and do not change during a person's entire life. The lip prints of parents and children and those of siblings don't show any similarities. Lip prints have become a recognized form of evidence in modern criminalistics. It must be claimed that gender-specific diversity helps in sex-distinguishing proof and individual identity.

The word transgender has its roots in Greek, which implies “keeper of the bed” [7]. It can be gathered that Vedic culture perceived three sexual orientations. Transgender individuals, including eunuchs, encompass both male-to-female and female-to-male transitions. In the context of India, the term "hijra" is used for those who identify as neither fully male nor fully female. The term "kinnar," derived from Sanskrit, refers to this third gender category (Nanda, 1996). They are also known as eunuchs, transvestites, bisexuals, and commonly identified as gays (Lal, 1999). The Tamil Nadu government took the striking step of formally recognizing transgender individuals as a distinct sex in January 2008. The Department of Education has decided that government-funded colleges must reserve 30% of seats for transgender individuals, in addition to those reserved for women. The government has implemented several measures to support the transgender community, including addressing issues related to ration cards, providing free surgeries in public hospitals, and establishing a welfare board. For the first time, there is an official count of the transgender population in the country. According to the 2011 census, the total transgender population in India was 499,000. In terms of state-wise distribution, the highest percentage of transgender individuals, 28%, was reported in Uttar Pradesh, followed by 9% in Andhra Pradesh, 8% each in Maharashtra and Bihar, and over 6% in both Madhya Pradesh and West Bengal.[7]. Following the rules of the highest court, several transgender individuals who are experiencing health issues or accidents are struggling to receive proper diagnoses. Medical professionals in hospitals are finding it challenging to treat them due to legal frameworks and hospital policies. Additionally, it is difficult to categorize individuals as male or female, not only in healthcare settings but also in schools and other institutional departments.

### AIM & OBJECTIVES

To study the morphological pattern and classification of lip prints among males, females, and transgender individuals.

1. To compare lip prints of males, females, and transgender individuals.
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### MATERIALS AND METHODS

The study requires scotch tape that is 14 mm wide and 50 mm long for taking prints by dabbing it against the lips. This will be done using brightly colored lipstick applied by the participants. Additionally, A4-sized bond paper will be used to support the analysis. The tape will then be affixed to the bond paper along with the relevant details.



FIG1,2&3- Collection of samples by applying lipstick and taking the prints using the scotch tape and stuck it into the bond paper with the details of the participator’s name, age, sex etc.

### DISCUSSION

The current study involves a total sample of 300 participants, comprising 100 females, 100 males, and 100 transgender individuals. The samples were collected and classified according to the classification system developed by Tsuchihashi and Suzuki, which categorizes lip print patterns into five types. While numerous classifications have been proposed by researchers to differentiate various lip print patterns, this classification serves as the standard reference.

- Type 1- Long and complete vertical.
- Type 1<sup>1</sup>- Short or incomplete vertical.
- Type 2- Branched.
- Type 3- Intersecting.
- Type 4- Reticulate.
- Type 5- Mixed or indefinite

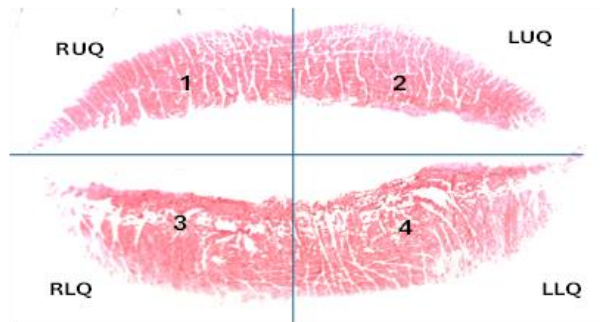


Fig 4 – Anatomical division of Quadrants of lip.

Type	Sex	RUQ	RLQ	LUQ	LLQ	Total	Percentage
I	Male	21	38	18	34	111	37%
	Female	33	69	31	30	163	54.3%
	Transgender	27	48	28	34	40	13.3%
I <sup>1</sup>	Male	4	17	7	20	48	16%
	Female	16	16	11	22	65	21.6%
	Transgender	7	17	13	23	19	6.3%
II	Male	33	32	38	32	135	45%
	Female	25	25	28	35	113	37.6%
	Transgender	35	35	35	40	50	16.6%
III	Male	41	25	31	26	127	42.3%
	Female	26	3	27	21	77	25.6%
	Transgender	23	17	18	8	15	5%
IV	Male	9	7	10	9	35	11.6%
	Female	23	8	21	12	64	21.3%
	Transgender	17	8	16	9	16	5.3%
V	Male	3	1	5	0	9	3%
	Female	1	0	0	0	1	0.3%
	Transgender	1	0	0	1	0	0%

**Table 1- Frequency of lip print pattern among subjects.**

The four quadrants illustrated in Fig. 4 above are as follows: the right upper quadrant (RUQ), the left upper quadrant (LUQ), the left lower quadrant (LLQ), and the right lower quadrant (RLQ). The anatomical subdivisions of these quadrants have been determined using lip prints. Everyone’s lips have been carefully examined, and the four quadrants have been evaluated separately for males, females, and transgender individuals.

Table 1 gives details regarding three gender groups—male, female, and transgender—and the numerous varieties of factors that differ by anatomical quadrants (RUQ, RLQ, LUQ, and LLQ). The total number of cases and relevant percentages are also included for each entry.

- Males: The most frequent pattern type is Type II (45%), followed by Type III (42.3%). Type V has the fewest cases (3%).
- Females: Type I is the most common pattern, representing 54.3% of cases, while Type V is rare (0.3%).
- Transgender: The highest occurrence was Type II (16.7%), while Type V had no recorded cases.

### Gender Comparisons

1. Type I: More prevalent in women (54.3%) than in men (37%), in addition to transgender people (13.3%). Among females, 69 cases of RLQ were quite frequent.
2. Type II: Males constitute the most significant percentage (45%), followed by females (37.7%) and transgender people (16.7%). Males and females show an approximately similar distribution across the quadrants, but transgender people indicate an average concentration in the RUQ and LLQ.
3. Type III: Transgender people have the lowest incidence of 5%), while men have a higher percentage (42.3%), followed by women (25.7%). Males have RUQ dominance, whilst females and transgender people show more evenly balanced distribution patterns
4. Type IV: Influences males (11.7%) and females (21.3%) in a similar manner, and transsexual people make up 5.3%. In all groups, the cases divide uniformly across the quadrants.
5. Type V: Rare across all groups, with no cases reported among transgender individuals.

### Key Observations

- While Type II prevails in males, Type I is more common in females.
- Males are prone to have Type III, notably in the RUQ.
- The prevalence of Type IV is more similar for men and women.
- Overall, Type V is the least frequent type.

RESEARCHER	YEAR	POPULATION OF STUDY	DOMINANT PATTERN IN MALES	DOMINANT PATTERN IN FEMALES
Sivapathasundram <sup>[14]</sup>	2001	Tamil Nadu	Type III	Type III
Vahanwala <sup>[1]</sup>	2005	Maharashtra	Type II	Type III
Gondivkar <sup>[26]</sup>	2009	Maharashtra	Type II	Type III
Sharma P et al <sup>[21]</sup>	2009	Uttar Pradesh	Type I Type 1 <sup>1</sup>	Type IV
Verghese at al <sup>[29]</sup>	2010	Kerala	Type IV	Type IV
S. Patel et al <sup>[12]</sup>	2010	Rajasthan	Type II	Type I
S Jaishankar <sup>[13]</sup>	2010	Tamil Nadu	Type I <sup>1</sup> , III, II	Type 1 <sup>1</sup> , III
Rohit M <sup>[10]</sup>	2011	Uttar Pradesh	Type I Type 1 <sup>1</sup>	Type IV Type V
P. Rastogi <sup>[19]</sup>	2013	Mangalore	Type I Type 1 <sup>1</sup>	Type II, III, IV, Type V

Dongarwar <sup>[24]</sup>	2013	Maharashtra	Type I Type 1 <sup>1</sup>	Type IV Type V
Koneru <sup>[28]</sup>	2013	Kerala& Manipur	Type I Type 1 <sup>1</sup>	Type IV Type V
M.KinraRamalingam <sup>[30]</sup>	2014	Rajasthan	Type I Type 1 <sup>1</sup> Type II	Type III Type IV
Nagrale <sup>[17]</sup>	2014	Maharashtra	Type III & IV	Type I, I <sup>1</sup> , II
Qudusia Sultana <sup>[23]</sup>	2014	Mangalore	Type III, IV	Type I, I <sup>1</sup> .
RachanaKaul <sup>[27]</sup>	2015	Karnataka	Type I	Type I
Neeti Kapoor	2015	Maharashtra	Type I	Type III
S. Bharathi <sup>[15]</sup>	2015	Tamil Nadu	Type 1 <sup>1</sup>	Type II
KesariAyushee <sup>[9]</sup>	2016	Maharashtra	Type III	Type I
Narmatha v <sup>[18]</sup>	2016	Manipal	Type III, IV	Type I, I <sup>1</sup> , II
Avanindra Kumar	2016	Bihar	Type IV	Type IV
RashmiNaik <sup>[6]</sup>	2016	Karnataka	Type II	Type III
P Kesarwani <sup>[16]</sup>	2017	Hazaribagh	Type I Type 1 <sup>1</sup>	Type IV Type V
Jeyaseelan A	2017	New Delhi	Type III, IV	Type III, IV
AanchalTandol <sup>[8]</sup>	2018	Uttar Pradesh	Type II	Type I
Sangameshwar M <sup>[20]</sup>	2018	Karnataka, Kerala, Manipuri.	Type III	Type I
SonalVahanwala <sup>[11]</sup>	2019	Mumbai	Type III	Type I, I <sup>1</sup> and II
Anju Devi <sup>[2]</sup>	2020	Rajasthan	Type III	Type III
Merry Pal Kaur <sup>[22]</sup>	2023	Punjab	Type III	Type III
CURRENT STUDY	2025	INDIAN POPULATION	Type II and III	Type I and II

**TABLE 2- Study shows the dominant pattern in males & females.**

Table 2 shows the highlights of the most prevalent anatomical patterns observed in both male and female populations during a two-decade period (2001–2025) of the research carried out in different regions of India. Significant trends in the distribution of morphological patterns by gender are shown

in the results.

### **Dominant Patterns in Males**

According to several studies, such as those conducted by Sivapathasundram (2001)<sup>[14]</sup>, Nagrale (2014)<sup>[17]</sup>, KesariAyushee (2016)<sup>[9]</sup>, SonalVahanwala (2019)<sup>[11]</sup>, etc. Type III is the most reported dominant pattern in males. Males also frequently exhibit type II, as revealed by studies such as Manipady (2001), Vahanwala (2005)<sup>[1]</sup>, and Gondivkar (2009)<sup>[26]</sup>. Many studies exhibit Type I, frequently paired with Type I<sup>1</sup>, as revealed by studies by Sharma P et al. (2009)<sup>[21]</sup>, Rohit M (2011)<sup>[10]</sup>, and P. Rastogi (2013)<sup>[19]</sup>. Despite Type IV being less common, it has been reported in a few studies, most notably those by Verghese et al. (2010) and Ravindra Kumar (2016).

### **Dominant Patterns in Females**

In line with multiple studies, especially Sivapathasundram (2001), Vahanwala (2005), and Anju Devi (2020)<sup>[2]</sup>, type III is the most frequent pattern in females. From studies such as S. Patel et al. (2010), KesariAyushee (2016), and SonalVahanwala (2019), type I is also prevalent in females. As reported by Verghese et al. (2010) and Rohit M. (2011), type IV is significant in places like Kerala and Uttar Pradesh, but it is documented in rare articles.

### **Unique Observations**

Occasionally noticed, Type V typically appears when mixed with other types. Studies by Dongarwar (2013)<sup>[24]</sup>, Koneru (2013)<sup>[28]</sup>, and P. Rastogi (2013) prove it. Mixed dominance patterns have been observed in several fields of study, like Type I<sup>1</sup>, Type III, and Type II were identified as co-dominant patterns by S. Jaishankar (2010)<sup>[13]</sup>. Both Type III and Type IV are prevalent patterns in males, as noted by Nagrale (2014). Males and females had an equivalent distribution of Type III and Type IV, as stated by Jeyaseelan A (2017).

### **Regional Trends:**

- Tamil Nadu consistently shows Type III as a dominant pattern in both genders, as reported in studies like Sivapathasundram (2001) and S Jaishankar (2010).
- Maharashtra displays a diverse pattern distribution, with Type II, Type III, and Type IV frequently reported.
- Karnataka shows a preference for Type II and Type III patterns across multiple studies.
- Uttar Pradesh reveals varying dominance patterns, with Type I and Type IV standing out.
- Rajasthan demonstrates a strong presence of Type III, particularly in the studies conducted by S. Patel et al (2010) and Anju Devi (2020).

**Comparative Analysis:** The comparison between Table 1 (Current Study) and Table 2 (Previous Research Analysis) reveals several noteworthy observations:

**Dominant Patterns in Males:** In Table 1, Type II (45%) and Type III (42.3%) are the most dominant patterns. In Table 2, Type III and Type II are frequently dominant across multiple studies, particularly in Maharashtra, Karnataka, and Tamil Nadu. Observation: Both datasets consistently highlight Type II and Type III as common patterns in males.

**Dominant Patterns in Females:** In Table 1, Type I (54.3%) is the most prominent pattern, followed by Type II (37.7%). In Table 2, Type I is also common in females, with some studies indicating Type III as a dominant pattern. Observation: While Type I is consistently dominant in both datasets, some regional variations exist in the prominence of Type III.

**Dominant Patterns in Transgender People:** Type II (16.6%) is the most common pattern identified in Table 1, which distinctly includes data on transgender individuals. The lack of transgender data in Table 2 highlights a gap in previous research. In comparison, Sonal (2016) conducted a study involving 30 transgender individuals and found a predominance of Type I and II patterns, which are typically associated with females. The lip-print patterns observed in transgender individuals were more like those

found in females than in males.

## **OBSERVATION**

Through bridging this knowledge to a vacuity bridging this knowledge to a broader context, the current study provides essential new insights into cheiloscopic patterns among transgender individuals. The current study offers crucial fresh insights underlying cheiloscopic patterns in transgender people. Rare Patterns: Across every category in both datasets, Type V is the least common pattern. The limited forensic value of Type V is evident due to its persistent scarcity.

## **CONCLUSION**

The comparative evaluation indicates that Type V is constantly very rare, while Types I, II, and III are frequent in males and females based on the present study and prior research. By incorporating transgender data and extensive quadrant-wise analysis, the current study strengthens its forensic value and offers fresh insights. The certainty of these cheiloscopic patterns is further reinforced by the extensive regional insights obtained from previous studies. Through combining the two data sets, the relevance of lip print patterns in forensic identification and population-centered analysis has been validated. The data clearly illustrated distinct regional and gender patterns in structural dominance. While both Type I and Type II patterns are significant, Type III is the pattern that is most documented across both genders. Variations in these patterns may be influenced by several factors, including regional healthcare practices, environmental conditions, and genetic differences.

The data reveals trends in the occurrence of conditions across anatomical quadrants that are specific to gender. Transgender people have a more even distribution and a lower total case count, but males and females reveal distinct traits in their dominant types. The information gained might guide treatment plans and targeted diagnostic techniques. The cheiloscopic experts have carried out several kinds of studies in the Indian subcontinent. Researchers were able to distinguish between males and females by observing their unique lip patterns. To promote inclusivity, they also advocate for recognizing the third gender in the study.

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