

# Assessment of Lip Print Pattern among the Population of Kota, Rajasthan

Neelam Gautam, Pallabi Samanta, Prashant Patel, Sheetal Sharma, Mukta Shelke, Geet Sood

Department of Oral Pathology and Microbiology, Daswani Dental College and Research Centre, Kota, Rajasthan, India.

## Abstract

**Objectives:** The objective of the study was to determine the predominant lip print type in Kota City of Rajasthan state. **Materials and Methods:** In this cross-sectional study, 100 subjects of both sexes (50 males and 50 females) aged between 25 and 40 years, whose family origins from Kota were studied. Young adults without any disease related to lips with normal lip mucosa were included in the study. The present study evaluates the pattern of lip print patterns among males and females, and the findings of the study are compared with the available data. **Results:** Out of the 100 lip print patterns studied, Type I (33%) was the most common pattern, followed by Type IV (26%) and Type V (4%) being the least common pattern. In males, Type IV, I, and II were 44%, 26%, and 4%, respectively, while in females, Type I was 40%, Type I' was 26%, and Type V was 4%. **Conclusion:** No two individuals have similar lip print impressions. Lip prints are unique to individuals and may help in personal identification. Each individual has unique lip prints, like fingerprints. Further studies with larger sample sizes are required to establish that lip prints are unique, like fingerprints, and can be used as a tool for identification in medicolegal cases.

**Keywords:** Cheiloscropy, Identification, Lip print, Medicolegal.

## INTRODUCTION

The wrinkles and grooves visible on the lips form the characteristic pattern of an individual and the imprints produced are termed as “lip print.” The study of these prints is known as “cheiloscropy.”<sup>[1]</sup> The grooves present on the human lips are unique to each person and can be used to determine identity.<sup>[2]</sup> The word cheiloscropy is derived from the Greek words “chelios” meaning “lips” and “skopein” meaning “see.” This biological phenomenon was first noted by anthropologists. R. Fischer was the first to describe it in 1902.<sup>[3]</sup> The pattern of lip print is unique to an individual<sup>[4]</sup> and thus can be used to fix the identity of a person.<sup>[5]</sup> Individual elements of vermilion zone patterns also contribute to the uniqueness of lip prints and thus help in individual identification. Coward suggested that the lip print patterns are genetically determined. The fact that these remain stable even after years, they are valuable as forensic research tools dealing with personal identification.<sup>[6]</sup> Cheiloscropy is similar to dactyloscopy as both are consistent and stable and allow establishing a classification, i.e., these imprints recover even after undergoing alterations, such as minor trauma, inflammation, and infections like herpes.<sup>[6,7]</sup> In countries, such as Poland and the USA, cheiloscropy has been used to identify criminals.<sup>[8,9]</sup> Tsuchihashi named the wrinkles and grooves present on the lips as “sulci labiorum rubrorum.”

Kazuo Suzuki and Yasuo Tsuchihashi (1971) devised their own classification of six different types of grooves, as shown in Table 1.<sup>[10]</sup> The previous work done in the past showed that different racial and ethnic groups show differences in the predominant lip print pattern. Hence, the present study was undertaken to determine the predominant lip print type in the Kota city of Rajasthan state.

## MATERIALS AND METHODS

The present cross-sectional study was conducted in the Department of Oral Pathology and Microbiology of Daswani Dental College and Research Center, Kota. Informed consent was taken on the consent form before selecting the subjects. A total of 100 subjects of both sexes (50 males and 50 females) aged between 25 and 40 years whose family origins from Kota were recruited in the study. Young adults without any disease

**Address for correspondence:** Neelam Gautam,  
Department of Oral Pathology and Microbiology, Daswani Dental College  
and Research Centre, Kota, Rajasthan, India.  
Email: dr.neelam77@gmail.com

**Received:** Apr. 15, 2024; **Accepted:** May. 24, 2024; **Published:** Jun. 10, 2024

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**How to cite this article:** Gautam N, Samanta P, Patel P, Sharma S, Shelke M, Sood G. Assessment of Lip Print Pattern among the Population of Kota, Rajasthan. J Res Adv Dent 2024;15(4):1-3.

### Access this article online

**Website:**  
[www.jrad.co.in](http://www.jrad.co.in)

**DOI:**  
<https://doi.org/10.53064/jrad.2022.15.4.524>

**Table 1: Suzuki and Tsuchihashi's classification of lip prints**

| Type | Description                                                    |
|------|----------------------------------------------------------------|
| I    | The clear-cut vertical grooves that run across the entire lips |
| I'   | Grooves similar to type I but do not cover the entire lip      |
| II   | Branched grooves (branching Y-shaped pattern)                  |
| III  | Criss-cross pattern                                            |
| IV   | Reticular patterns                                             |
| V    | Miscellaneous                                                  |

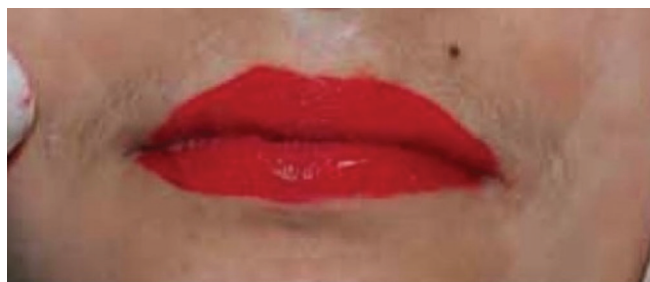
related to lips and with normal lip mucosa were included while subjects having any gross congenital deformities of lips (e.g., cleft lip) and those with any inflammation, allergic to the lipstick, and with any kind of disease were excluded from our study. Lip prints were recorded on white, non-absorbent bond paper. The general information of the subjects, such as age, sex, occupation, name, and signature, were recorded on the consent form.

### Armamentarium

A red-colored, non-glossy, non-metallic lipstick, cellophane tape or scotch tape, white bond paper, and magnifying lens.

### Lip print recording procedure

The subjects were asked to clean their lips thoroughly with soap and water and then dried with tissue paper. Then, starting at the midline and moving laterally, lipstick was applied uniformly on the lips. The glued portion of the cellophane tape strip was placed over the lips, and a lip impression was in the normal rest position of the lips by applying it in the center first and then applying uniform pressure toward the corner of the lips; The cellophane tape strip was carefully lifted from the lip from one end to the other, to avoid smudge of the print. The cellophane strip was then stuck to the white bond paper (A4 size) for permanent record purposes and then evaluated using a magnifying lens according to Suzuki and Tsuchihashi's classification.



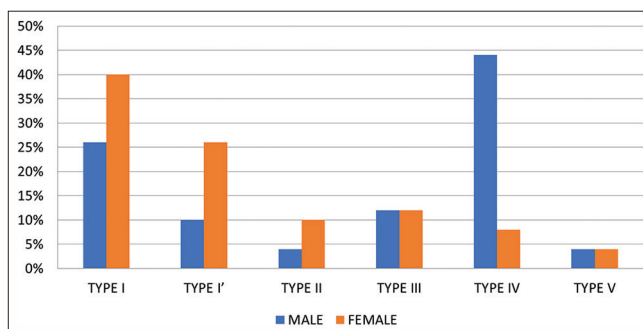
Application of lipstick and impression being taken on the glued surface of the cellophane tape.

### RESULTS

In the present study, we observed that no two lip impressions were similar, and none of the individuals had the same type of lip print pattern. The most prevalent pattern in males was Type IV (44%), followed by Type I (26%), whereas Type II (4%) was the least common variant. The most common lip print pattern in females

**Table 2: Distribution of type of lip prints**

| Lip print pattern | Males  |         | Females |         | Total  |         |
|-------------------|--------|---------|---------|---------|--------|---------|
|                   | Number | Percent | Number  | Percent | Number | Percent |
| Type I            | 13     | 26      | 20      | 40      | 33     | 33      |
| Type I'           | 5      | 10      | 13      | 26      | 18     | 18      |
| Type II           | 2      | 4       | 5       | 10      | 7      | 7       |
| Type III          | 6      | 12      | 6       | 12      | 12     | 12      |
| Type IV           | 22     | 44      | 4       | 8       | 26     | 26      |
| Type V            | 2      | 4       | 2       | 4       | 4      | 4       |

**Graph 1: Gender-wise distribution of type of lip prints**

was Type I (40%), followed by Type I' (26%), whereas Type V (4%) was the least common variant. Overall, Type I (33%) was most prevalent, followed by Type IV (26%), whereas Type V (4%) was the least common pattern (Table 2 and Graph 1).

### DISCUSSION

Cheiloscopy is an upcoming tool for the identification of a person's lip print. The most common lip print pattern found in our study was Type I. Various studies carried out in India, done by Sivapathasundharam *et al.*,<sup>[11]</sup> Gondivkar *et al.*,<sup>[12]</sup> and Saraswathi *et al.*,<sup>[13]</sup> showed type III as the predominant type, whereas studies by Sharma *et al.*,<sup>[14]</sup> and Verghese and Mestri<sup>[15]</sup> showed type IV as the predominant type.

In the present study, we observed that no two lip impressions were similar, and none of the individuals had the same type of lip print pattern. The most prevalent pattern in males was Type IV (44%), followed by Type I (26%), whereas Type II (4%) was the least common variant. The most common lip print pattern in females was Type I (40%), followed by Type I' (26%), whereas Type V (4%) was the least common variant. Overall, Type I (33%) was most prevalent, followed by Type IV (26%), whereas Type V (4%) was the least common pattern.

A study conducted by Y. Tsuchihashi found that no lip print showed the same pattern in the investigation of 1364 Japanese subjects (757 males and 607 females) 3–60 years old. The observation of the lip prints of 49 pairs of uniovular twins resulted in the finding that although the lip print patterns of the uniovular twins are duplicates, in detail, no two of them are exactly identical.<sup>[16]</sup>

A study conducted by Alzapur *et al.* found that lip prints of study participants did not match each other. The result validates

that lip prints are unique as that of fingerprints and therefore have forensic importance. The study showed that the Type I lip pattern was the most common.<sup>[17]</sup>

A study conducted by Rao and Kiran found Type IV lip print patterns to be the most common in males and Type I in females. Type I patterns predominated in the overall sample, followed by Type I'. Results revealed that the pattern of lip prints was unique to each and every individual.<sup>[18]</sup>

A study conducted by Sandhu *et al.* found that no two lip prints matched with each other. Type 1 pattern (vertical grooves that run across the entire lip) was found to be predominant in both males (51.02%) and females (43.47%), and there was no statistically observed difference between males and females in individual lip print types.<sup>[19]</sup>

The result of the present study coincides with other studies<sup>[16-19]</sup> done in the past. The variation in prevalence can be explained by the ethnic and racial differences of the several cohort studies. Cheiloscopy can be used as an identification tool in the fields of forensic medicine and dentistry.

## CONCLUSION

No two individuals have similar lip print impressions. Lip prints are unique to individuals and may help in personal identification. Each individual has unique lip prints, like fingerprints. Further studies with larger sample sizes are required to establish that lip prints are unique, like fingerprints, and can be used as an aid in solving medicolegal cases.

## REFERENCES

- Chandrakala J, Suganya G, Yadava TS, Doddawad V, Nagarathna J, Kalavathi M. Lip print patterns: Similarities among the parents and their children. *J Oral Maxillofac Pathol* 2022;26:134.
- Nandy A. Principles of Forensic Medicine. 2<sup>nd</sup> ed. Calcutta: New Central Book Agency; 2003. p. 100-1.
- Kasprzak J. Possibilities of cheiloscopy. *Forensic Sci Int* 1990;46:145-51.
- Verghese AJ, Somasekar M, Babu RU. A study on lip print types among the people of Kerala. *J Indian Acad Forensic Med* 2010;32:6-7.
- Goonerathne I. Establishing lip print analysis/Cheiloscopy in Sri Lanka and its forensic use. *Sri Lanka J Forensic Med Sci Law* 2011;1:28-9.
- Coward RC. The stability of lip pattern characteristics over time. *J Forensic Odontostomatol* 2007;25:40-56.
- Ashwinirani SR, Suragimath G, Sande AR, Kulkarni P, Nimbal A, Shankar T, *et al.* Comparison of lip print patterns in two Indian subpopulations and its correlation in abo blood groups. *J Clin Diagn Res* 2014;8:ZC40-3.
- Kasprzak J. Cheiloscopy. In: Siegel JA, Pekka SJ, Geodfrey CK, editors. *Encyclopedia of Forensic Sciences*. 1<sup>st</sup> ed. Warsaw: Academic Press; 2000. p. 358-61.
- Ball J. The current status of lip prints and their use for identification. *J Forensic Odontostomatol* 2002;20:43-6.
- Ahuja P, Butani TP, Dahiya MS. Cheiloscopy: A study on lip print patterns among the Gujarati population. *Indian J Forensic Med Toxicol* 2018;12:1148.
- Sivapathasundharam B, Prakash PA, Sivakumar G. Lip prints (Cheiloscopy). *Indian J Dent Res* 2001;12:234-7.
- Gondivkar SM, Indurkar A, Degwekar S, Bhowate R. Cheiloscopy for sex determination. *J Forensic Dent Sci* 2009;1:56-60.
- Saraswathi TR, Gauri M, Ranganathan K. Study of lip prints. *J Forensic Dent Sci* 2009;1:28-31.
- Sharma V, Ingle NA, Kaur N, Yadav P. Identification of sex using lip prints: A clinical study. *Journal of International Society of Preventive and Community Dentistry*. 2014 Dec 1;4(Suppl 3):S173-7.
- Verghese AJ, Mestri SC. A study of efficacy of lip prints as an identification tool among the people of Karnataka in India. *J Indian Acad Forensic Med* 2011;33:200-2.
- Tsuchihashi Y. Studies on personal identification by means of lip prints. *Forensic Sci* 1974;3:233-48.
- Alzapur A, Nagothu RS, Nalluri HB. Lip prints-a study of its uniqueness among students of MediCiti medical college. *Indian J Clin Anat Physiol* 2017;4:68.
- Rao GV, Kiran G. Assessment of lip print pattern in South Indian population-role in forensic medicine. *Asian Pac J Health Sci*. 2016;3:224-7.
- Sandhu SV, Bansal H, Monga P, Bhandari R. Study of lip print pattern in a Punjabi population. *J Forensic Dent Sci* 2012;4:24-8.