

Original Research

Assessment of lip print patterns and palatal rugae pattern in gender determination

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ABSTRACT:

Background: Rugoscopy is the study of palatal rugae pattern. The present study was conducted to assess lip prints and palatal rugae pattern in males and females. **Materials & Methods:** 90 subjects of both genders were enrolled. The lip prints were analysed using the classification proposed by Tsuchihashias. The rugae patterns were assessed using the classification proposed by Thomas & Kotze. **Results:** Out of 90 subjects, males were 40 and females were 50. Type 1 was seen in 45% and 27%, type 1' in 28% and 14%, type 2 in 10% and 35%, type 3 in 7% and 5%, type 4 in 2% and 4% and type 5 in 8% and 15% males and females respectively. Common type of palatal rugae were curved seen in 65% males and 23% females, straight in 20% males and 55% females and wavy in 15% males and 22% females. The difference was significant ($P < 0.05$).

Conclusion: In males predominate type of lip print was type 1 and in females was type 2. In males, predominate type of palatal rugae was curved and in females was straight.

Key words: lip print, palatal rugae, Rugoscopy

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INTRODUCTION

The study of lip prints is known as cheiloscopy and is derived from the Greek word cheilos meaning "lips" and eskopein meaning "to seen." The wrinkles and grooves present on the lip were designated as "sulci labiorum rubrorum" by Suzuki and Tsuchihashi in 1970. Lip prints are seen to remain same for an individual throughout his/her life unless scarring occurs due to a pathosis, a trauma, or due to any surgical procedure.¹ By analyzing the imprints of lips left at the crime scene and their comparison with the suspects, investigating personnel can place the culprit at the crime scene and in a mass disaster also can give a positive match.² The lip prints, being uniform throughout life and it is the characteristic to a person, it can be used to verify the presence or absence of a

person from the crime, provided there has been consumption of beverages, drinks, usage of cloth, tissues or napkin etc., at the crime scene. However, studying in-depth and establishing further facts and truth in lip prints will certainly help as useful evidence in crime investigation.³

Rugoscopy is the study of palatal rugae pattern. The prime importance of studying rugae patterns is that they are permanent, due to normal growth remaining in the same position throughout the entire life of a person they do not undergo any changes except in length. Several studies have shown that rugae patterns can be used as an additive tool for gender determination and in population identification.^{4,5} The present study was conducted to assess lip prints and palatal rugae pattern in males and females.

MATERIALS & METHODS

The present study comprised of 90 subjects of both genders. The written consent was obtained from all enrolled one.

Data such as name, age, gender etc. was recorded. All were explained regarding the study. Lips of subjects were cleaned, and then the lipstick was applied all over the lips. The impression of the lips was traced by applying a rectangular piece of cellophane tape over the lips of the subjects. Then the lip impression was transferred to the white chart paper and then visualized using the magnifying lens. The lip prints were analysed using the classification proposed by Tsuchihashias as type 1: Clear-cut vertical grooves

that run across the entire lips, type 1': similar to type 1, but do not cover the entire lip, type 2: branched grooves, type 3: intersected grooves, type 4: reticular grooves, type 5: grooves do not fall into any of the above categories.

The rugae patterns were assessed using the classification proposed by Thomas & Kotze as curved: crescent shaped and curved gently, wavy: slight curve at the origin or termination of curved rugae and straight: run directly from their origin to termination. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 90		
Gender	Males	Females
Number	40	50

Table I shows that out of 90 subjects, males were 40 and females were 50.

Table II Assessment of lip prints

Lip prints	Males	Female	P value
type 1	45%	27%	0.05
type 1'	28%	14%	
Type 2	10%	35%	
Type 3	7%	5%	
Type 4	2%	4%	
Type 5	8%	15%	

Table II, graph I shows that type 1 was seen in 45% and 27%, type 1' in 28% and 14%, type 2 in 10% and 35%, type 3 in 7% and 5%, type 4 in 2% and 4% and type 5 in 8% and 15% males and females respectively. The difference was significant (P< 0.05).

Graph I Assessment of lip prints

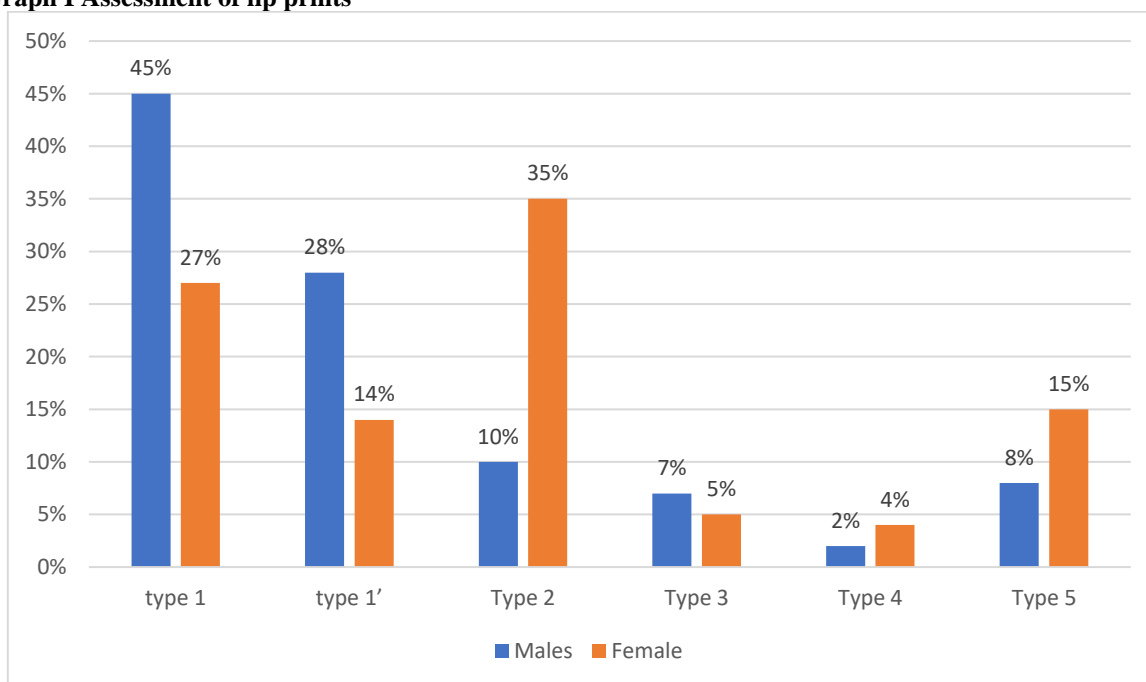
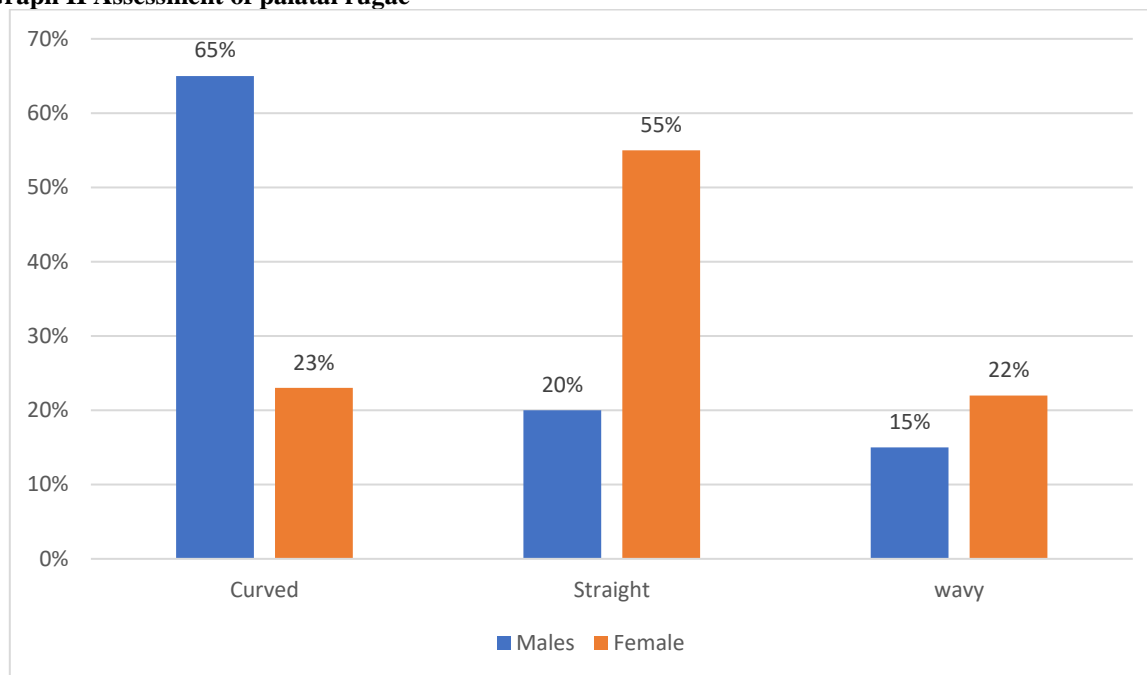


Table III Assessment of palatal rugae

Palatal rugae	Males	Female	P value
Curved	65%	23%	0.02
Straight	20%	55%	0.01
wavy	15%	22%	0.05

Table III, graph II shows that common type of palatal rugae were curved seen in 65% males and 23% females, straight in 20% males and 55% females and wavy in 15% males and 22% females. The difference was significant ($P < 0.05$).

Graph II Assessment of palatal rugae



DISCUSSION

Lip prints have a great significance in medico-legal issues. Identification plays a major role in any criminal investigation. The external surface of lips has many elevations and depressions forming a characteristic pattern called lip prints, examination of which is known as cheilioscopy.⁶ The lip prints are unique and distinguishable for every individual like fingerprints. The indispensable role of forensic odontologists is to identify the distinctive features of the diverse anatomy prevailing in the head-and-neck region. The maxillofacial region is unique in its presentation of hard- and soft-tissue structures and its characteristics.⁷ By reviewing literature, it can be specified that forensic dentistry works with the two objectives; post-mortem identification of an individual and identification of the culprit from evidences that may be left.^{8,9} The present study was conducted to assess lip prints and palatal rugae pattern in males and females.

We found that out of 90 subjects, males were 40 and females were 50. Mani et al¹⁰ assessed the predominant type of lip print and tongue print and to correlate the lip print with tongue print in identification of gender. This study was carried out with fifty individuals (25 males and 25 females). For each individual, lip prints were recorded using a

dark-colored lipstick and analyzed according to Suzuki and Tsuchihashi classification, and the tongue impression was recorded by making alginate impression and being preserved using the alginate molding. Type 3 pattern in males and Type 1 pattern in females were the predominant lip patterns. In tongue, the physiological texture, pentagonal shape, scrotal tongue in 8% and blunt apex were the predominant features in males whereas ovoid shape with sharp lingual apex were seen predominantly in females. A statistically significant correlation was found between the lip print and tongue print with.

We found that type 1 was seen in 45% and 27%, type 1' in 28% and 14%, type 2 in 10% and 35%, type 3 in 7% and 5%, type 4 in 2% and 4% and type 5 in 8% and 15% males and females respectively. Desai et al¹¹ included 90 subjects 30 Karnataka, 30 Kerala and 30 Tamil nadu subjects. Each group consisted of 15 males & 15 females in the age group of 18 to 30 years. Each individual's lip prints, palatal rugae & tongue prints were studied using classifications given by Tsuchihashi, Lysell and Stefanescu et al. respectively. Results Type 3 lip print was found to be the most predominant among males and Type 1 in females in all the three populations. The major rugae shape among males was wavy and in females it was straight in all the three population. The U- shaped

tongue was predominant among males and V- shaped among females and the longitudinal grooves showed no significant difference among males and females and between the states

We observed that common type of palatal rugae were curved seen in 65% males and 23% females, straight in 20% males and 55% females and wavy in 15% males and 22% females. Srinivasulu et al¹² showed type-1 (vertical groove running across the lip) is the most common pattern present in all the quadrants of the lip in both males and females. In the left upper quadrant, it is found to be 51.4%, followed by 37.1% in the left upper right quadrant, 49.3% in the lower left quadrant and 53.6% in the lower right quadrant. Type-2 pattern (vertical partial length groove) is the second common pattern, in the upper left quadrant, it is 37.1%, in the upper right 42.1%, in the lower-left 34.3% and lower right quadrant 27.9%. Type-3 (Branched groove) observed as the third common pattern in the study population, in the upper left quadrant it is 11.4%, upper right 18.6%, lower left 15.7%, lower right quadrant 17.9%. Type-5 (Reticular pattern) is noticed in the upper right quadrant in 1.4%, lower left 0.7%, lower right 0.7% and not found in the upper left quadrant. The type-6 pattern is found upper right quadrant in 0.7% of study population and Type-4 pattern (intersected groove) is not found in our study group. Study revealed that the pattern of lip prints for each individual in each quadrant is unique. According to our study, there is no sex difference with lip print patterns. Study also revealed that there is no relation between lip print patterns and the blood groups, a near significant relation observed with the chi-square test in one quadrant, but not considered as significant.

CONCLUSION

Authors found that in males predominate type of lip print was type 1 and in females was type 2. In males, predominate type of palatal rugae was curved and in females was straight.

REFERENCES

1. Manikya S, Sureka V, Prasanna MD, Ealla K, Reddy S, Bindu PS. Comparison of cheiloscopia and rugoscopy in Karnataka, Kerala, and Manipuri population. *J Int Soc Prevent Communit Dent* 2018;8:439-45.
2. Musa OA, Elsheikh TE, Hassona ME. Tongues: Could they also be another fingerprint? *Indian J Forensic Med Toxicol.* 2014;8:171-5.
3. Radhika T, Jeddy N, Nithya S. Tongue prints: A novel biometric and potential forensic tool. *Journal of Forensic Dental Sciences.* 2016;8(3):117-119.
4. Saxena S, Sharma P, Gupta N. Experimental studies of Forensic Odontology to aid in the Identification process. *Journal of forensic dental sciences* 2010; 2(2): 69-76.
5. Rastogi P, Parida A. Lip prints - An aid in identification. *Aust J Forensic Sci* 2012;44:109-116.
6. Paliwal A, Wanjari S, Parwani R. Palatal rugoscopy: Establishing identity. *J Forensic Dent Sci* 2010;2:27-31.
7. Mathew SA, Kasim K, Mrudula K, Jayashekeran. Establishing identity using cheiloscopia and palatoscopy. *Sch J Dent Sci* 2016;3:74-80.
8. Hunasgi S, Koneru A, Gottipati H, Vanishree M, Surekha R, Manikya S. Comparison of lip prints, palatal rugae with blood groups in Karnataka and Kerala population. *Journal of Advanced Clinical & Research Insights* 2014; 1: 83-88.
9. Sivapathasundharam B, Prakash PA, Sivakumar G. Lip prints (Cheiloscopia) *Indian J Dent Res.* 2001;12:234-7.
10. Mani M S, Ahamed Y, Dhandapani P, Sivaraman G, Ambiga P, Balan N. Comparative assessment of lip print and tongue print in gender determination: A cross-sectional study. *Int J Forensic Odontol* 2021;6:60-4.
11. Desai D, Christopher GS. Comparison of Lip Prints, Rugae Pattern and Tongue Prints among Karnataka, Kerala and Tamil Nadu Population—A Short Study. *International Journal of Innovative Science and Research Technology* 2019; 1182-87.
12. Srinivasulu K, Katikaneni PS, Abbagoni V, Popuri SB, Reddy TR. Study on Pattern of Lip Prints and its Relation to Sex and Blood Groups in Telangana Population. 2020 Oct;20(4):292.